# 7 Construction

*This chapter provides a description of the indicative construction methodology for the project. This includes an outline of the construction process and likely activities, the estimated construction resources that would be required, and an indicative construction program.*

*The construction methodology presented in this chapter is indicative and would continue to be modified and refined as the design process continues. A final construction methodology and program would be developed by the construction contractor based on the conditions of approval for the project (if approved) and the mitigation and management measures provided in Part B of this EIS.*

## 7.1 Overview

Construction of the project would broadly involve the following main work phases:

- enabling works
- main construction works
- testing and commissioning works.

The indicative construction methodology during these work phases is described in section 7.2. Some overlap between these work phases may occur to ensure construction is completed as quickly as possible.

Construction is anticipated to start in early 2021 and take around two years. Further information on the construction program and timing is provided in section 7.3.

Key construction areas, including compounds and work sites, are shown in Figure 7.2, and described in section 7.4.

Information on construction requirements, including resources and transport arrangements, is provided in sections 7.5 and 7.6.

### 7.1.1 Approach to avoiding or minimising impacts

The approach to avoiding or minimising/managing impacts is based on two key steps; understanding the key constraints and issues in the study area and attempting to avoid these up-front by incorporating appropriate design and planning approaches, and then developing mitigation and management approaches based on the assessment of the potential impacts of the project as proposed. These approaches are described below.

#### *7.1.1.1 Construction planning to date*

The approach to design development (shown in Figure 7.1) and construction planning has included a focus on avoiding and/or minimising the potential for impacts during all key stages. The study area has a number of constraints and characteristics that have influenced development of the construction methodology to date.

The indicative construction methodology described in this chapter has been developed with consideration given to the constraints associated with the study area (including key environmental features and land uses) and other issues identified during the early stages of the design and environmental assessment process.

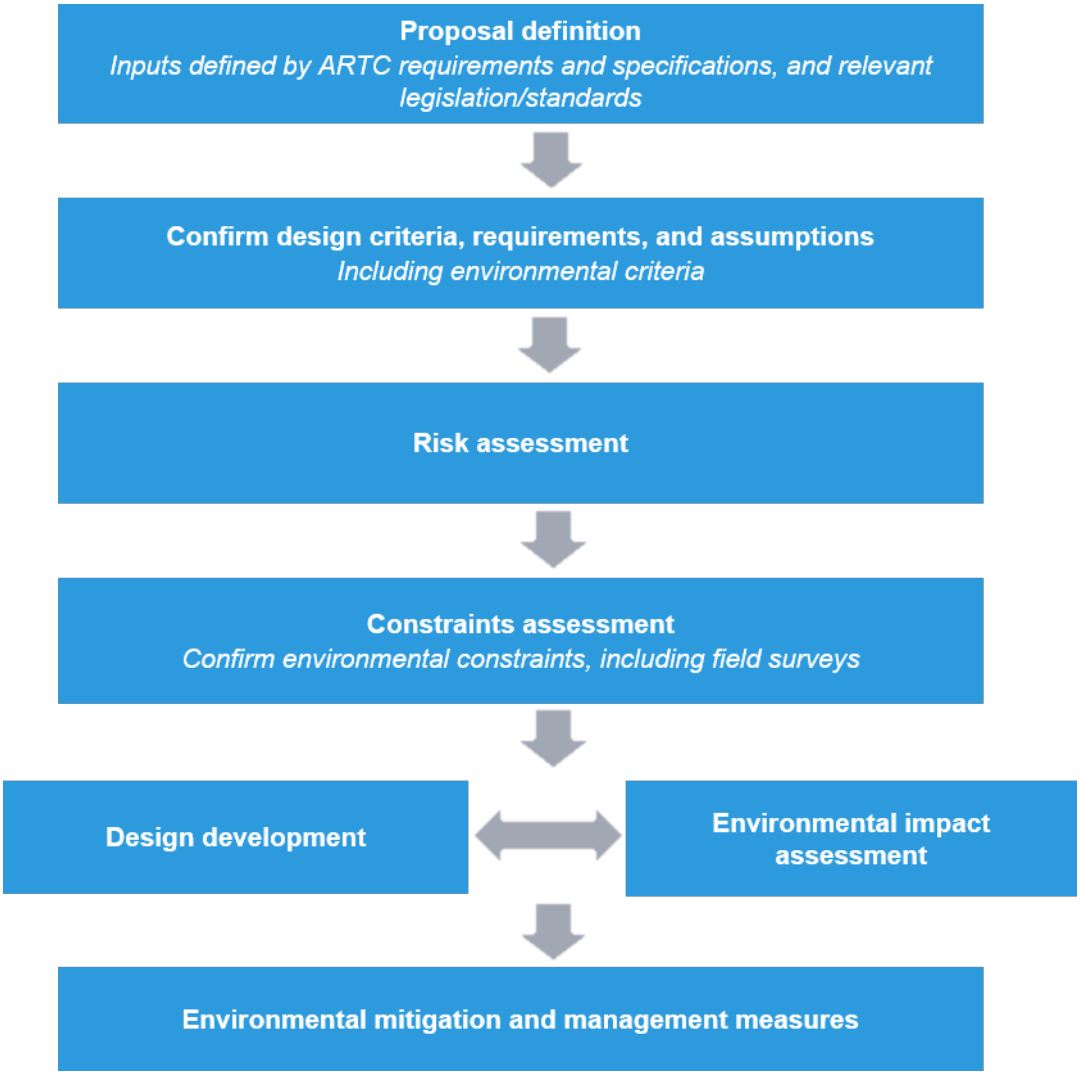


Figure 7.1 Approach to avoiding and minimising impacts during the design process

The key constraints that have influenced construction planning are summarised in Table 7.1 together with how the how the project has developed to date to avoid/minimise potential impacts.

Table 7.1 Key constraints and how construction planning has avoided/minimised environmental impacts to date

| Key constraint | Approach to avoiding/minimising impacts |
|---|---|
| Access along Broomfield Street | The proposed approach to construction incorporates staging of the works in Broomfield Street so that access along the street is retained throughout the works. |
| Availability of on-street parking for construction workers | To minimise the need for construction workers to park in surrounding streets and local town or shopping centres (such as Hometown Warwick Farm), with the potential to impact on availability of parking for commuters and customers, parking for construction worker vehicles would be provided in construction compounds. |
| Water quality and flow | The use of large cranes is proposed such that bridges can be constructed without undertaking works within the creek bed of Cabramatta Creek. |

| Key constraint | Approach to avoiding/minimising impacts |
|---|---|
| Land use, Aboriginal heritage, biodiversity, community facilities | Compounds have been sited to utilise the sites used for similar activities during construction of the SSFL as far as practicable, to minimise impacts on land use, Aboriginal heritage and endangered ecological communities.<br>The footprint of compound C3 (in Jacquie Osmond Reserve) has been configured to minimise potential impacts on the sports fields and use of the reserve. |
| Existing noise mitigation provided by the noise wall | The existing noise wall would be demolished and constructed in stages to minimise the length of time that the noise wall would not be effective and as such, the time sensitive receivers would be exposed to potential noise impacts from existing train operations. |
| Pedestrian/cyclist access between Broomfield Street and Jacquie Osmond Reserve | A temporary shared path diversion will be constructed during the enabling works to allow continued pedestrian/cyclist access while construction of the bridges is being undertaken. This temporary shared path diversion has been located to ensure that the disturbance footprint associated with construction of the temporary path was limited to either cleared land or non-native vegetation. |

