

# 7. Refinement of the concept design, detailed design and construction of the proposed upgrade

## 7.1 Project delivery

The project delivery method would be decided by the RTA following approval of the proposed upgrade. Options for project delivery may include:

- Design by the RTA or a consultant to the RTA, followed by competitive tendering by contractors for a construction-only contract.
- Design and construction contract awarded after competitive tendering to select a contractor with a design team.
- Design, construct and maintain contract with maintenance for a specified period of time.
- Alliance contract awarded to a consortium of companies to team with the RTA to design and construct the proposed upgrade.

The proposed upgrade concept design and environmental assessment were not predicated on any particular contract packaging, delivery or construction method. If the proposed upgrade proceeds, the RTA would consider the options for project delivery, and select and implement the most suitable delivery method in compliance with the Environmental Assessment and the conditions of approval.

The RTA would be responsible for overseeing the construction, including inspections, monitoring and auditing works performed by the contractor(s).

For the purpose of this Environmental Assessment, a possible construction method and staging of construction are described in Section 7.3. The approximate extent of construction is shown in Figure 7-1.

## 7.2 Refining the concept design and detailed design

### 7.2.1 General

The concept design on which this Environmental Assessment is based, is an initial functional layout developed as part of the concept design and environmental assessment phase. It addresses and responds to all constraints and principles identified during investigations. The concept design is intended to define a robust and buildable concept that provides:

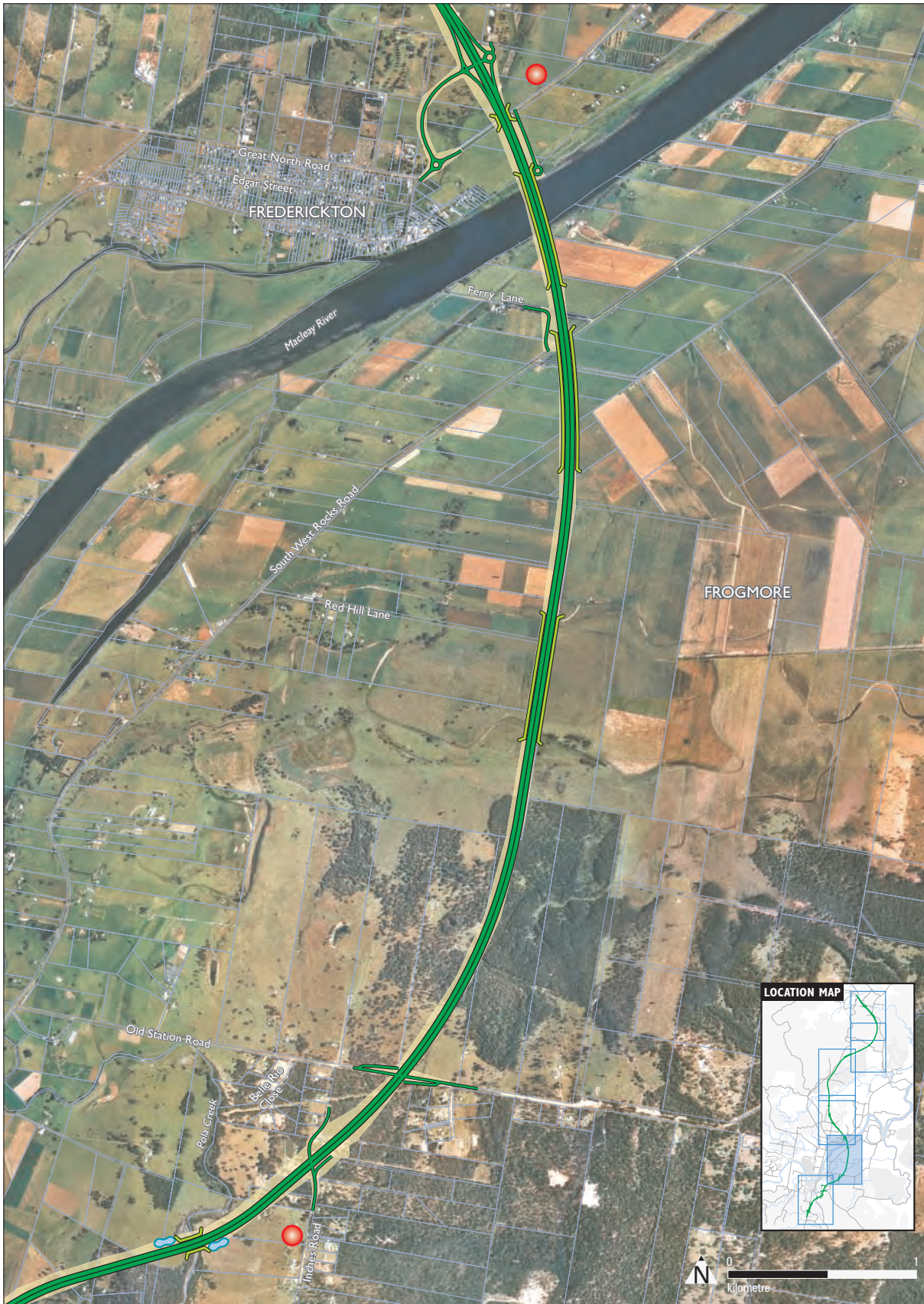
- A definition of property acquisition requirements sufficient to allow acquisition to proceed.
- A clear description of the design principles, extent of impacts and impact mitigation requirements.
- A sound and clear basis for later development of the detailed design to a standard required to support project delivery.

