4.11 Landscaping and public domain works

Public Domain and Landscape plans prepared by Place Design Group are provided at **Appendix S**.

Roads throughout the subject site are to be dedicated to Council, as public roads.

A total of 33 hollow bearing trees (including peppercorn trees) are to be retained as part of the open space at the proposed Canal Park.

The majority of native vegetation, including Cooks River/Castlereagh Iron Bark Forest and Cumberland Plain within the Brunker Road Park will be retained. Some vegetation will need to be removed to accommodate a stormwater detention basin. However, the condition of vegetation within the Brunker Road Park will be enhanced through planting of native species to improve the condition of disturbed vegetation, and through weed management.

The streetscape landscaping and public open space lots are described in detail below.

Streetscape landscaping

It is proposed that roads throughout the development be landscaped with street trees and landscaping. A Streetscape Tree Planting Plan is provided as part of the landscape/public domain plans at **Appendix S**. It is proposed that street planting be undertaken in accordance with this plan and the plant schedule.

The street tree species include Kauri Pine, Brush Box, Forest Red Gum, Spotted Gum, Red Flowering Gum, Jacaranda, Kurrajong, Blueberry Ash, Claret Ash and Water Gum at the locations, heights and spacing provided in the Streetscape Planting Plan and Indicative Street Tree Schedule provided at **Appendix S**.

Public domain lots

The detailed design of the public domain/open space lots is provided as part of the Public Domain Plans at **Appendix S**.

Northern pocket park

The small northern portion of land (0.23 hectares in area) will be undeveloped area, for stormwater management purposes as a basin to the northern stormwater catchment. The area will include vegetation for water quality treatment/filtration. The basin is accessible via a 3 metre concrete ramp for maintenance and emergency purposes only.

This lot will also provide a buffer between the Southern Sydney Freight line at the northern boundary of the site, and residential lots adjoining the site and opposite Road 4.

It is proposed that this detention basin be dedicated to Bankstown City Council.

Canal Park

Canal Park (1.41 hectares in area) is a large park located in the north eastern portion of the site. Canal Park will provide the opportunity for both passive and active recreation as will all public domain areas.

Canal Park will be dedicated to Bankstown City Council.

The landscape plan for Canal Park is provided at **Figure 28** below.

The eastern boundary of Canal Park abuts the retained lands boundary. A one (1) metre high post and rail fence is provided along this boundary. A four (4) metre landscape buffer will be provided between this fence and the 2.7 metre high palisade Sydney Water security fence, located four (4) metres east of the site boundary to the retained lands (within the Sydney Water land).

Canal Park is divided into two portions. The north-eastern portion of the site will provide passive recreational opportunities. This portion includes a number of landscape features such as mounding and hedges and retention of existing vegetation, along with sculptural elements.

The south-western portion of the site allows for active recreational opportunities with a large turfed area with no vegetation. An open plaza is also provided in the southern portion of the site. A pavilion/shade structure is provided in the open plaza area.

A pathway runs through the park along the former railway alignment, forming part of its heritage interpretation. This interpretation includes the retention of the existing Peppercorn Trees. Concrete Sleepers will be used along the pathway to add to the railway interpretation.

Barbeque facilities will be provided in the park for public use. A community kitchen will also be provided at the northern end of the park, which provides an opportunity for use by local schools for recreational purposes.

Figure 28 Canal Park landscape plan
Canal Park is located at the northern portion of the site and has an area of 1.41 hectares. The Park provides for a mix of passive and active recreational uses.
*Source: Public Domain Plans prepared by Place. Refer to **Appendix S**.*

New Cooper Road Park

The new Cooper Road park (1.25 hectares) forms part of a linear east-west pedestrian link between Canal Park and Cooper Road. The park will provide opportunity for passive recreation and will also include a series of stormwater detention basins to the proposed stormwater Catchment 2.

The landscape plan of the proposed park is provided at **Figure 29** below.

The stormwater detention basin will be turfed open space. The western basins of this space will be vegetated for water quality treatment. A bridge between the road and the pathway to Cooper Road will be located over the vegetated area, with a sculptural element being incorporated into the bridge design.

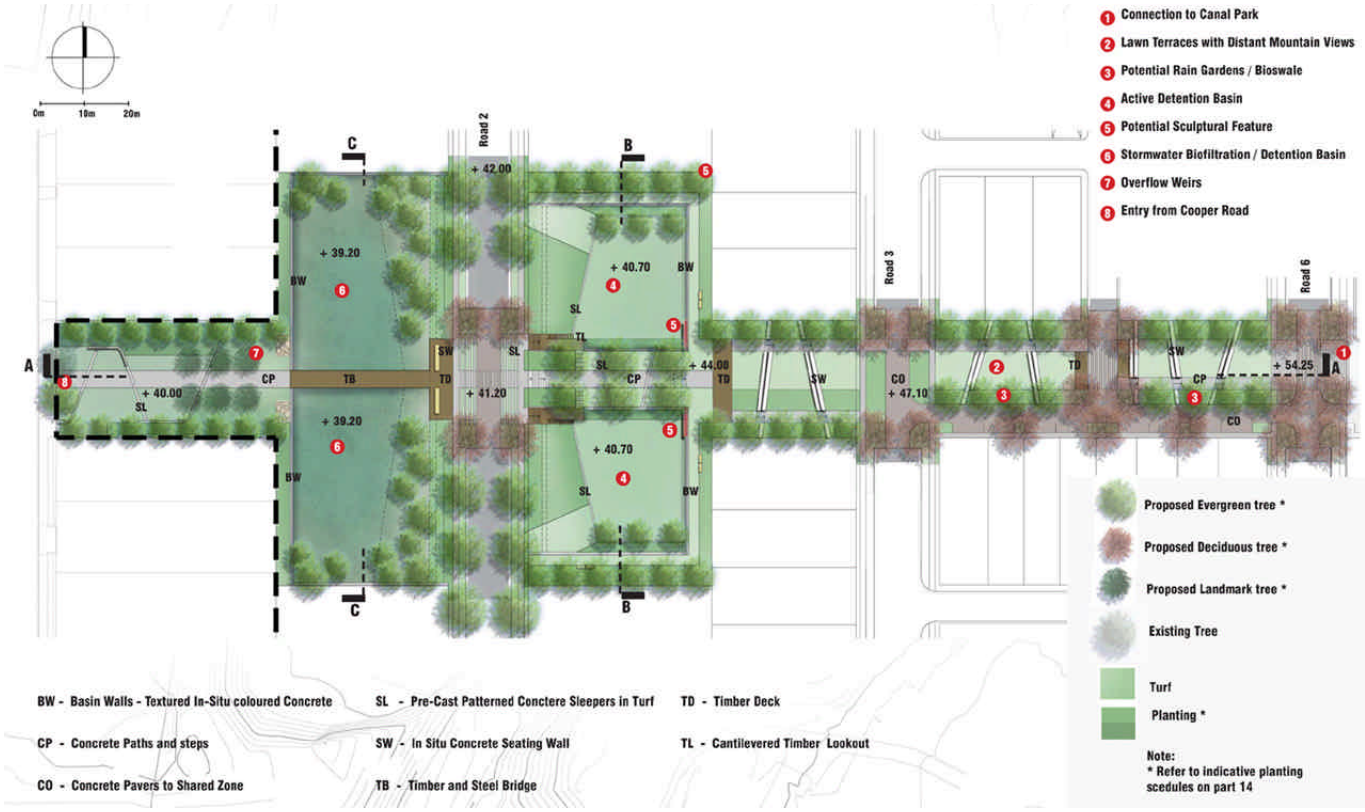

Figure 29 Proposed Cooper Road Park
Cooper Road Park is split into east and west portions, with Road 2 bisecting the site. The park also forms part of an east-west pedestrian link between Canal Park and Cooper Road.
*Source: Public Domain Plans prepared by Place at **Appendix S**.*

Brunker Road Park

The Brunker Road Park (2.78 hectares) is located at the southern end of the site. Much of the park is constrained by steep topography and existing remnant native vegetation. This park forms part of the southern gateway into the site off Brunker Road and addresses proposed Road 3.