#### *7.1.1.2 Construction environmental mitigation and management*

Mitigation and management measures applicable to the pre-construction (enabling works) and construction stages would be implemented to minimise and manage the potential impacts described in chapters 8 to 21. Mitigation measures are provided in each chapter in Part B, and are summarised in Chapter 22 (Approach to environmental management and mitigation). The approach to environmental management includes preparing and implementing Site environmental management plans (EMP(s)) for enabling works and a construction environmental management plan (CEMP) including detailed sub-plans, for construction activities post enabling works.

The Site EMP(s) and CEMP would be prepared for the construction phase of the project by the responsible construction contractor. These documents would provide a centralised strategy through which all potential environmental impacts would be managed during construction, and would include detailed management measures to avoid or minimise potential impacts. The requirements for the Site EMP(s) and CEMP are described in Chapter 22 (Approach to environmental management and mitigation).

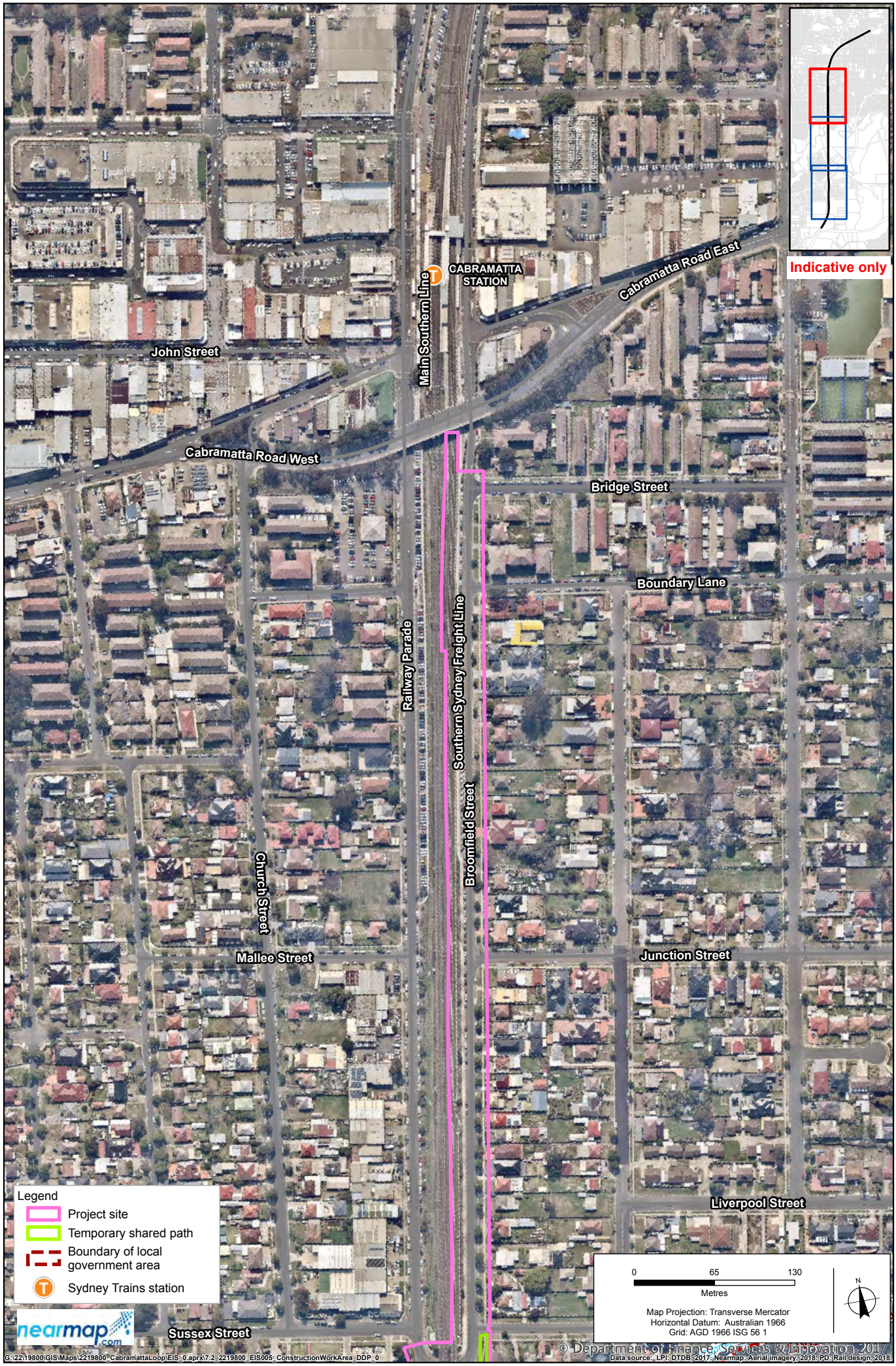


Figure 7.2a Construction work areas

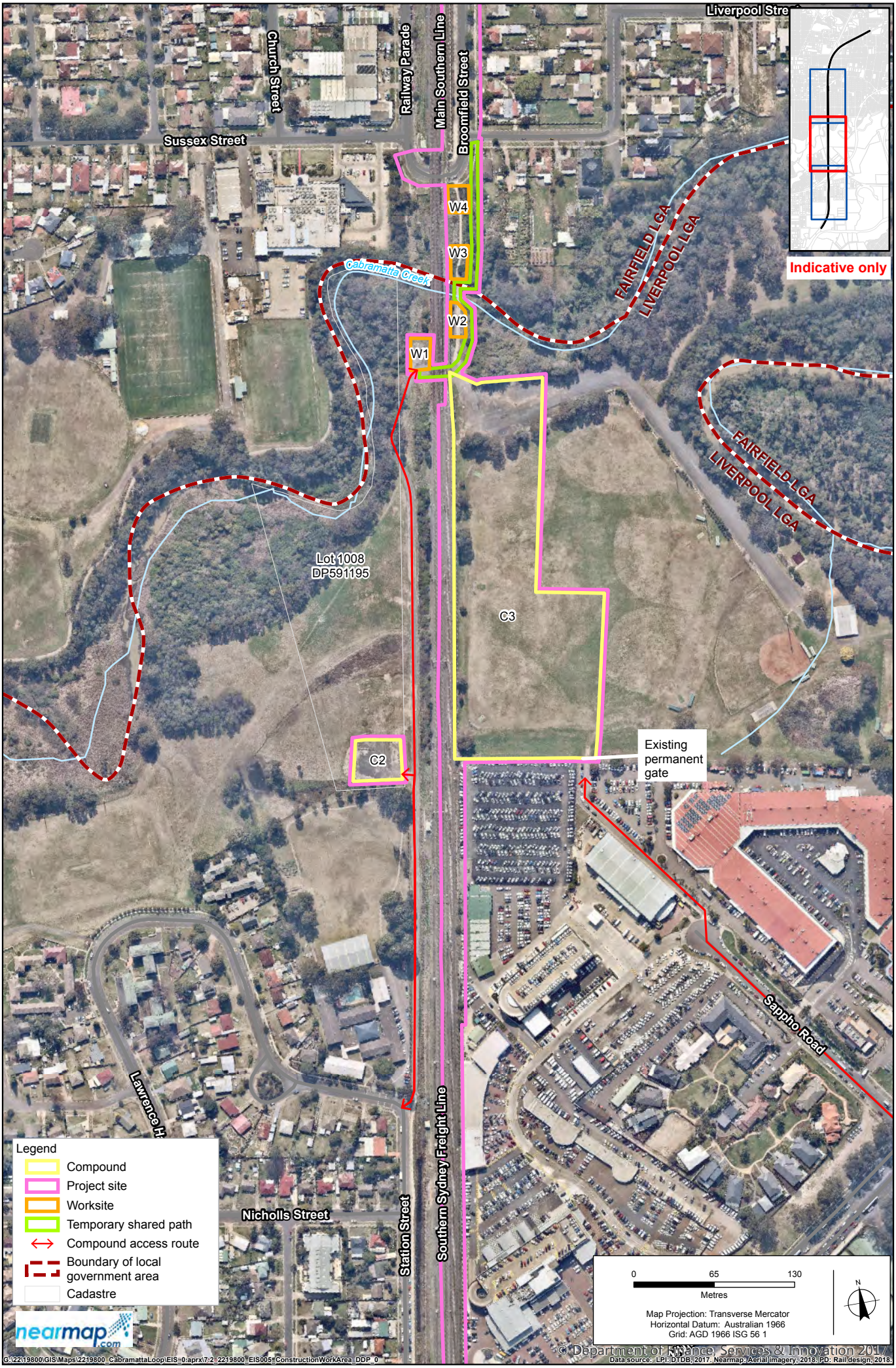


Figure 7.2b Construction work areas


Figure 7.2c Construction work areas

## 7.2 Indicative construction methodology

### 7.2.1 Enabling works

Enabling works for major infrastructure (also known as early works) are typically carried out before the start of substantial construction to establish key construction sites and provide protection to the public and environment as required.

All enabling works would be carried out in accordance with the relevant mitigation and management measures provided in this EIS, the Site EMP(s) and the conditions of approval for the project (if approved).

#### *7.2.1.1 Site establishment*

Site establishment is expected to include:

- carrying out heritage investigations, protection and archival recordings, if required
- installing site environment management and traffic controls (including pedestrian and cyclist management)
- establishing construction compounds and work sites including stockpiles and storage areas, regrading surfaces where required, delivery of plant and equipment, and installing fencing and hoarding where required in public areas (the proposed compounds and work sites are described in section 7.4)
- establishing access to work areas where required, including regrading of surfaces where required
- establishment of a temporary shared path to be used by pedestrians/cyclists during construction of Cabramatta Creek bridge
- suppling power, water and other utilities to construction compounds and other areas within the project site (whether temporary or permanent supplies)
- vegetation clearance and tree removal (further information is provided in Chapter 11 (Biodiversity)).

#### *7.2.1.2 Protection or relocation of utilities*

There are a number of utilities and services located within the project site, including power, water, wastewater and telecommunications. Those with the potential to be impacted by construction would be protected or relocated/adjusted prior to the commencement of the main construction works. It is expected that the following utilities would need to be relocated:

- stormwater drainage pipes on the eastern and western sides of Broomfield Street
- sewer rising main and gravity main located parallel to the rail corridor in Jacquie Osmond Reserve and Peter Warren Automotive
- power poles and power lines on the eastern side of Broomfield Street.