Figure 7-1a Approximate extent of construction and construction features



- The proposed upgrade
- Construction footprint
- Ancillary area
- Sedimentation basin (temporary and permanent)

Figure 7-1b Approximate extent of construction and construction features



- The proposed upgrade
- Construction footprint
- Ancillary area
- Sedimentation basin (temporary and permanent)

Figure 7-1c Approximate extent of construction and construction features

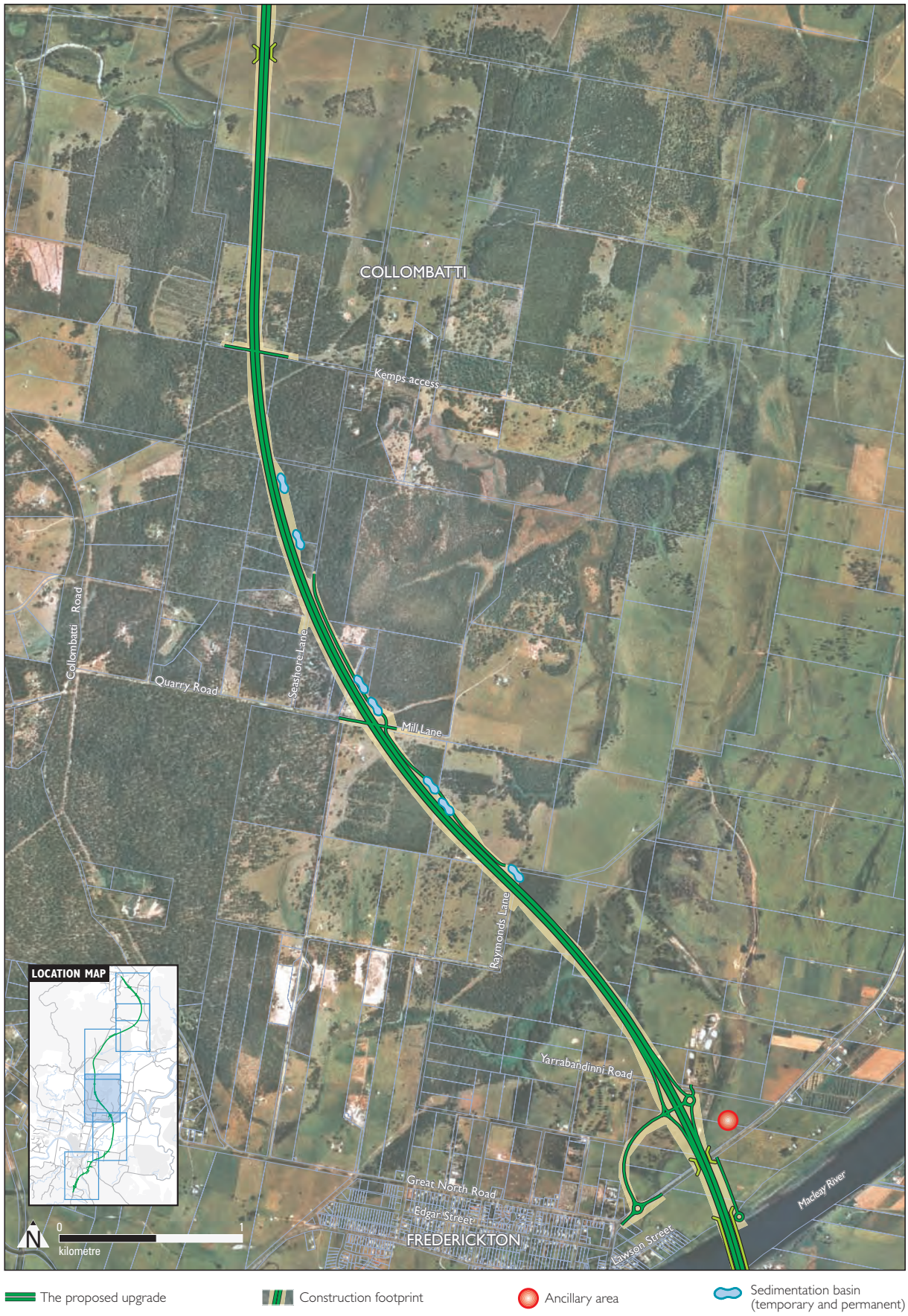
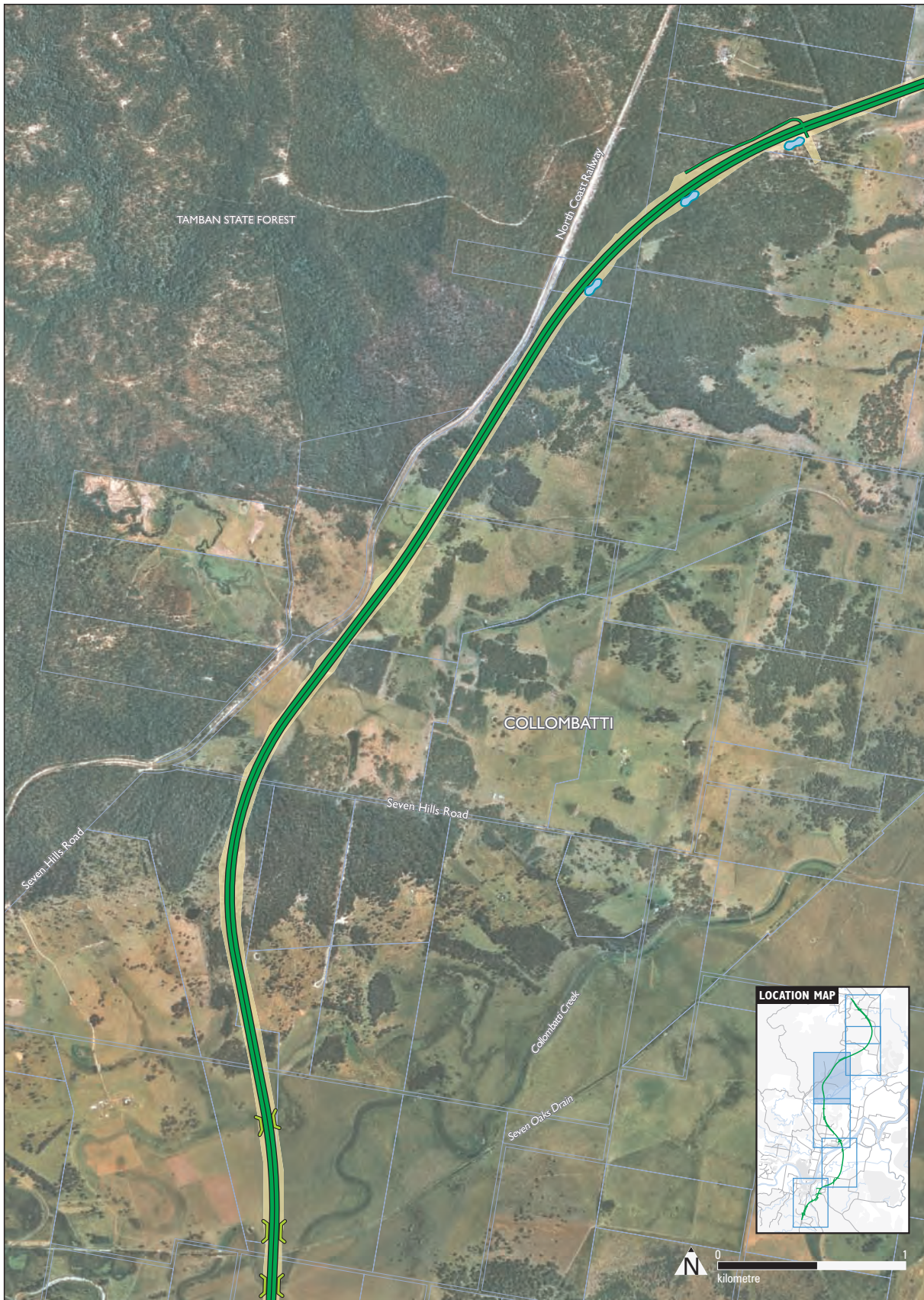