The Brunker Road Park landscape plan is provided at **Figure 30**.

Areas of open space are scattered throughout the park. A long north-south strip of open space is provided along the entry road off Brunker Road.

Landmark trees will be planted at the Brunker Road entrance to the site, including along the boundary of the park, and in the northern portion of the park.

Much of the steep embankment area will be either regraded or revegetated. The vegetation in the park includes native flora species including Cumberland Plain Woodland.

A number of pathways will provide pedestrian circulation through the site, and onto Brunker Road and Cooper Road.

Other elements of the park include BBQ facilities; a swale network, as part of the Water Sensitive Urban Design of the stormwater management system; exercise facilities; a viewing deck from the higher eastern grounds of the park; public art and sculptures; retained native vegetation; open space areas and a detention basin in the area adjoining Cooper Road.

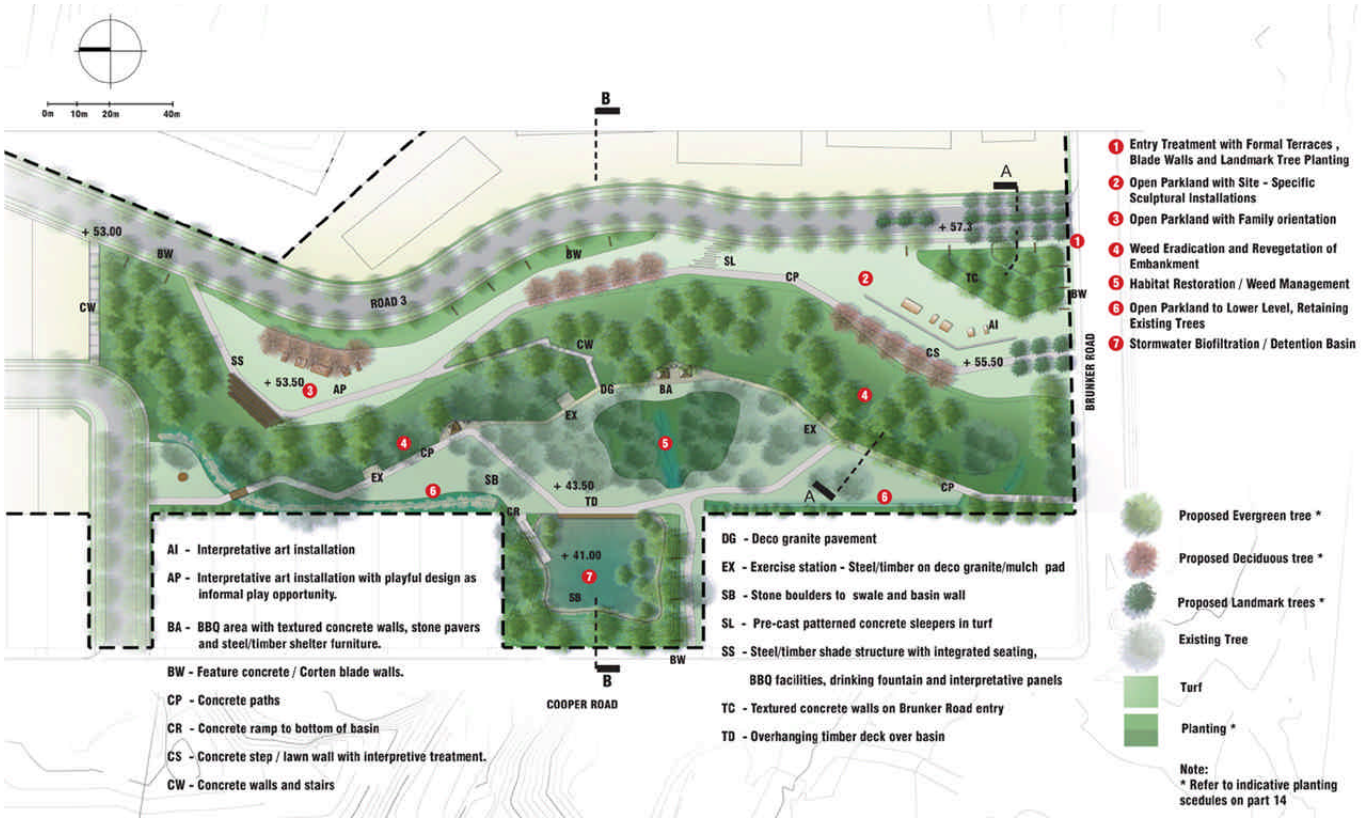

Figure 30 Proposed Brunker Road Park
Brunker Road is the largest of the proposed parks, being 2.78 hectares in area at the southern portion of the site. The park forms part of the southern gateway to the site.
*Source: Public Domain Plans prepared by Place at **Appendix S**.*

Public art

It is proposed that public art be located throughout the site, in accordance with the Landscape Report at **Appendix S**. Public art will facilitate the heritage interpretation of historic elements of the site, either through the use of sculptural elements within the public open space or through the treatment of the public domain. Play areas will also incorporate public art, through the incorporation of historic site elements in and around children's play areas. Historic industrial elements such as water pipes may also be used across the site to make reference to the historic uses of the site. Public art will be enhanced through the provision of appropriate lighting.

4.12 Heritage and interpretation

This section outlines the proposed development in relation to heritage and interpretation.

Heritage interpretation

A number of heritage interpretation works are proposed. These are detailed in the Heritage Interpretation Strategy prepared by Tanner Architects at **Appendix N**.

The following heritage design parameters form the basis of heritage interpretation on the subject site:

- *'The historic associations of the area of the former Migrants' Camp (now Mechanical Branch Plant warehouses in the North-West corner of the site) should be appropriately interpreted through signage, street names, etc.*
- *The former railway alignment and the associated cultural plantings should be conserved and interpreted in the redevelopment.*
- *Provide or enhance the vegetation buffers along the revised SHR [State Heritage Register] boundary beside the two Reservoirs.*
- *Respect the visual connections through the site and the views across the whole site.'*

In accordance with the above parameters, the following heritage interpretation options are proposed for the subject site:

Migrant Workers Camp

- The proposed changes in threshold to be reflected through variations in pavement and material in a manner that reinterprets the location of the former Migrant Worker's Camp in the north western corner of the site.
- Interpretive marker located in the small recreation area within the immediate vicinity of the Migrant Camp.

Native and exotic plantings on the Potts Hill Reservoirs Site

- Retention of the row of Eucalypts along the former railway siding and inclusion in the residential subdivision, with an appropriate curtilage allowed for the tree survival.
- Views to row of Canary Island Date Palms to be retained and enhanced.
- Incorporate use of native species which reflect the species maintained on and significant to the site.

- Interpretive marker located within one of the northern recreation areas within the vicinity of the retained eucalyptus trees.