The general methodology to undertake these works is outlined below.

**Relocation of sub-surface utilities**

The general methodology to relocate sub-surface utilities, including stormwater drainage pipes and wastewater mains is as follows:

- trenching along the pipe alignment
- installing pipe bedding material
- installing pipes and access pits
- installing rock aprons at outlets (drainage pipes)
- tie in works with existing utilities

- backfilling material
- decommissioning existing pipes and rehabilitation.

Relocation of the Sydney Water gravity main will involve underboring at a depth of about four metres below ground surface. The type of underboring technique used would be confirmed during the detailed design phase of the project. Two underboring techniques which could be used are dry case-boring or wet-boring. Generally underboring will involve:

- drilling of a small diameter pilot hole along a directional path from one surface point to the next
- enlargement of the pilot hole using a back reamer
- pulling the pipeline through the enlarged hole behind the reamer using the drill stem.

#### Power pole relocation

Undertaking the proposed road works in Broomfield Street (described in section 6.2.4) would require relocation of power poles to the location of the proposed new footpath on eastern side of Broomfield Street. This would generally involve the following:

- isolating power source to existing power poles
- removing wires and poles
- excavating to about three metres below ground surface for power pole footing installation
- installing new poles and wires
- commissioning and testing of new asset.

Further information regarding utility adjustments is provided in Chapter 16 (Land use and property).

### 7.2.2 Main construction works

An outline of the proposed methodology (ie the works proposed) to construct the project's key features and main ancillary infrastructure is provided below. A description of how these works would be staged in relation to each other is provided in section 7.3.

All works would be carried out in accordance with the mitigation and management measures provided in this EIS, the CEMP and the conditions of approval for the project (if approved).

#### *7.2.2.1 New track*

The fencing and wall (noise and retaining wall, discussed further below) marking the existing eastern boundary of the rail corridor would be removed and new fencing and walls would be installed an average of t five metres east to mark the new boundary of the rail corridor. The new track for the passing loop would be installed within the new wider rail corridor area and would generally involve:

- placing and compacting the formation layer
- installing track drainage and connecting it to existing drainage outlets
- placing ballast, sleepers and rail tracks on top of the new formation
- tamping track to final height and alignment
- installing new signalling equipment and associated equipment.

Constructing the turnouts would generally involve:

- excavating the landform to the required design levels
- backfilling and compacting the formation layer
- placing ballast, sleepers and rail on top of the new formation
- tamping track to final height and alignment
- installing control infrastructure (points motor, power supply etc).

The above methodology is based on the retaining walls being in place prior to construction of new track.

#### *7.2.2.2 Track realignment*

Track realignment (slewing) is typically undertaken as part of standard ARTC rail maintenance works. Realignment of operational track, required as part of the project, would be undertaken during possession period(s) (refer to section 7.3.2).