Figure 7-1d Approximate extent of construction and construction features



- The proposed upgrade
- Construction footprint
- Sedimentation basin (temporary and permanent)

Figure 7-1e Approximate extent of construction and construction features



 The proposed upgrade

 Construction footprint

 Ancillary area


Figure 7-1f Approximate extent of construction and construction features



 The proposed upgrade

 Construction footprint

 Ancillary area

 Sedimentation basin (temporary and permanent)

Should the proposed upgrade be approved and the Chief Executive of the RTA determines that the project should proceed, the RTA would procure tenders for the detailed design and/or construction of the proposed upgrade, depending on the method of project delivery selected. However, prior to calling for tenders for this work, the RTA may undertake further refinement of the concept design for the proposed upgrade.

The detailed design would only be undertaken if the proposed upgrade is approved, and would take into account environmental constraints and mitigation measures identified in this Environmental Assessment. – Matters raised in submissions would be considered and could result in adjustments to the concept design as a condition of approval for the proposal. In addition, alternative approaches derived from improved knowledge prior to detailed design may be proposed in relation to elements of the concept design. Consequently, the detailed design may vary from the concept design described in Chapters 6 and 7 of this Environmental Assessment.

The detailed design phase of the proposed upgrade would involve detailed survey, geotechnical investigations, as well as the design activities described above, prior to the commencement of construction. During this phase, the RTA would also commence negotiations with affected landholders with regard to property acquisition and property adjustments, where required.