Development of Potts Hill in relation to the development of the water industry and urban services

- Use of water features in recreation areas as a representation of the overall significance of the site.
- General interpretive marker at each entrance to the site.
- Naming the proposed streets to correspond with notable individuals of Sydney Water.

Figure 31 Defunct water carrier pipes
Former pipes may be used as sculptural elements throughout the site.
Source: Heritage interpretation Plan

Achievements in hydraulic technology

- Incorporation of sculptural elements, such as former pipes (refer to **Figure 31**) and machinery in accordance with the proposed artistic/sculptural display.
- Interpretive marker located within the proposed Brunker Road Park to work in conjunction with artistic/sculptural display.

Railway as a key method of transportation of goods and people in the area from the 1860s

- Reinterpretation of the former railway siding through the location and configuration of Road 5 with the existing eucalypts maintained along the siding to reinforce the alignment.
- Concrete sleepers to be incorporated into the proposed Cooper Road Park to emulate railway sleepers.
- Former carriage that has been retained on the site to be incorporated into sculptural art display within one of the northern passive recreation areas.
- Interpretive marker located in one of the northern recreation areas within the immediate vicinity of the former railway alignment.

Continue growth and operation of reservoirs and Potts Hill site

- Vistas to each of the reservoirs.
- Interpretive markers located within the recreational areas where views to the reservoirs are most evident.

A detailed outline of the heritage interpretation options is provided at **Appendix N**.

Moveable heritage

It is proposed that moveable heritage located on the subject site will be registered/ catalogued, stored, displayed or exhibited in accordance with the Moveable Heritage Policy and Procedures Manual, provided at **Appendix O**.

Registration of moveable heritage items and details of their storage and display are to be provided to the Director, Heritage Office of the Department of Planning prior to determination of this Project Application.

Indigenous heritage management

It is proposed that indigenous heritage management measures and requirements be implemented during the undertaking of works on the subject site in order to ensure Aboriginal cultural significance is preserved.

These measures and requirements provided in the Preliminary Indigenous Heritage Management Sub-Plan provided as part of the Preliminary Construction Environmental Management Plan at **Appendix G** are to be implemented on the subject site.

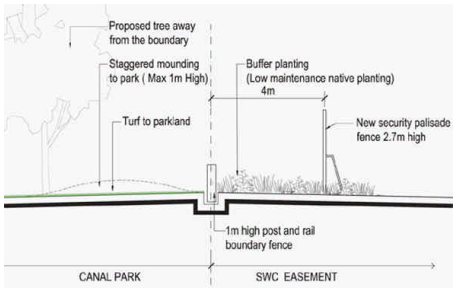

Figure 32 Public open space interface to retained lands
The 2.7 metre high security fence to the retained lands is setback from the site boundary. A 4 metre landscape buffer separates the fence from the public open space. A one metre high post and rail fence is situated in front of the landscape buffer, on the boundary of the subject site and the retained lands.
*Source: Landscape Concept Report prepared by Place at **Appendix S**.*

4.13 Interface with Sydney Water lands

The eastern boundary of the subject site will adjoin the retained Sydney Water lands. As such, appropriate security and access control measures into the Sydney Water lands need to be provided given the importance of the Potts Hill Reservoirs site on the Sydney Metropolitan water network.

It is proposed that a security fence be erected along the eastern boundary of the site. The Conditions of Approval to Concept Plan MP 07_0099 require that the interface to the Sydney Water operational lands (the eastern section of the boundary) be addressed in the Residential Design Guidelines and Public Domain Guidelines.

Under this application, the Landscape Concept Report provided at **Appendix S**, addresses the interface with Sydney Water lands both with the public domain and private residential properties.

As shown on Page 28 of the Landscape Concept Report, a 2.7 metre high palisade security fence will be erect along the perimeter of the boundary between the subject site and the retained Sydney Water lands.

In areas where the boundary abuts public open space or a road, the security fence will be setback four (4) metres from the boundary within the retained lands. In these areas, a 1 metre high post and rail timber boundary fence will be located along the site boundary, and a four (4) to six (6) metre planted buffer will be located between the 1 metre high post and rail timber fence and the 2.7 metre high security fence. This is illustrated in the section provided at **Figure 32**.

At the interface between the northeast and southeast medium density lots and the Sydney Water retained lands, the 2.7 metre high black palisade fence will be located along the boundary. A section of this boundary is provided at **Figure 33**.

The ground level of the low-density residential lots at the eastern boundary of the site is generally one (1) metre below that of the retained lands. A one (1) metre retaining wall will be located along the boundary of these lots to the retained lands. A one (1) metre landscape buffer will be situated above the retaining wall. This buffer is located with the Sydney Water lands. The 2.7 metre high security fence will be located behind this one (1) metre landscape buffer. An indicative section is provided at **Figure 34** below.

Plans, sections and details of the site interface with the Sydney Water retained lands are provided at **Appendix S**.

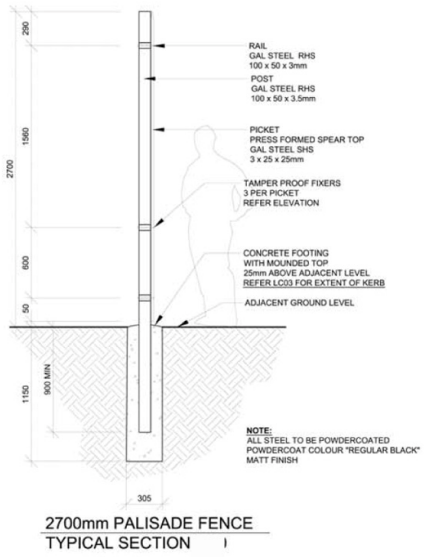

Figure 33 Medium density lot interface with retained lands
A 2.7 metre high palisade security fence will form the interface between the medium density lots and the operational lands.
*Source: Landscape Concept Report prepared by Place at **Appendix S**.*

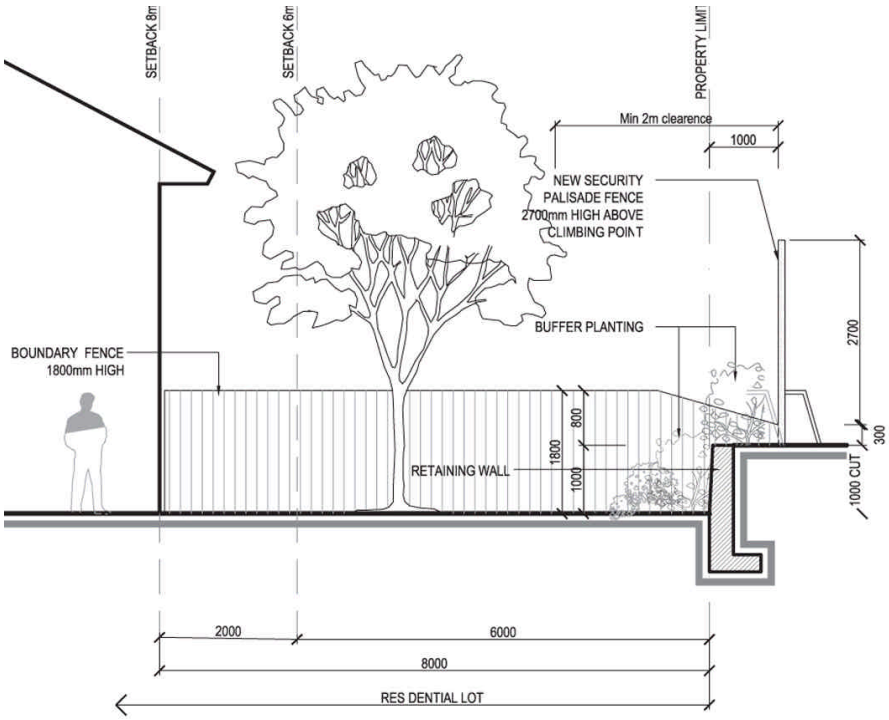

Figure 34 Low-density residential lots interface with retained lands
A one (1) metre landscape buffer will separate the low-density residential lots and the 2.7 metre high security fence. The landscape buffer will be behind the one (1) metre high retaining wall.
*Source: Landscape Concept Report prepared by Place at **Appendix S**.*

4.14 Bulk earthworks

Details regarding bulk earthworks on the subject site are provided in the Geotechnical Report at **Appendix E**, an Engineering and Infrastructure Report prepared by Cardno is provided at **Appendix H** and a Draft Construction Environmental Management Plan is provided at **Appendix G**. This section outlines the development proposal with regards to bulk earthworks.