The typical construction methodology for realigning the existing SSFL track would generally involve:

- removing the existing track infrastructure including rail, sleepers and fastenings for reuse in the new arrangement
- constructing new track as described above
- welding and adjusting the track to interface back into the existing track alignment.

#### *7.2.2.3 Bridge works*

Construction of the new bridges over Sussex Street and Cabramatta Creek would generally involve:

- diverting the shared pathway around perimeter of works to the temporary shared path (located to the east of the existing shared path)
- constructing access ramps to the bridge work areas for the piling rigs and cranes
- constructing crane pads and boring new piles (maximum depth of about 20 metres):
    - for the Sussex Street bridge a crane pad would be constructed at the southwestern corner of the proposed bridge location (Work site W4)
    - for the Cabramatta Creek bridge crane pads would be constructed at the northwestern and southwestern corners of the proposed bridge location (Work sites W3 and W2) - no works would be undertaken within the creek bed
- constructing pile caps to join between the piles
- erecting pre-cast piers
- installing the headstock and bearings
- installing girders by crane during possession periods – traffic control would be required on Sussex Street during bridge girder delivery
- adding barriers
- installing shock matt
- placing ballast, sleepers and rail on top of the new bridge
- tamping and profiling the ballast under and around the sleepers and welding tracks
- installing any required furnishings or infrastructure, such as handrails and walkways
- reinstating the shared pathway.

#### *7.2.2.4 Road works*

**Broomfield Street**

The reconfiguration of Broomfield Street would be undertaken in stages, as described in section 7.3.1. In summary, works would commence on the eastern side of Bromfield Street, and traffic would be diverted to the western side of Broomfield Street. Prior to works on the eastern side, fencing would be placed along the centreline of Broomfield Street to delineate the works area from the adjacent trafficked area. Once works on the eastern side of Broomfield Street are complete, fencing would be installed about five metres east of the previous rail corridor fencing. Traffic and parking would be diverted to the eastern side of Broomfield Street, between the new rail corridor fencing and the fencing installed along the Broomfield Street centreline.

The works would generally involve:

- earthworks to remove surface layers, including identifying and stripping of suitable top soil and stockpiling on site for future use
- importing embankment, foundation and select materials and fill to the road formation levels
- classifying and disposing of unsuitable and/or surplus material from the proposal footprint
- installing new culverts and subsoil drains
- installing new kerbs and gutters
- constructing the pavements, including placing and compacting select fill, the base course, and the asphalt wearing surface
- constructing tie-ins to existing roads
- installing new street lights
- resurfacing driveways on the western side of Broomfield Street to tie into the reconfigured road
- line-marking and installing signage
- removing fencing along previous centreline.

**Sussex Street**

The works at Sussex Street would generally involve:

- earthworks to remove surface layers, including identifying and stripping of suitable top soil and stockpiling on site for future use.
- importing embankment, foundation and select materials and fill to the road formation levels
- classifying and disposing of unsuitable and/or surplus material from the proposal footprint
- installing new kerbs and gutters
- constructing the pavements, including placing and compacting select fill, the base course, and the asphalt wearing surface
- constructing tie-ins to existing roads
- line-marking and installing signage.

#### *7.2.2.5 Ancillary infrastructure and works*

**Noise wall**

The noise wall would be installed on top of a cast-in-situ retaining wall.

The existing noise wall would be demolished first and then the new wall would be constructed. The new noise wall cannot be constructed until the existing noise wall is removed for the following reasons:

- Along some sections of the wall the new noise wall panels would not be able to be placed until the area behind the wall is filled to provide a counterweight. This cannot be undertaken if the retaining wall associated with the existing wall still needs to be demolished.
- Along some sections of the wall the new noise wall footings could be constructed without demolishing the existing wall. However, there would be insufficient space between the two walls to fit plant and equipment if the existing wall was demolished after construction of the noise wall, and the alternative would be to undertake works within the danger zone of the rail corridor. This could only be done during possessions, which as there are only four weekend possessions where this can occur, this is insufficient time to undertake the works.

Therefore, removing the existing noise wall and constructing the new noise wall would be undertaken in stages to minimise exposure of sensitive receivers to noise sources. It would involve the following general methodology:

- removing existing panels for storage, re-painting and later reuse, where practicable
- dismantling the existing retaining wall
- constructing the new retaining walls (as described below)
- installing the structural posts for the noise wall by bolting these to the top of the retaining wall (may require additional steel around the posts within the retaining wall structure)
- inserting reused panels from the old noise wall between poles using a mobile crane
- adding any urban design treatments and furnishings such as handrails as required.

**Retaining walls**

The required retaining wall structure would vary along the rail corridor requiring slightly different construction techniques. Construction of the retaining walls would involve:

- partial bored pile and partial cantilever retaining wall (Bridge Street to Sussex Street bridge):
  - excavating in the proposed location of the new noise walls
  - constructing bore piers to a maximum depth of 10 metres
  - building pile cap/footings and structural wall (either reusing concrete blocks or exposed concrete finish)
  - backfilling to the underside of formation behind the wall and installing sub-surface and surface water drainage.
- cantilever reinforced concrete wall (Sussex Street bridge to Cabramatta Creek bridge):
  - removal of the existing retaining wall
  - partially excavating between the two embankments

- constructing bore piers to a maximum depth of 10 metres
- constructing new footings involving excavation, placing formwork and steel, and pouring concrete backfilling to the underside of formation behind the wall and installing sub-surface and surface water drainage.

- reinforced concrete footing and wall (Jacquie Osmond Reserve):
  - minor excavation for the new wall
  - pouring concrete footing
  - installing structural wall (exposed concrete finish with handrail on top)
  - backfilling and installing sub-surface and surface water drainage
  - partially demolishing the old wall with the base to be retained underneath the new track.
- reinforced concrete footing and block wall (adjacent to the Peter Warren Automotive site)
  - potential shoring of existing building footings
  - assembly of steel reinforcement and formwork
  - pouring concrete into formwork for footing and wall
  - backfilling to the underside of formation behind the wall and installing sub-surface and surface water drainage.

### Embankment at Jacquie Osmond Reserve

Construction of the embankment would involve:

- striping top soil
- placing reused spoil and compacting
- reinstating top soil and revegetating.

### Other track and rail system works

Existing SSFL signals would need to be temporarily relocated during construction. This would involve:

- running a signal cable from the existing cable location to the western boundary of the rail corridor (through Sydney Trains track ballast)
- running a temporary signal cable within the existing rail corridor above ground (attached to star pickets)
- connecting back to the existing signal cable location at the extent of the project site.

Installing the proposed new combined services route and associated signalling would involve:

- excavating a trench for the new route directly to the east of the proposed passing loop track
- installing bedding material at the base of the trench
- installing conduit within the trench
- installing cable within the conduit by pulling it through the conduit
- excavating and installing pits between new and existing infrastructure
- installing signalling equipment and associated infrastructure
- backfilling trenches and pits with spoil

- compacting of backfilled material.