### 7.2.2 Key issues for detailed design

The detailed design of the proposed upgrade would be guided by the key principles developed during the concept design and environmental assessment phase. The development of the detailed design would be required to:

- Be consistent with the design criteria and design principles on which the concept design was based, as described in the Environmental Assessment and any subsequent Submissions Report.
- Address any unresolved issues associated with the development of the concept design proposed in the Environmental Assessment and any subsequent Submissions Report.
- Meet any Conditions of Approval arising from the approval process under Part 3A, unless changes to the Conditions of Approval are subsequently agreed.
- Incorporate community and government agency requirements by the implementation of a consultation plan to identify and resolve further concerns raised by the community and other stakeholders.
- Avoid identified environmentally sensitive areas and significant species wherever possible.
- Develop and refine mitigation measures.
- Appropriately develop and incorporate the urban design strategy and landscape concept plan.
- Establish detailed proposals for construction delivery method and construction staging addressing buildability, traffic capacity and safety during construction, geotechnical issues, all relevant RTA specifications and design requirements, current guidelines and policies, and practicality/cost-effectiveness.
- Address risk management during construction and operation.
- Provide a level of definition sufficient to support a construction contract that will meet all RTA's requirements for the completed highway upgrade.
- Ensure that the detailed design allows for safe and cost-effective maintenance of the proposed upgrade during operation in accordance with Occupational Health and Safety requirements and relevant RTA specifications.



## 7.3 Construction approach

### 7.3.1 Construction activities

A summary of the likely construction phases and activities for the proposed upgrade is provided in Table 7-1.

**Table 7-1 Summary of construction components and activities**

Component	Activities
Procurement, award and environmental management system set up	<ul style="list-style-type: none"> <li>• Tendering.</li> <li>• Award of contract.</li> <li>• Environmental management plans, licences and approvals.</li> </ul>
Site establishment	<ul style="list-style-type: none"> <li>• Site set out.</li> <li>• Site compounds and other ancillary sites (batch plants, crushing plants, pug mills, stockpile and storage sites, launching site/ramp for river crossing).</li> <li>• Initial environmental safeguards.</li> </ul>
Frederickton levee	<ul style="list-style-type: none"> <li>• Construction of the Frederickton levee.</li> </ul>
Relocation of services	<ul style="list-style-type: none"> <li>• Identification and consultation.</li> <li>• Relocation.</li> </ul>
Site preparation	<ul style="list-style-type: none"> <li>• Clearing and grubbing.</li> <li>• Mulching.</li> <li>• Stripping and stockpiling of topsoil, spoil and unsuitable material.</li> <li>• Construction access.</li> </ul>
Structures for drainage, fish, fauna and vehicles	<ul style="list-style-type: none"> <li>• Bridges and underpasses.</li> </ul>
Earthworks	<ul style="list-style-type: none"> <li>• Pre-loading on soft soils.</li> <li>• Cuttings.</li> <li>• Fill embankments.</li> <li>• Select zones.</li> <li>• Batter treatments.</li> </ul>
Drainage	<ul style="list-style-type: none"> <li>• Cross culverts.</li> <li>• Highway drainage.</li> <li>• Water quality basins.</li> </ul>
Interchanges and highway connections	<ul style="list-style-type: none"> <li>• Southern tie-in.</li> <li>• South Kempsey interchange.</li> <li>• Frederickton interchange.</li> <li>• Stuarts Point Road interchange.</li> <li>• Eungai Rail at-grade access.</li> <li>• Northern tie-in.</li> </ul>
Other works	<ul style="list-style-type: none"> <li>• Pavement construction.</li> <li>• Batching plants.</li> <li>• Flora and fauna measures.</li> <li>• Landscaping.</li> <li>• Noise barriers.</li> <li>• Safety barriers.</li> <li>• Lighting, linemarking and signposting.</li> </ul>
Ancillary works	<ul style="list-style-type: none"> <li>• Upgrade of local roads.</li> <li>• Property access.</li> <li>• Existing highway works.</li> <li>• Batching plants, crushing plants, pug mills, stockpile and storage sites.</li> </ul>
Finishing works	<ul style="list-style-type: none"> <li>• Remove temporary works.</li> <li>• Restore and landscape temporary sites.</li> </ul>

**Note:** These activities would be subject to refinement during detailed design.

The construction period for the proposed upgrade is anticipated to be approximately 4 years. An indicative program of activities is provided in Figure 7-2.

### 7.3.2 Construction staging and traffic management

The proposed upgrade would be constructed either in its entirety or in stages. One of the staging options could comprise:

- A southern section, which would start south of Kempsey and join the existing highway north-east of Frederickton.
- A northern section, which would start at the existing highway north-east of Frederickton and finish at the dual carriageways north-east of Eungai Rail.

If each stage was to be constructed under a different contract and at a different time, the southern stage would most probably be constructed first, as this section would provide a bypass for the towns of Kempsey and Frederickton. If the southern stage was constructed initially as a single contract, then temporary works would be required to connect the proposed upgrade to the existing highway at Frederickton.

The RTA has also considered the option of a potential single carriageway bypass of Kempsey in the short term to remove traffic from the Kempsey and Frederickton town centres.