It is proposed that bulk earthworks be undertaken on the site to make the site suitable for residential and open space uses. Bulk earthworks will optimise cut and fill, minimise the amount of surplus fill and maintain existing fill on the site where possible.

It is proposed that the following bulk earthworks be undertaken on the subject site:

- Total earthworks movement in excess of 350,000 cubic metres to prepare site for urban uses;
- Earthworks to result in an approximate surplus of 250,000 cubic metres of material (storage of material most likely to be retained on Sydney Water lands. This is subject to ongoing discussions).
- Excavation to be undertaken over approximately 70% of the total site area ranging in depths from 0.5 metres to 10 metres with the majority of excavation to be undertaken in the centre of the site (to a depth of approximately 2 to 5 metres);
- A few areas are to be excavated in excess of five (5) metres, predominately at the top of the embankment;

- Placement of fill (ranging between 0.5 metres and 2 metres) in parts of the site, with two areas at the north-eastern and western boundary of the site requiring fill in excess of two (2) metres;
- Stockpiling of excavated material;
- Off-site disposal of a small proportion of surplus materials;
- Compaction, regrading and remodelling of the site;
- Traditional cut and fill to make lots suitable for development; and
- Construction of retaining walls where required along the boundaries of the site.

Much of the subject site is fill, or 'spoil' from the construction of Reservoir 2 on the Sydney Water lands. The spoil depth varies across the site, with a maximum depth of approximately 10 metres. The spoil area (predominately in the central portion of the site) consists of four types of 'soil horizons', including:

- Horizon 1A – Generally uncontrolled fill that includes deleterious material such as builders' rubble, concrete, pipes etc.
- Horizon 1B – Generally uncontrolled fill that is free from deleterious material.
- Horizon 2 – Represents existing ground conditions prior to the placement of fill from Reservoir 2 construction.
- Rock – Existing rock profile that underlies the site.

It is proposed that 1A materials are striped from the site and screened or treated prior to either storage on the retained Sydney Water lands or disposal off site.

It is proposed that a 1 metre strip from the existing surface will be removed. Where the depth of 1A materials (described above) is greater than 1 metre, the full depth of 1A material will be removed. For example if the depth of 1A material is 0.6 metres, then 0.6 metres of 1A material and 0.4 metres of 1B material will be removed. If the depth of 1A material is 2.0 metres, then 2.0 metres of 1A material will be stripped. Refer to Engineering and Infrastructure Report at **Appendix H** for details.

Once the above material has been stripped, further consolidation and compaction of the remaining fill will be undertaken through impact rolling. This will then be followed by traditional cut and fill earthwork operations.

On the recommendation of the Engineering and Infrastructure Report at **Appendix H,** boundary offsets of proposed earthworks will be implemented in order to ensure the structural stability of surrounding development, including residential properties along Cooper Road and Reservoir 2. These offsets include:

- No earthworks machinery within 50 metres of the reservoir edge (eastern boundary); and
- Earthworks within 30 metres of the residential properties along the western boundary are to be undertaken with machinery that restricts particle velocities to less than 5mm per second.

Staging of works is described at **Section 4.8** of this report.

4.15 Site grading

It is proposed that final site levels will be graded to match existing site levels at each of the site's boundaries, with the exception of the following areas:

- Along the eastern boundary to the retained Sydney Water lands. This retaining wall varies in height from 1 to 2.5 metres. The wall is required to support the Sydney Water lands and to minimise the lot grade between Road 3 and Road 13, at the 'pinch point' of the site.
- Along the northern boundary of the site (Road 4). This retaining wall is required to support the existing open space to the north and to provide appropriate vertical road geometry. This wall is approximately 0.6 metres in height.

It is not proposed that any grading be undertaken on the medium density lots located at the northern and southern ends of the site as part of this application. A batter from the edge of the road verge to the existing site levels will be provided. This approach is also proposed adjoining the Canal Park and Brunker Road open space areas.

The grading of the site will also require a number of site treatments to reduce the impact of the grading on the useability and buildability of the lots as follows:

- 0.5 metre high berm at the front of lots.
- Maximum rear yard grade of 10%.
- Maximum 2 metre high batter in rear yard at maximum 3H:1V.
- Stepped house construction.

One of, or a combination of the above treatments are generally proposed for each lot.

Site grading is outlined in detail at Section 6 of the Engineering and Infrastructure Report provided at **Appendix H** and in the Concept Civil Design Drawings provided at **Appendix I**.

4.16 Water quality, soil and stormwater management

A number of water quality and stormwater management measures are proposed during the undertaking of site works. It is also proposed that water quality and stormwater management infrastructure and works be undertaken to minimise future ongoing impacts on water quality and ensure appropriate ongoing stormwater management following completion of site works. These measures and works are outlined in this Section.

Water quality and soil management during construction

It is proposed that appropriate water quality management measures be implemented during the undertaking of works on the subject site to minimise the risk of soil erosion and the impacts on receiving waters and environments. A Preliminary Soil and Water Management Sub-Plan is provided as part of the Draft Construction Management Plan at **Appendix G**. It is proposed that soil and water quality management measures and requirements outlined in the Preliminary Soil and Water Management Sub-Plan (discussed further under **Section 7.6** of this report) be implemented prior to and during the undertaking of the proposed site works.

Erosion and sediment control

Temporary erosion and sediment control measures will be implemented during bulk earthworks. Where possible, these works will be staged to limit the disturbance area potentially exposed to erosion at any one time.

Erosion and sediment control measures are detailed in the Engineering and Infrastructure report provided at **Appendix H**.

It is proposed that erosion and sediment control measures be undertaken in accordance with the requirements of the Preliminary Soil and Water Management Sub-Plan provided as part of the Draft Construction Environmental Management Plan at **Appendix G**.

Ongoing water quality and stormwater management

It is proposed that stormwater detention and water quality treatment be incorporated into the development to improve the quality of water discharged from the site.

The Engineering and Infrastructure Report at **Appendix H** provides a detailed overview of the water quality and stormwater drainage elements of the proposal.

The development site will consist of three (3) stormwater catchment areas. These catchment areas are identified on Drawing 600246-040 prepared by Cardno at **Appendix I**. A reduced copy is shown at **Figure 35**.

Catchment 1 is located at the northern end of the site, between the northern boundary and proposed Road 1. Catchment 2 is located in the centre of the site, south of Road 1 and north of southern lots addressing Road 7. Catchment 3 is located in southern portion of the site between Catchment 2 and Brunker Road.