In addition, minor works in the form of new signalling would be installed at a number of locations within the rail corridor. Indicative locations for the signalling works are shown in Figure 7.3 however the exact locations would be determined during detailed design.

Signalling works at these locations would generally involve:

- installing a new slab and location case
- installing a local signal cable run and power supply, involving:
- excavating signal cable run or placing the cable run above ground (attached to wall)
- placing new signal / power cable in a polyvinyl chloride (PVC) conduit
- backfilling of existing excavated material into trench
- installing new signal and axle counter.

#### *7.2.2.6 Finishing and rehabilitation*

At the end of the main construction works phase, the contractor would remove all construction equipment from the project site. Areas that were occupied temporarily and do not form part of the operational footprint of the project would be rehabilitated and revegetated (where required and agreed with the relevant landowner). Construction work areas, compounds and access routes would be returned to the same or better condition than prior to construction commencement as required. Site reinstatement and rehabilitation would be undertaken progressively, and would include the following activities:

- demobilising construction compounds and work areas
- removing materials, waste and redundant structures from the work areas
- decommissioning temporary work area signs
- removing temporary fencing
- establishing permanent fencing, where not established during works
- decommissioning site access roads that are no longer required
- restoring disturbed areas as required, including revegetation.

Site rehabilitation would be undertaken in accordance with the landscape plan for the project (described in Chapter 17 (Landscape and visual amenity)) and the CEMP (described in Chapter 22 (Approach to environmental management).

### 7.2.3 Testing and commissioning

Testing and commissioning (checking) of the rail line and communication/signalling systems would be undertaken to ensure that all systems and infrastructure are designed, installed, and operating according to ARTC's operational requirements.


Figure 7.3a Indicative signalling locations


Figure 7.3b Indicative signalling locations


Figure 7.3c Indicative signalling locations


Figure 7.3d Indicative signalling locations

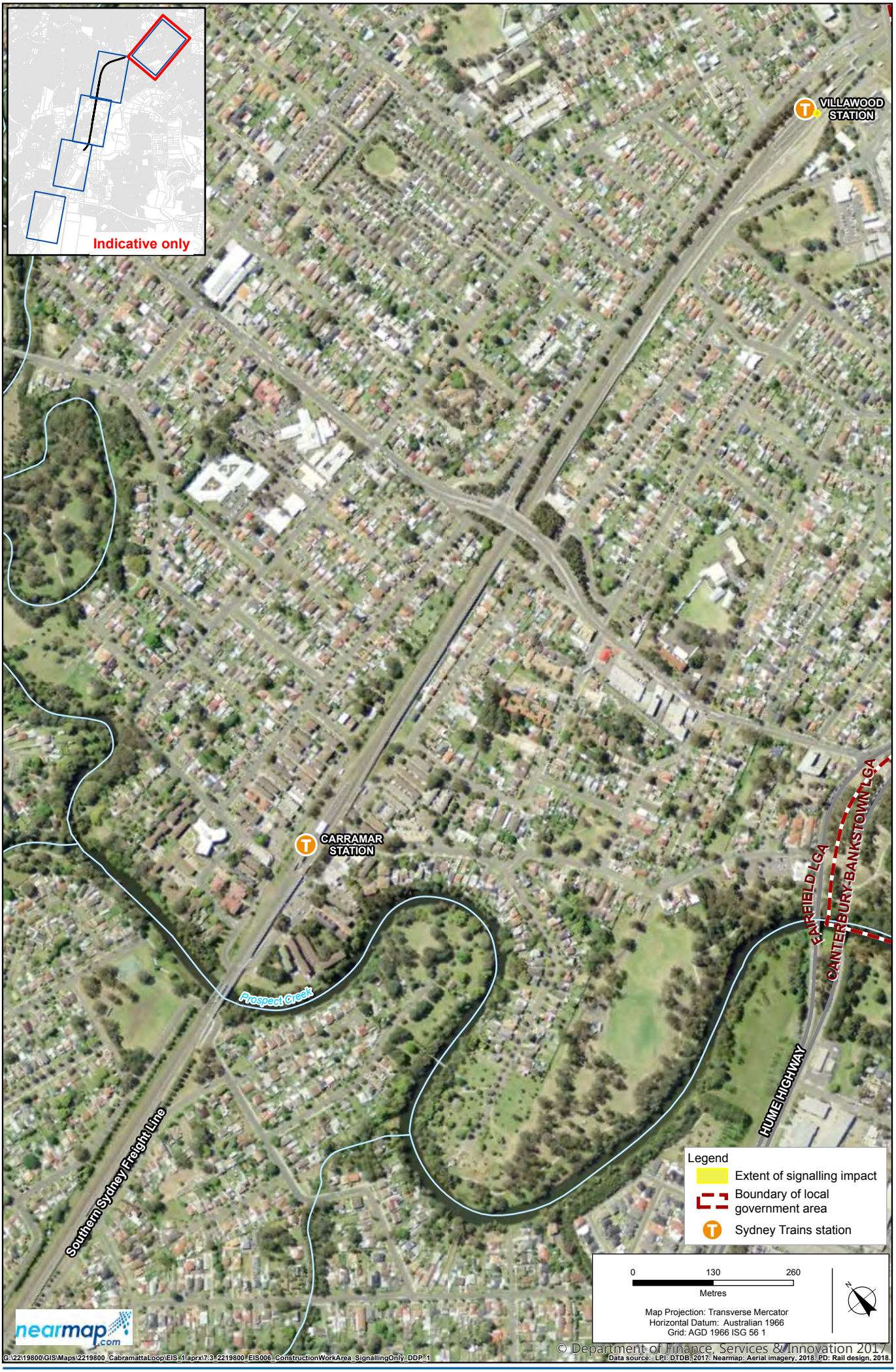


Figure 7.3e Indicative signalling locations

## 7.3 Construction program, timing and staging

### 7.3.1 Program and staging

Construction would commence once all necessary approvals are obtained (anticipated to be in early 2021) and take about two years to complete.

The main construction works would broadly be undertaken in six stages, some of which would overlap as shown in the indicative program shown in Figure 7.4 which also shows when enabling works would be undertaken. Testing and commissioning would likely be undertaken over one weekend possession in late 2022 (or potentially early 2023, if an additional possession is required).

A summary of the proposed staging for the main construction works is provided in Table 7.2. This would be subject to refinement and would be confirmed following engagement of the construction contractor.