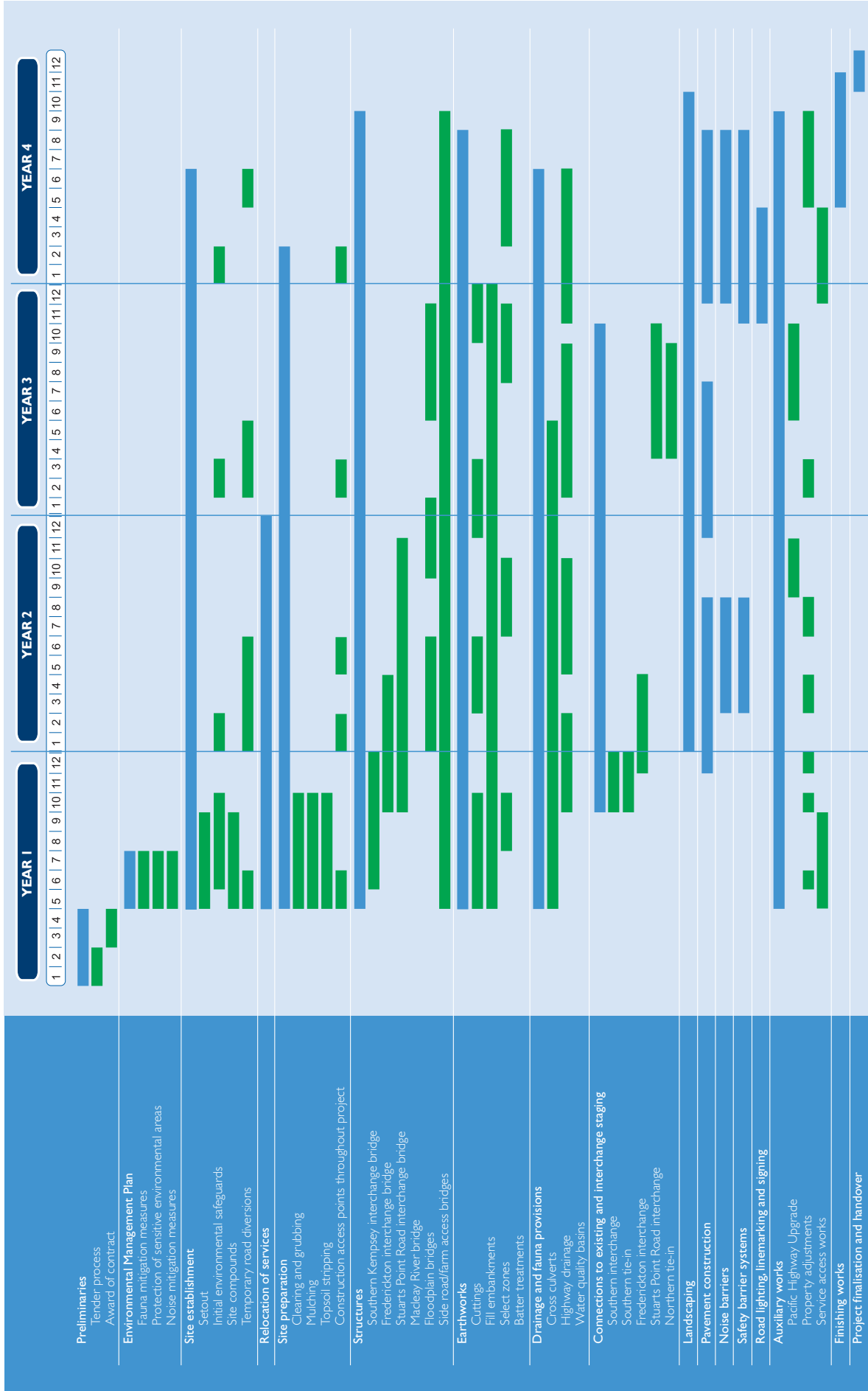
Regardless of whether the project is staged or not, the sequence of the project construction would be very similar. It is proposed that the upgrade is generally constructed away from highway and local traffic and that, wherever possible, construction traffic would not use public roads.

To allow construction to be completed efficiently, services would be relocated prior to commencement of any major earthworks. The services that would require relocation are described in Section 6.5.1.

Another critical factor in the construction of the proposed upgrade is the method adopted for the construction of embankments across the floodplains and soft soils. The method adopted by the contractor would significantly influence embankment settlement time and, therefore, the duration of construction activities.

One potential construction staging option is described in Table 7-2.

Figure 7-2 Indicative construction program



Note: This program would be subject to refinement during detailed design.