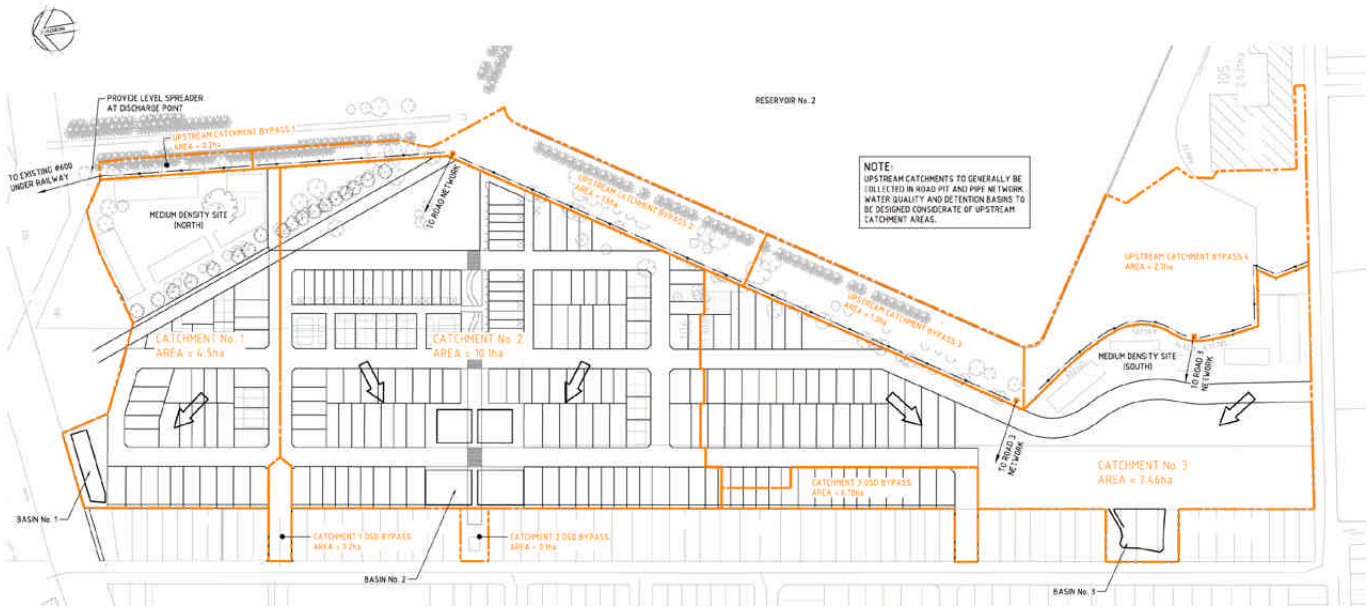

Figure 35 Proposed catchment plan
The development site will consist of three (3) stormwater catchments.
*Source: Concept Civil Design Plans prepared by Cardno at **Appendix I**.*

It is proposed that a catchment basin be located at the downstream of each catchment area (as shown at **Figure 35**). The basins will be used for stormwater detention and water quality treatment. It is proposed that the basins will be dedicated to Bankstown City Council for ownership, maintenance and operation at the registration of the lots.

The stormwater basins are located in the following sections of the site:

- Basin 1 – North-west corner of the site.
- Basin 2 – Located within the proposed Cooper Road Park. The Basin is split into four cells, bisected by Road 3 and the pedestrian link between Canal Park and Cooper Road.
- Basin 3 – Located within Brunker Road Park, fronting Cooper Road.

A detailed description of the catchment areas and basins is provided in the Engineering and Infrastructure Report at **Appendix H**.

It is proposed to adopt Landcom's Water Sensitive Urban Design Policy. This was confirmed as acceptable by Bankstown Council on 20 October 2009. Landcom's Water Sensitive Design measures and modelling are detailed in the Engineering and Infrastructure Report at **Appendix H**.

4.17 Services and infrastructure

The proposed development includes the provision of services and infrastructure to future residential lots and the public domain. An Engineering and Infrastructure Report prepared by Cardno is provided at **Appendix H** detailing the provision of services and infrastructure.

These details are summarised below.

Potable water

Potable water connections will be made to the existing water mains servicing Brunker Road and Cooper Road. Potable water supply layout will be generally in accordance with the Concept Potable Water Layout prepared by Cardno (Drawing 600246-052, Concept Civil Design Plans provided at **Appendix I**). A reduced copy of the Concept Potable Water Layout is provided at **Figure 36**.

Recycled water

Landcom is currently in negotiations with Sydney Water Corporation regarding the provision of recycled water to the site.

The Proponent seeks approval to construct recycled water mains. The mains will only be constructed if a source of recycled water is confirmed by Sydney Water Corporation prior to construction.

Sewer

It is proposed that sewer lines servicing the site will discharge into the existing network at three locations, subject to Sydney Water Corporation approval.

Existing sewer lines servicing the Sydney Water buildings on the site will be decommissioned.

Concept sewer plans are provided at Drawings 600246-050 and 600246-051 provided as part of the Concept Civil Design Plans prepared by Cardno at **Appendix I**.

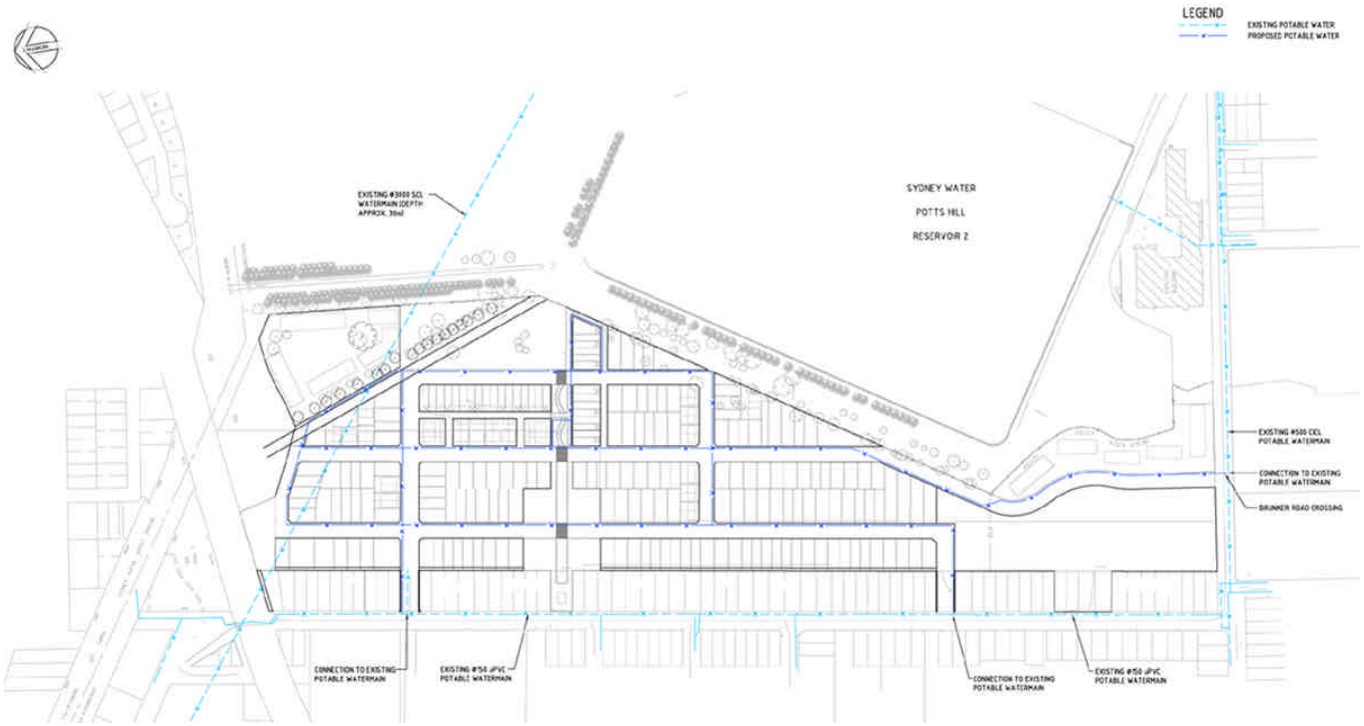

Figure 36 Concept potable water layout
The potable water supply will connect to existing water mains along Cooper Road and Brunker Road.
*Source: Concept Civil Design Plans prepared by Cardno at **Appendix I**.*