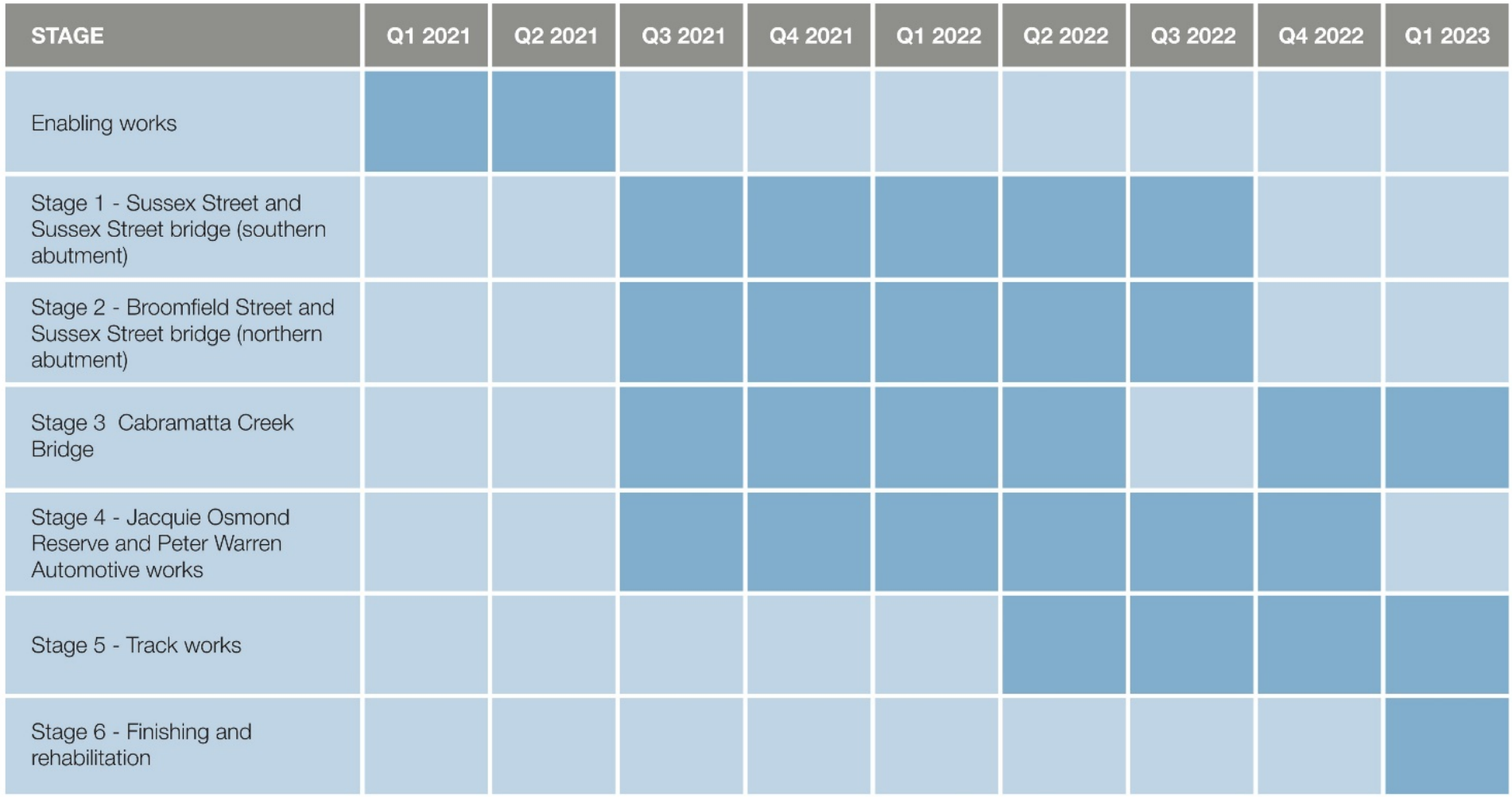


Figure 7.4 Indicative construction program

Table 7.2 Indicative staging

| Stage | Feature constructed during stage | Main activities |
|---|---|---|
| Stage 1 – Sussex Street and southern abutment of Sussex Street bridge | • Road works (changes in Sussex Street and reconfiguration of Broomfield Street)<br>• Sussex Street bridge | • Close the southern side of Sussex Street and direct traffic along the northern side of the road<br>• Construct southern bridge abutment for the new bridge<br>• Widen the road to the east of Broomfield Street, using the existing road (southbound lane) as a construction area while maintaining traffic flow on the west of Broomfield Street (northbound lane) – the Broomfield Street realignment would be completed as a rolling closure, from Sussex Street northwards to Bridge Street, in 200 metre sections |
| Stage 2 – Broomfield Street and northern abutment of Sussex Street bridge | • Road works (reconfiguration of Broomfield Street)<br>• Retaining walls<br>• Noise wall<br>• Sussex Street bridge | • Redirect traffic through the southern side of Sussex Street Bridge and onto the east of Broomfield Street<br>• Temporarily close the western part of Broomfield Street (northbound lane and parking) to use as a construction area<br>• Construct northern abutment of the Sussex Street bridge<br>• Remove existing retaining wall and noise wall and construct new retaining wall<br>• Construct noise wall<br>• Reinstate Broomfield Street with new alignment<br>• Close Sussex Street over a weekend to construct the bridge |
| Stage 3 – Cabramatta Creek bridge | • Cabramatta Creek bridge | • Constructing the bridge (described in section 7.2.2)<br>• Reinstating shared path |
| Stage 4 – Works at Jacquie Osmond Reserve and Peter Warren Automotive | • Retaining walls | • Clearance and site setup<br>• Partial demolition of existing wall<br>• Install footing for retaining structure<br>• Build up sub-base and cap layer<br>• Construct embankment (Jacquie Osmond Reserve only)<br>• Reinstate fence |
| Stage 5 – Track works | • Track works<br>• Signalling | • Construct track turnout and undertake realignment works at the northern end during the first available possession (described in section 7.3.2)<br>• Construct track turnout and undertaken realignment at the southern end during the second available possession<br>• New track would be constructed progressively along the corridor in a linear sequence, with multiple teams operating concurrently |

| Stage | Feature constructed during stage | Main activities |
|---|---|---|
| | | • Install signals<br>• Commission track during the last available possession |
| Stage 6 – Finishing and rehabilitation | N/A | • Demobilisation, rehabilitation and finishing works |

### 7.3.2 Timing/work hours

#### *7.3.2.1 Standard construction working hours*

The majority of works (with the exception of during possession periods as described below in 'construction working hours for possession periods') would be undertaken during recommended standard construction working hours as defined by the Interim Construction Noise Guideline (DECC, 2009), which are:

- Monday to Friday: 7.00 am to 6.00 pm
- Saturday: 8.00 am to 1.00 pm
- Sundays and public holidays: no work.

During these periods, there may be a need to undertake some limited activities outside recommended standard working hours. These could include:

- electrical connections and installation
- delivery and/or removal of oversized equipment
- works on key roads such as delivering cranes, to minimise impacts to traffic flow and access
- setting up traffic conditions for partial road closures
- works required by utility service providers or where impacts to services cannot be reasonably managed during standard working hours.

Out of hours work would be undertaken in accordance with the out of hours work protocol described in Chapter 9 (Noise and vibration).