**Table 7-2 Potential construction staging**

Stage 1
<p><b>Southern section</b></p> <p><b>Construction works:</b></p> <ul style="list-style-type: none"> <li>The Frederickton levee would be constructed prior to commencing any earthworks across the floodplain.</li> <li>The South Kempsey interchange would be constructed in three stages, with most of the structure and roadworks to the east of the existing Pacific Highway constructed without disturbance to the public. Temporary pavement at Stations (-)700 and 500 would then allow traffic to be switched onto the new road, and the remainder of the construction would commence, and be completed in one more final stage.</li> <li>The proposed northbound and southbound carriageways would be constructed between Stations 700 and 13 000:                     <ul style="list-style-type: none"> <li>Wick drains would be installed across the Macleay River floodplain as the Frederickton levee is constructed.</li> <li>During the construction of the northbound and southbound carriageways, all of the local roads would be constructed. Generally, these local roads would be constructed by initially diverting traffic onto temporary access tracks around the works before constructing the final works.</li> </ul> </li> <li>A temporary crossover would be constructed between the existing northbound and southbound carriageways at Stations (-) 800 to (-) 700.</li> </ul> <p><b>Traffic arrangements:</b></p> <ul style="list-style-type: none"> <li>Traffic would remain on the existing highway through this section.</li> </ul>
<p><b>Northern Section</b></p> <p><b>Construction works:</b></p> <ul style="list-style-type: none"> <li>The proposed northbound and southbound carriageways would be constructed between Stations 13 000 and 35600:                     <ul style="list-style-type: none"> <li>As per the southern section, local roads would be constructed by initially diverting traffic onto temporary access tracks around the works before constructing the final works.</li> </ul> </li> <li>A southbound carriageway would be constructed between Station 35900 and the existing pavement stub at Station 40600.</li> <li>A service road would be constructed between Stations 35600 and 39400 (east of the proposed upgrade).</li> <li>A service road would be constructed between Stations 34600 and 36280 (west of the proposed upgrade).</li> <li>Southbound on and off-ramps would be constructed at the Stuarts Point Road interchange.</li> <li>A temporary crossover would be constructed between the existing highway at Station 35700 and the proposed southbound carriageway at Station 36050.</li> <li>A temporary crossover would be constructed between the existing northbound carriageway at Station 39800 and the existing southbound carriageway at Station 39650.</li> <li>The Frederickton interchange would be constructed, including bridge, embankments and approach road.</li> </ul> <p><b>Traffic arrangements:</b></p> <ul style="list-style-type: none"> <li>Traffic would remain on the existing highway through this section.</li> </ul>
Stage 2
<p><b>Southern section</b></p> <p><b>Construction works:</b></p> <ul style="list-style-type: none"> <li>The southbound carriageway would be constructed between Stations (-) 700 Station 700.</li> <li>At the South Kempsey interchange, road works to the east of the interchange would be constructed.</li> <li>A crossover would be constructed between the proposed southbound carriageway at Station 500 and the existing highway at Station 650.</li> <li>A crossover would be constructed between the proposed southbound carriageway at Station (-) 650 and the existing highway at Station (-) 700.</li> </ul> <p><b>Traffic arrangements:</b></p> <ul style="list-style-type: none"> <li>Northbound and southbound traffic between Stations (-) 800 and 500 would be diverted onto the existing northbound carriageway (one lane each way).</li> <li>North of Station 700, traffic would use the existing highway into Kempsey.</li> </ul>

**What is a temporary crossover?**

A temporary crossover is a section of road that is required to allow the proposed upgrade to be constructed (e.g. when permanent works are to be constructed over the existing road). The crossover facilitates a diversion of traffic around worksites.

### Northern section

#### Construction works:

- The northbound carriageway would be constructed between Stations 35600 and 40600.
- A service road between 38800 and 39300 (west of the proposed upgrade) and the access to Station Street would be constructed.
- The southbound carriageway would be constructed between Stations 35750 and 35900.
- The Stuarts Point Road interchange would be constructed.

#### Traffic arrangements:

- Northbound and southbound traffic would travel on the existing highway to Station 35700 before joining onto the crossover at Station 35700 and the proposed southbound carriageway at Station 36050. Vehicles would then travel on the proposed southbound carriageway to the northern end of the proposed upgrade.
- Access to Stuarts Point Road would be provided via the temporary access road at Station 37280.

### Stage 3

### Southern section

#### Construction works:

- The Northbound carriageway would be constructed between Stations (-) 700 and 550.
- The South Kempsey interchange, western side, would be constructed.
- A service road would be constructed from South Kempsey interchange to the existing Pacific Highway.
- A temporary road would be constructed at Station 450 between the southbound carriageway and the existing highway.

#### Traffic arrangements:

- Northbound and southbound traffic would switch to the new southbound carriageway between Stations (-) 700 and 500. Traffic would then cross via the temporary works at Station 650, onto the existing highway.

### Stage 4

### Southern section

#### Construction works:

- The Northbound carriageway would be constructed between Stations 550 and 700.

#### Traffic arrangements:

- Northbound and southbound traffic would travel on the new southbound carriageway between Stations (-) 700 and 450. Traffic would then cross onto the existing highway.

**Note:** These activities would be subject to refinement during detailed design.

As the project is geographically split and largely away from the existing highway, the environmental impacts of staging the construction of the proposed upgrade would be similar to constructing the project as a whole. To ensure that environmental and community issues arising during a staged construction process are considered and resolved, the construction contractor would need to consult the community and stakeholders prior to and throughout the construction of the project.

### 7.3.3 Construction methods

The construction methods used to construct the roadwork elements of the proposed upgrade would generally be conventional techniques employed on most major highway projects, adapted to account for various environmental constraints along the proposed upgrade alignment.

The number of embankments and bridges over soft soils across the various floodplains, and the excavation of the deep cutting south of Crescent Head Road, would influence the choice of construction techniques.

Where an embankment would be constructed across soft soils, various construction techniques would be employed. These have been described in Section 6.1.8 and Chapter 12 - *Geology and soils*, and include the installation of wick drains prior to placing the embankment, or driving timber piles or rock columns into the soft soils. The technique adopted by the construction contractor would affect the program and construction costs. Generally, cheaper options would take longer to construct.

The large excavation proposed south of Crescent Head Road would be deep and would cut through hard material. It is expected that blasting would be required through this area.