Telecommunications

Preliminary discussions with Telstra have indicated that telecommunications will be made available to the development. Details of the proposed telecommunications network to residential dwellings will be provided at the detailed infrastructure design stage.

Gas

It is proposed that reticulated gas is provided to the subject site. Preliminary advice received from Jemena, the gas servicing authority, indicate that the existing network should be capable of providing gas supplies to the existing site.

Jemena recommend that an application for gas supplies be made following the Project Application approval to allow for appropriate time for the preparation of detailed design and documentation of the proposed works.

Electricity

The site is proposed to be serviced by underground power connected to the existing electricity network. Landcom, Cardno and Energy Australia are currently in negotiations as to the relocation of existing electricity cables on the subject site.

Energy Australia has proposed a new substation to meet increasing electricity demand in Potts Hill and the surrounding area. Details regarding the timing of the new zone substation are yet to be confirmed.

Full details of the proposed electricity supply to the proposed residential development and street lighting will be provided at the detailed infrastructure design stage.

4.18 Access, traffic and transport

Access to the site will be provided via a number of pedestrian and vehicular access points along Brunker Road and Cooper Road in accordance with the approved Concept Plan 07_0099.

This section describes the proposal in regards to the proposed road layout and types; geometry; turning paths; road cross sections; pavement; internal and external intersection details; and likely traffic generation.

A Traffic and Transport Report is provided at **Appendix J**.

Road layout

The road layout has been designed to minimise the number of irregular shaped lots and to optimise solar access for residential dwellings. Accordingly, all roads generally run in a north-south or east-west direction.

The road types are summarised below. Detailed sections of each road type are provided as part of the Concept Civil Design Plans at **Appendix I**. Detailed road specifications, plans and sections will be provided to the Principle Certifying Authority prior to the issue of a Construction Certificate.

All roads include a kerb and gutter. Kerbs and footpaths are to be constructed to Bankstown City Council standards.

Road 1 (road)

Road 1 is an east-west road, providing the main vehicular access to the site off Cooper Road. Road 1 is located between Cooper Road and Canal Park.

The Road 1 road reserve is 20.1 metres which includes a 1.2 metre footpath on both sides of the road, street trees on either side and in the median strip of the road and two 5.4 metre wide carriageways (in each direction) which allow for a travel lane and parking lane.

A reduced section of proposed Road 1 is provided at **Figure 37** below.

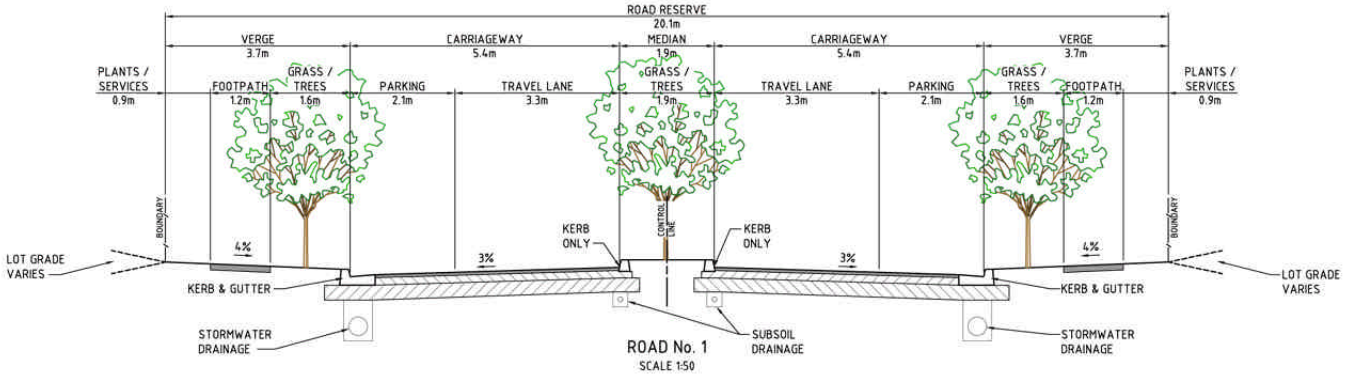

Figure 37 Road 1 section
Road 1 forms the main entrance to the site off Cooper Road.
Source: Concept Civil Design Plans, prepared by Cardno

Road 2 and 7 (local street)

Road 2 is a north-south road between Road 13 and Road 4. The road intersects with Road 7, which is an east-west road between Road 2 and Road 6.

Roads 2 and 7 have a total road reserve of 16.6 metres which includes a 9.2 metre carriageway with two (2) travelling lanes and two (2) parking lanes; and a verge of 3.7 metres on either side of the carriageway which includes 0.9 metres for plants and services, a 1.2 metre footpath and 1.6 metres for grass and trees.

A reduced section of proposed Roads 2 and 7 is provided at **Figure 38** below.

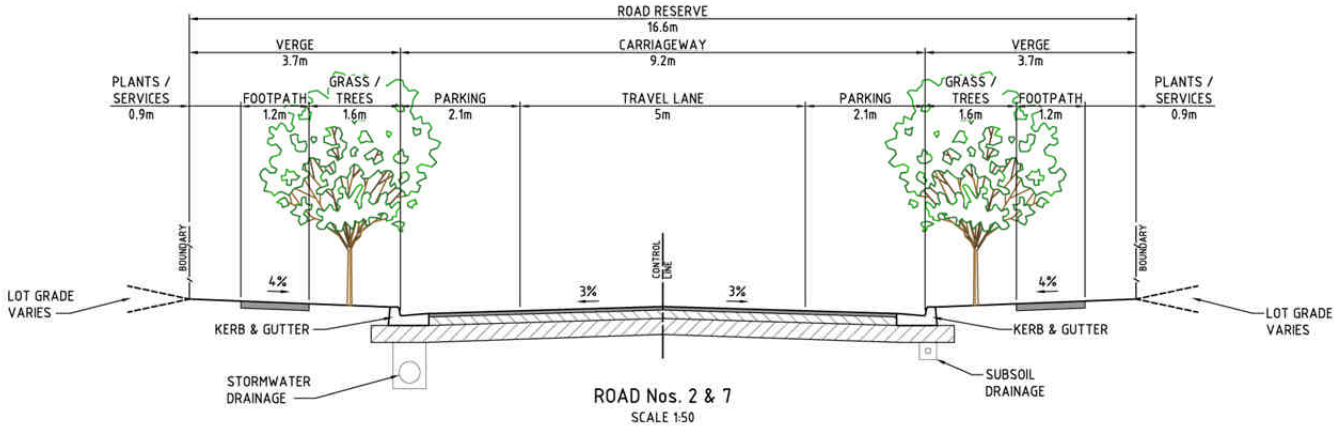

Figure 38 Roads 2 and 7 section
Roads 2 and 7 are local streets forming part of the internal road network.
Source: Concept Civil Design Plans, prepared by Cardno

Road 3 (local road)

Road 3 is a main north-south road, with an intersection to Brunker Road at the south and Road 4 to the north. A modified seagull intersection is proposed at the intersection of Brunker Road and Road 3 (discussed in detail further in this report).