#### *7.3.2.2 Construction working hours for possession periods*

To ensure that works are carried out as efficiently as possible and that worker safety is maintained, some construction works would need to be undertaken during the scheduled rail maintenance possession periods, during which trains do not operate along the SSFL. ARTC currently schedules routine maintenance possessions on four weekends each calendar year.

Subject to detailed construction planning, these scheduled maintenance possessions would be used to complete certain construction works. Works that would need to be undertaken during possession periods include (but are not limited to):

- site establishment activities such as erection of barrier fencing within the rail corridor
- installing new track that affects operational line
- realigning the existing track
- moving large components (such as bridge girders) into place above the rail line
- bridge tie-in works
- signalling works

- installing undertrack crossings such as drainage and signal routes
- testing and commissioning of rail systems.

During possession periods, works may be undertaken 24 hours per day, and would involve working during and outside the recommended standard hours. However, the use of highly noise intensive equipment (such as hydraulic breakers and ballast tampers) would generally be limited to daytime and evening periods (between 7.00 am and 10.00 pm) unless technical constraints exist.

Work outside standard hours during possession periods would be undertaken in accordance with the out of hours work protocol.

## 7.4 Construction compounds and work sites

### 7.4.1 Compound

Construction compounds are areas used as the base for construction activities, such as for the storage of plant, equipment and materials, and/or construction site offices and worker facilities. Site compounds, which would be generally located outside the rail corridor, are shown in Figure 7.2 and are listed in Table 7.3. Compounds would be used for the duration of construction works and would include:

- site offices
- toilets, showers and change rooms
- meal rooms and first aid facilities
- areas for plant, equipment and material storage
- fencing and security facilities
- worker parking for between 60 to 80 cars.

Table 7.3 Construction compounds

| Compound ID | Location | Existing land use |
|---|---|---|
| C1 | Within rail corridor | Temporary storage |
| C2 | Warwick Farm Recreation Reserve | Public recreation |
| C3 | Jacquie Osmond Reserve | Public recreation |

### 7.4.2 Work sites

In addition to the compounds and general construction activities within the rail corridor, there are also a number of other sites where construction activities would be undertaken, or where support would be provided for other construction areas. These sites, which would generally be located outside the rail corridor, are shown in Figure 7.2 and are listed in Table 7.4. The majority of these sites are unlikely be required for the duration of works.

Table 7.4 Work sites

| Work site ID | Location | Existing use | Proposed use | Duration of use |
|---|---|---|---|---|
| W1 | Access to compound site C3 | Unnamed road/shared path | Truck turning circle | Long term |
| W2 | Southern side of Cabramatta Creek bridge | Shared path | Crane pads | Short term |
| W3 | Northern side of Cabramatta Creek bridge | Shared path | Crane pads | Short term |

| Work site ID | Location | Existing use | Proposed use | Duration of use |
|---|---|---|---|---|
| W4 | Sussex Street bridge | Shared path | Crane pads | Short term |

## 7.5 Construction resources

### 7.5.1 Workforce requirements

During non-possession periods, it is estimated that a peak workforce of about 80 people would be required. During possession periods, it is estimated that a peak workforce of about 220 people would be required, comprising 110 people per 12 her shift (with two 12 hours shifts per day). This increase in workforce numbers during possession periods is a result of the need to ensure that works can be completed during the possession period, which are limited to four 48 hours periods during the year.

### 7.5.2 Plant and equipment

An indicative list of the plant and equipment expected to be used during construction is provided in Table 7.5. The actual plant and equipment used at each work area within the project site would be refined during the detailed design stage and upon appointment of the construction contractor.

Table 7.5 Indicative construction plant and equipment

| Feature/main works | Indicative plant and equipment | |
|---|---|---|
| Enabling works | • Grinder / mulcher<br>• 20 tonne (T) excavator including rock-breaker<br>• Vibratory roller<br>• Directional drilling machine<br>• Concrete truck and pumps | • Water cart Compactor Light vehicles<br>• Delivery truck<br>• 60 T crane<br>• Welding truck |
| New track/track realignment | • Ballast train (side dump)<br>• Rail train<br>• Front end loader (modified to pick up sleepers) | • Rail tamper (vibration)<br>• Rail regulator<br>• 10 T franna |
| Road works | • Asphalting machines<br>• Rollers (standard pneumatic and vibratory)<br>• 4 x 20 T excavators including two rock-breakers<br>• Several backhoes<br>• Trucks for spoil<br>• Articulated trucks for delivery<br>• 100 T crane<br>• Delivery truck / semi-trailers for material movement<br>• Concrete trucks<br>• Concrete vibration | • Water tanks<br>• Water truck<br>• Milling machine<br>• Light vehicles<br>• Piling rig<br>• Concrete pump<br>• Steel delivery<br>• Panel delivery<br>• Cherry picker<br>• Grader |
| New bridges | • 200 - 300 T crane or 2 x 100 T cranes for girders | • Excavator<br>• Concrete pump |

| Feature/main works | Indicative plant and equipment | |
|---|---|---|
| | • 60 T crane<br>• Piling rigs for encased piles<br>• Semi-trailer for delivery of girders<br>• Concrete trucks<br>• Concrete tester<br>• Compressors<br>• Front end loaders | • Concrete vibrators<br>• Excavators (15 T and 20 T) including rock breakers<br>• Truck and dog<br>• Roller / compactor (plate compactor)<br>• Pneumatic tools<br>• Light vehicles |
| Retaining walls, embankment and noise walls | • 20 T excavator including rock breakers<br>• Trailers<br>• Truck and dog<br>• Graders<br>• Water cart<br>• Concrete delivery | • Semi-trailers<br>• Light vehicles<br>• Vibratory roller<br>• Jack hammers<br>• Grinders / concrete cutters<br>• 10 T Franna |
| Signalling | • Light vehicles<br>• Trucks<br>• Earthmoving equipment | |
| Finishing and rehabilitation | • Light vehicles<br>• Trucks<br>• Earthmoving equipment | |
| Testing and commissioning | • Light vehicles | |

### 7.5.3 Materials

A variety of materials would be required to construct the project. The project would require about 8,500 cubic metres of fill material for the purpose of embankment widening and fill behind retaining walls.

The main materials are outlined in Table 7.6.