Construction of bridges for the proposed upgrade would follow conventional procedures used for Pacific Highway projects. One option is to launch the bridge across the Macleay River from the northern abutment, as this side of the river has a more stable geotechnical profile and would be more readily accessible for construction equipment and material deliveries. During the detailed design stage, the contractor would have the opportunity to further investigate appropriate structure types and construction methods.

## 7.4 Equipment, resources and labour

### 7.4.1 Plant and machinery

Table 7-3 lists the likely construction plant and equipment that would be used at each of the major work sites.

**Table 7-3 Equipment likely to be used for most construction activities**

Activities and locations	Plant and equipment
Construction work sites (locations to be determined)	<ul style="list-style-type: none"> <li>• Fences.</li> <li>• Sheds.</li> <li>• Fuel storage tanks.</li> <li>• Concrete and asphaltic concrete batch plants.</li> <li>• Crushing plants.</li> </ul>
Services relocation at various locations	<ul style="list-style-type: none"> <li>• Trucks, cranes and excavators.</li> <li>• Elevated platform vehicle.</li> <li>• Backhoes.</li> <li>• Trenchers.</li> <li>• Small equipment.</li> </ul>
Structures	<ul style="list-style-type: none"> <li>• Piling rigs.</li> <li>• Concrete pumps.</li> <li>• Cranes.</li> <li>• Excavators.</li> <li>• Trucks.</li> <li>• Barges.</li> <li>• Small equipment.</li> </ul>
Earthworks	<ul style="list-style-type: none"> <li>• Bulldozers.</li> <li>• Trucks.</li> <li>• Scrapers.</li> <li>• Graders.</li> <li>• Watercarts.</li> <li>• Compactors.</li> <li>• Vibratory rollers.</li> <li>• Drilling and blasting equipment for hard rock cuttings.</li> <li>• Piling rigs.</li> </ul>

Activities and locations	Plant and equipment
Structural pavement	<ul style="list-style-type: none"> <li>• Trucks.</li> <li>• Concrete paver.</li> <li>• Concrete curing equipment.</li> <li>• Concrete saws.</li> <li>• Asphalt paver.</li> <li>• Vibratory rollers.</li> <li>• Rubber-tyred rollers.</li> </ul>
Other roadworks (including local road improvements)	<ul style="list-style-type: none"> <li>• Graders.</li> <li>• Backhoes.</li> <li>• Trucks.</li> <li>• Watercarts.</li> <li>• Vibratory compactors.</li> <li>• Bitumen sprayers.</li> <li>• Vibratory rollers.</li> <li>• Rubber-tyred rollers.</li> </ul>

**Note:** Plant and equipment requirements would be subject to refinement during detailed design.

### 7.4.2 Materials

The construction of the proposed upgrade would require the use of various types of materials, including fill (of varying quality) for use in earthworks, aggregate for use in concrete batching, materials for lining drainage channels, sand for use as backfill around pipes, and production of Portland cement and asphaltic concretes. Material would also be required for bridging layers to allow operation of construction traffic over soft areas and to achieve the degree of compaction needed for fill embankments.

The total volume of required general fill, and some of the select fill and upper zone formation, would most likely be sourced from a number of cuttings along the alignment. However, based on the required volume estimates for bridging and drainage layers, it is unlikely that the type of rock excavated from the cuttings would provide sufficient volume of product for these purposes. Further investigation would be undertaken during detailed design to determine the availability of quality fill. Additional volume would also be required for concrete aggregates. Therefore, some material may have to be sourced from local quarries to make up the shortfall in these materials. Sand for concrete would also be sourced from the local area.

There is estimated to be approximately 4.2 million cubic metres of bulk excavation generated during the proposed upgrade construction. A proportion of excavated material would be considered unsuitable for use during construction. Therefore, approximately 125,000 cubic metres would need to be imported from other sources, such as local quarries.

### 7.4.3 Water usage

Where possible, water used during construction would be sourced from sustainable supply sources. Construction water is generally sourced from local water resources, such as groundwater, streams and dams. More recently, contractors are also considering alternative water supply sources such as mobile desalination plants and other recycled water sources to supply some construction water.

At present, there are no water quality parameters that can be applied specifically to the use of recycled water for the various construction activities. However, the RTA has QA specifications (e.g. R84 (Ed 3 Rev 6) - Continuously Reinforced Concrete Base) that apply to the quality of mixing water in the production of concrete. These state that water used in the production of concrete must be free from materials harmful to concrete and reinforcement and be neither salty nor brackish. Water must conform to AS 1379 Clause 2.7 and Table 4 "Limits for Impurities in Mixing Water".

As more information becomes available on the parameters of using recycled water in construction, the RTA can increase the use of sustainable sources of water.

Indicative quantities of water needed for use during construction are outlined in Table 7-4.

**Table 7-4 Sources and volume of water used for construction of the proposed upgrade**

Activities	Source	Quantities
Earthworks construction (compaction and pavement stabilisation)	Watercart	18 L/m <sup>3</sup> for compaction, 70 L/m <sup>3</sup> for stabilisation.
Dust suppression	Watercart	As required but average 70,000 L per day.
Vegetation watering (from vehicle only)	Watercart	120,000 L per day in extreme weather.
Concrete and asphalt batching	Potable water supply or groundwater / stream water	200,000 L per day per batching plant.