Road 3 has a total road reserve of 17.4 metres which includes a 9.6 metre carriageway providing two (2) travel lanes and two (2) parking lanes; and a road verge of 3.9 metres on either side of the road which includes 0.9 metres for plants and services, a 1.2 metre footpath and 1.8 metres for grass and trees.

A reduced section of proposed Road 3 is provided at **Figure 39** below.

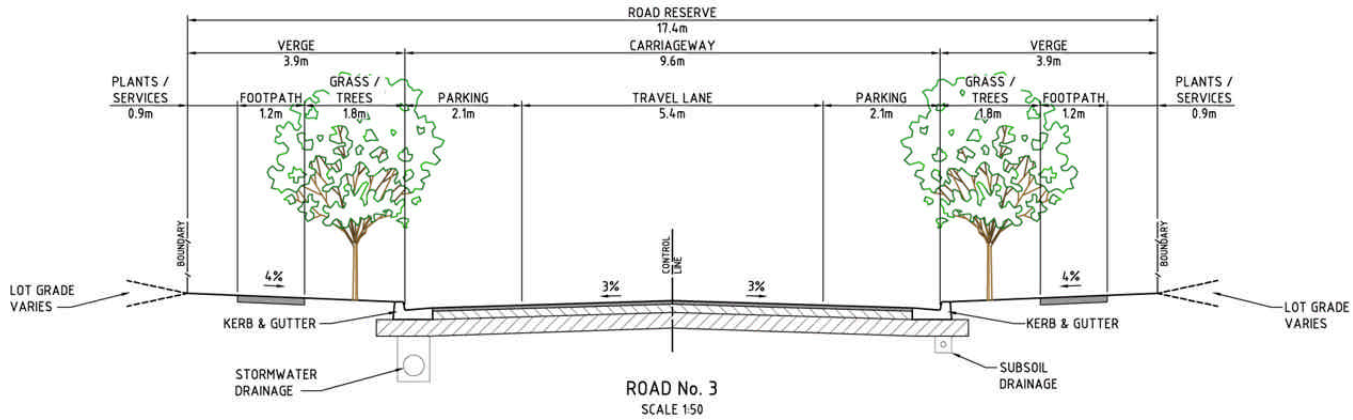

Figure 39 Roads 3 section
Road 3 forms a key north-south road, with an intersection to Brunker Road to the South.
Source: Concept Civil Design Plans, prepared by Cardno

Road 4 (Parkside minor local road)

Road 4 is an east-west road at the northern end of the site, located between Road 2 and Road 3. The northern side of the road is bounded by the proposed Northern Pocket Park/Basin 1 and the Sydney Water retained lands.

Road 4 has a total road reserve of 14.8 metres including a 7.7 metre carriageway providing a parking/travel lane in each direction. The verge adjacent to the proposed open space/basin is 3.1 metres wide and includes a 1.2 metre footpath and 1.9 metres for grass and tree planting. The verge adjacent to residential properties is 4 metres wide and includes 0.9 metres for plants and services, a 1.2 metre footpath and 1.9 metres for grass and tree planting.

A reduced section of proposed Road 4 is provided at **Figure 40** below.

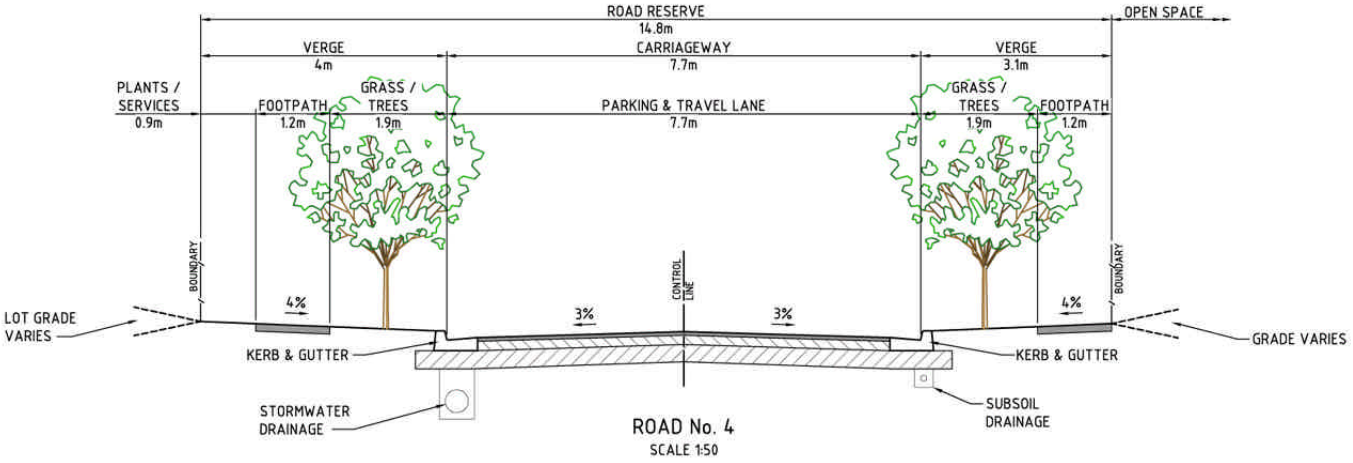

Figure 40 Roads 4 section
Road 4 is an east-west road located adjacent to the northern boundary to the Sydney Water retained lands and the proposed open space/Basin 1.
Source: Concept Civil Design Plans, prepared by Cardno

Road 5 (Shared zone)

Road 5 is a shared zone located in the northeast corner of the site, between Road 4 and Road 6. The road runs along the historic railway alignment.

Road 5 has a road reserve of 11.2 metres including a 6.1 metre travel lane, a 2.1 metre parking lane and a verge of 3 metres on one side, which includes a 1.2 metre footpath and 0.9 metres of plant and services.