Table 7.6 Indicative material requirements

| Feature | Indicative materials | |
|---|---|---|
| New track/track realignment | • Electrical conduit<br>• Wiring<br>• Pre-cast pits<br>• Signal posts<br>• Aluminium case cabinet<br>• Concrete, general fill material | • Fine crushed rock (engineered materials)<br>• Ballast<br>• Rail<br>• Sleepers<br>• Steel handrail / walkway |
| Road works | • Asphalt<br>• Concrete<br>• Sand | • Road base (fine crushed rock)<br>• Binding layer<br>• Pre-cast concrete |

| Feature | Indicative materials | |
|---|---|---|
| | • Services pipes<br>• Electrical wiring / telegraph poles | • Grates<br>• Traffic barricades |
| New bridges | • Pre-cast girders<br>• Concrete reinforcement<br>• Piles<br>• Scaffolding<br>• Temporary barriers | • Lighting<br>• Fencing<br>• Engineered fill<br>• Steel handrail / walkway<br>• Concrete |
| Noise and retaining walls | • Hebel panels<br>• Structural steel | • Piling casing<br>• Recycled elements of the existing noise wall |
| Other | • Signage<br>• Landscaping (plants and associated planting material) | • Paint<br>• Signalling equipment (eg cables, star pickets, signal poles) |

### 7.5.4 Earthworks and spoil generation

Earthworks would be required to construct the new passing loop, retaining walls and embankment at Jacquie Osmond Reserve and bridges at Cabramatta Creek and Sussex Street and to undertake the road works along Broomfield Street and Sussex Street.

Minor earthworks would also be required to construct infrastructure such as signalling and drainage, and undertake the ancillary works associated with the project, such as utilities relocation and temporary path relocations.

Excavated spoil would be reused within the project site where practicable to construct the rail formation. It is estimated about 8,100 cubic metres excess spoil would be generated. The approach to managing excess spoil and other construction wastes is considered in Chapter 19 (waste management).

### 7.5.5 Temporary land requirements

Some areas of land located outside the rail corridor would need to be temporarily leased or occupied for the proposed construction compounds and work sites (described in section 7.4). These areas are located within road reserves or other public land.

Additionally some land is proposed to be temporarily occupied on land privately owned south of Jacquie Osmond Reserve. This is required to facilitate the temporary relocation of the Sydney Water sewer rising main and gravity main located parallel to the rail corridor (as discussed in section 7.2.1). The land to accommodate the temporary relocation of this easement would likely be obtained via a temporary access license for a period of around six months. Temporary land acquisition requirements to facilitate relocation of the Sydney Water sewer rising main are summarised in Table 7.7.

**Table 7.7 Temporary land requirements for the relocation of Sydney Water assets**

| Lot/DP | Approximate amount of land required (m2) | Part/all of lot? | | Existing use | Existing land zoning |
|---|---|---|---|---|---|
| Lot 101 DP 876817 | 800 | Partial | Private commercial owner | Car sales | IN1 General Industrial |

| Lot/DP | Approximate amount of land required (m2) | Part/all of lot? | | Existing use | Existing land zoning |
|---|---|---|---|---|---|
| Lot 3 DP 1013680 | 110 | Partial | Private commercial owner | Car sales | IN1 General Industrial |
| Lot 12 DP 578199 | 110 | Partial | Private commercial owner | Car sales | IN1 General Industrial |

ARTC is currently consulting with the relevant landowners to arrange leasing of the required land.

### 7.5.6 Site servicing requirements

Construction (mainly the use of compounds) would require connections to surrounding utilities, such as potable water, power, wastewater and telecommunications. Generally, these utilities are located close to the project site and supply is considered 'business as usual' for utility companies.

## 7.6 Transport, access and haulage

### 7.6.1 Routes for the movement of construction equipment and materials (haulage routes)

Preliminary identification of haulage routes has been undertaken with consideration given surrounding land uses. Potential routes have been proposed to minimise impacts on local roads as far as possible, while providing the most direct route to the arterial road network. It is proposed that the Hume Highway would provide the key access to and from the locality, with Cabramatta Road East and Mannix Parade comprising the two major access routes to and from the Hume Highway.

Liverpool and Junction streets may be used in one direction (westward) to access Broomfield Street, while Sappho Road may be used in special circumstances to access the Jackie Osmond Reserve. The preliminary haulage and access routes are shown on Figure 7.5.

These preliminary routes would be reviewed during detailed design and confirmed following appointment of the construction contractor. In general, vehicle movements would be scheduled to be undertaken outside peak periods. However, there may be a need for some vehicle movements during peak periods.

### 7.6.2 Access to work areas

With the exception of compounds and work sites access to the project site would be from either Broomfield Street, Sussex Street, Jacquie Osmond Reserve (via Railway Parade), Sappho Road, or Warwick Street near Warwick Farm Station.

Compounds and work sites would be accessed via the haulage and access roads described in section 7.6.1 and as shown in Figure 7.5.

### 7.6.3 Construction traffic numbers

Construction traffic would include heavy and light vehicles associated with waste removal, material deliveries, and the arrival and departure of construction workers. The indicative construction traffic volumes are based on the following vehicle types:

- light vehicles – up to 4.5 tonnes
- heavy vehicles – 12.5 metres long, greater than 4.5 tonnes.

It is estimated that an average of about 60 light vehicles and 40 heavy vehicles would access the project site on a typical working day. This number would increase to about 160 light vehicles and 96 heavy vehicles during possession periods.

Table 7.8 provides the estimated peak vehicle numbers per hour. Volumes have been shown for both during a possession period and outside of possession periods.

Traffic movements would be managed in accordance with the CEMP. Further information on the approach to managing construction traffic is provided in Chapter 8 (Traffic, transport and access).


Figure 7.5 Potential haulage and access routes

Table 7.8 Peak number of construction vehicles per hour

| Road/Street | Possession (24 hours) | | Outside possessions (day time working hours) | |
|---|---|---|---|---|
| | Heavy vehicle | Light vehicle | Heavy vehicle | Light vehicle |
| Hume Highway | 4 | 60 | 4 | 30 |
| Cabramatta Road East | 2 | 20 | 2 | 15 |
| Junction Street | 2 | 20 | 2 | 15 |
| Liverpool Street / Sussex Street | 2 | 20 | 2 | 15 |
| Broomfield Street | 2 | 20 | 2 | 15 |
| Mannix Parade / Lawrence Hargrave Road / Nicholls Street / Station Street / Railway Parade | 3 | 60 | 2 | 30 |
| Sappho Road | 2 | 20 | 2 | 15 |
| Warwick Street | 4 | 60 | 4 | 30 |

### 7.6.4 Construction workforce parking

Parking would be provided for construction workers within the construction compounds and/or work sites. Approximately 60 to 80 worker's vehicles could be accommodated within the site compounds. Therefore there should be minimal impact to on street parking from construction workers. Parking locations would be detailed in the CEMP.

As the project site is located in close proximity to Cabramatta and Warwick Farm stations and a number of bus routes, there is also an opportunity for construction workers to use public transport, reducing the need for parking.

### 7.6.5 Diversions and temporary transport arrangements

To support construction, a number of changes to the surrounding road network would be required. These changes to the road network are required to:

- facilitate construction of the Sussex Street bridge
- facilitate the reconfiguration of Broomfield Street and changes in Sussex Street
- facilitate the movement of construction vehicles in and out of compounds and work areas
- ensure safe movement of pedestrians and cyclists around the project
- optimise the availability of on- and off-street parking.

The proposed changes and how these would be managed is considered in Chapter 8 (Traffic, transport and access).