**Notes:** These sources and quantities would be subject to refinement during detailed design.  
 L = Litres  
 L/m<sup>3</sup> = Litres per cubic metre

To ensure that the use of recycled water is maximised and waste minimised, a Water Use and Re-use Sub-Plan would be developed as part of the Soil and Water Management Plan for the project prior to construction.

#### 7.4.4 Other opportunities for sustainable construction

Specific considerations to reduce energy use and greenhouse gas emissions during construction could include:

- Assess energy (fuel/electrical) efficiency when selecting equipment.
- Maintain equipment to retain high levels of energy efficiency.
- Purchase a minimum 50% accredited renewable energy (such as through GreenPower), in order to reduce greenhouse gas emissions associated with electricity production.
- Where feasible, use biofuels (biodiesel, ethanol, or blends such as E10 and B80), to reduce greenhouse gas emissions from construction plant and equipment.
- Minimise vegetation clearance, and replant vegetation where feasible.
- If vegetation must be cleared, consider beneficial reuse of this material, to substitute for other vegetation clearance activities, and avoid on-site burning.
- Use local materials and local staff wherever possible, to reduce transport-related emissions.
- Use recycled materials, such as replacing cement with fly ash, and using recycled aggregate and recycled content in steel, to minimise the lifespan impact of greenhouse gas emissions in production.
- Substitute low greenhouse-intensity materials where appropriate.

#### 7.4.5 Workforce and working hours

##### Construction workforce

The extent and composition of the construction workforce would vary, depending on the location and construction activities at any given time.



Each construction site along the alignment would require specialist crews. These crews would include construction management staff, equipment and plant operators, formworkers, steel fixers, concreters, erosion and sediment control crews, labourers, tradespersons and truck drivers. An on-site workforce of up to approximately 300 would be engaged at any given time during the construction period.

Over the anticipated construction period of up to 4 years, approximately 2 million person hours (or 11,000 person months) would be required for an on-site workforce.

### Construction hours

Construction hours would normally be limited to between 7am and 6pm Monday to Friday and between 8am and 1pm Saturday. No work would take place outside these hours or on public holidays without prior discussion with and/or notification of local residents and the Department of Environment and Climate Change.

So that work undertaken outside normal construction hours does not cause unreasonable nuisance to residents, this work may include:

- Delivery of materials outside normal hours as requested by police and other authorities for safety reasons.
- Emergency work.
- Work that would significantly delay traffic or cause traffic management problems.
- Other works for which a need has been demonstrated.
- Works otherwise addressed in the Noise and Vibration Management Plan.

## 7.5 Ancillary construction facilities

Construction work sites would be required for personnel, materials and plant. They would contain offices, a vehicle parking area, and machinery and plant storage areas.

Ancillary construction facilities would consist of:

- A main site compound.
- Several smaller site compounds.
- Other minor compounds at bridge sites or remote areas of the project.
- Concrete/asphalt batching plants.
- Crushing operations.
- Pug mill(s).
- Stockpile areas.

At least one major site compound would be required at each end of the proposed upgrade, as well as a number of minor depot sites adjacent to bridges. A major work site would require an area of at least 100 by 100 metres.

Potential sites for these ancillary construction facilities have been identified and assessed against the following environmental and engineering criteria:

- Environmental criteria:
  - More than 100 metres from waterways and protected wetlands.
  - In areas of low conservation significance for flora, fauna and Indigenous or non-Indigenous heritage.

- No substantial clearing of native vegetation required, or located where future clearing is required for permanent works.
- More than 100 metres from residential uses or other activities that may be affected by operational noise or other impacts of the compound.
- Operation of the plant would not affect the land use of adjacent properties.
- Engineering criteria:
  - Easy and safe access to the main road network.
  - Adjacent to the proposed upgrade.
  - Relatively level ground, but elevated to assist drainage and allow containment and treatment of run-off.
  - Sufficient area for proposed facility.
  - Electricity and phone services available or able to be provided without additional environmental impacts.
  - Preferably within existing road reservation boundaries or within areas to be acquired by the RTA or on cleared farmland adjacent to the proposed upgrade (following negotiations with relevant landholders).
  - At least one site within each major construction stage/package.
  - Easily accessible potable water supply or suitable dam.

Preliminary locations for major work sites and ancillary construction facilities are shown in Figure 7-1. These comprise the maximum number of sites to be used during construction. It is unlikely that all sites would be used; however, it is necessary to provide flexibility in work site locations for the construction contractor.

Alternative work sites may be identified during the detailed design phase and during the preparation of the final construction method by the successful contractor(s). A separate assessment of environmental impacts would be undertaken for any alternative work sites identified outside the existing extent of construction.

Several batching plants would be required for the production of concrete and asphalt. Batch plants would be located within major construction sites along the construction corridor. Batching plants can be noisy and create localised air quality impacts if stockpiles are not covered. Where possible, batch plants would be located away from sensitive – residential receivers. The construction contractor would be required to identify specific management measures for batching plants within a CEMP and relevant sub-plans.

Sedimentation basins proposed for temporary use during construction of the proposed upgrade are shown in Figure 7-1.