A reduced section of proposed Road 5 is provided at

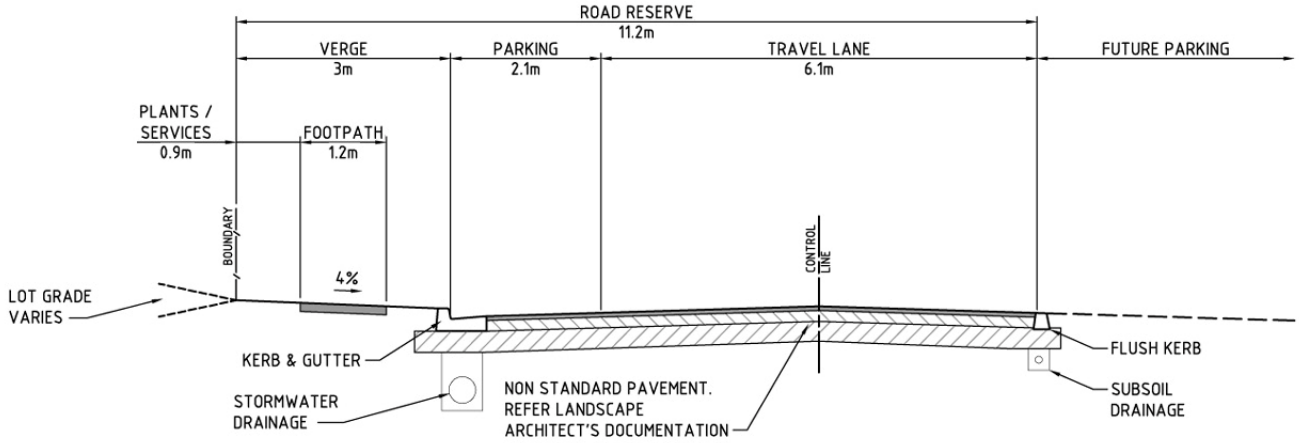

Figure 41 Road 5 section
Road 5 is a shared zone located along the former railway alignment on the site.
Source: Concept Civil Design Plans, prepared by Cardno

Road 6 (park side local road reserve)

Road 6 is a north-south road between Road 1 and Road 7. Road 6 is adjacent to Canal Park (east) and is a continuation of Road 5 (shared zone).

Road 6 has a road reserve of 16.6 metres including a 9.2 metre carriageway providing two (2) travel lanes and two (2) parking lanes (one in each direction). The verge adjacent to Canal Park is 3.4 metres wide and includes a 1.5 metre footpath and 1.9 metres for street trees and planting. The verge adjacent to residential properties is 4 metres and includes 0.9 metres for plants and services, a 1.2 metre footpath and 1.9 metres for grass and tree planting.

A reduced section of proposed Road 6 is provided at **Figure 42** below.

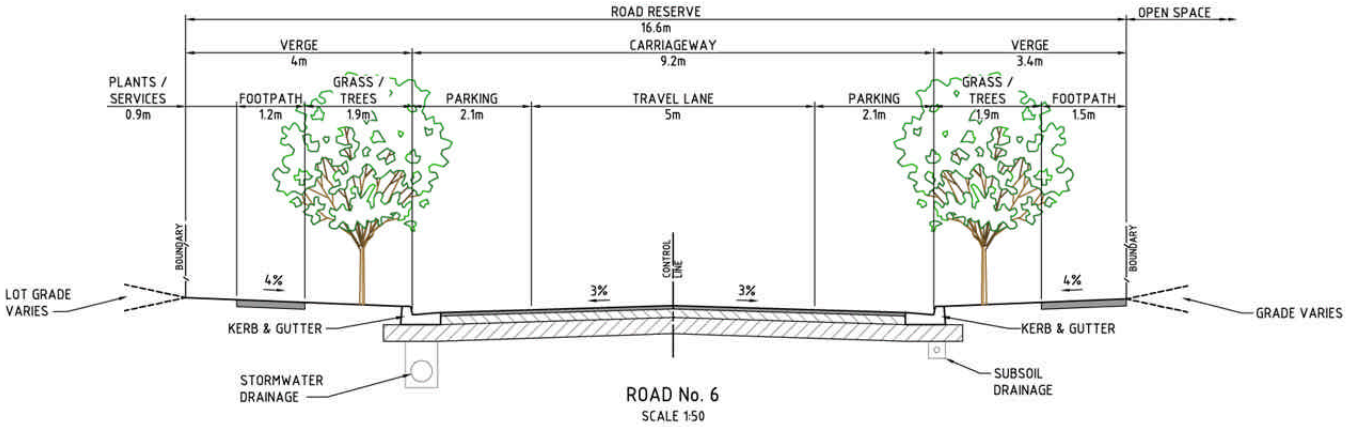

Figure 42 Roads 6 section
Road 6 is a north-south road, adjacent to Canal Park. North of Road 6 is the proposed Shared Zone (Road 5).
Source: Concept Civil Design Plans, prepared by Cardno

Road 8 and 10 (lane reserve)

Roads 8 (8A and 8B) and 10 are laneways providing vehicular access to terrace, duplex and manor home dwellings.

The laneway reserve is a total of eight (8) metres which includes a six (6) metre carriageway, a verge of 0.5 metres on one side and a 1.5 metre tree planting verge on the other.

A reduced section of proposed Roads 8 and 10 is provided at **Figure 43** below.

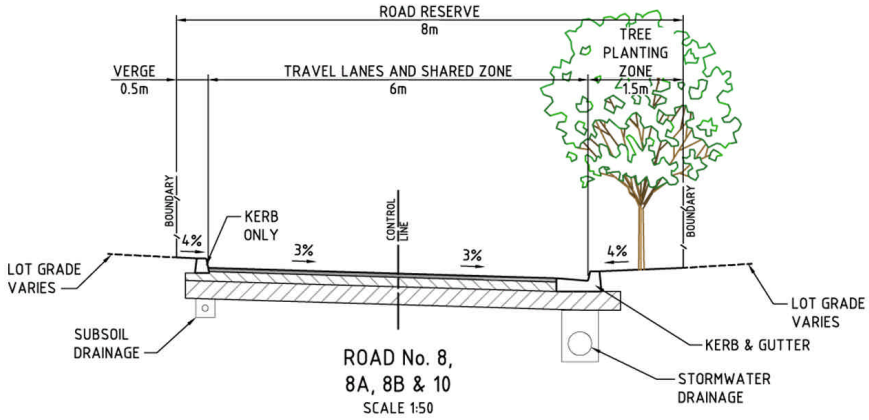

Figure 43 Roads 8 and 10 section
Road 6 is a north-south road, adjacent to Canal Park. North of Road 6 is the proposed Shared Zone (Road 5).
Source: Concept Civil Design Plans, prepared by Cardno

Road 9 and 11 (shared zone)

Roads 9 and 11 form part of the east-west shared zone between the Sydney Water boundary and Road 3.

The roads have a total road reserve of 7.6 metres which includes a 4 metre travel lane and shared zone, a 2.1 metre parking lane, a tree planting zone and a verge of 0.5 metres.

A reduced section of proposed Roads 9 and 11 is provided at **Figure 44** below.

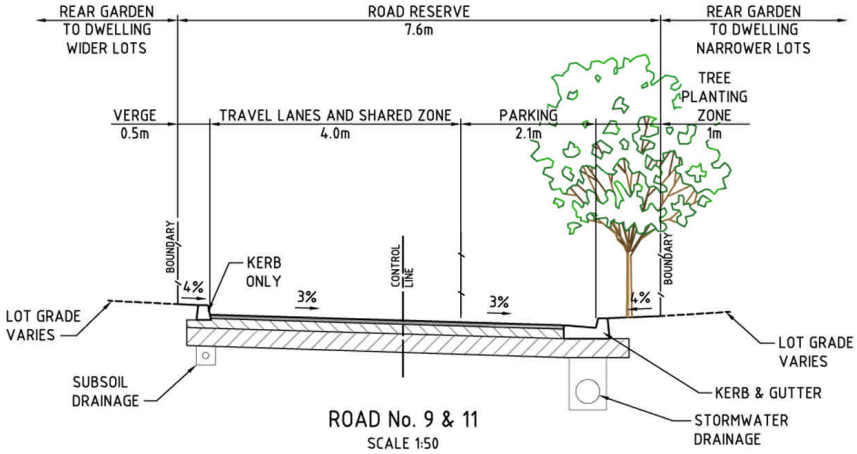

Figure 44 Roads 9 and 11 section
Roads 9 and 11 are part of the east-west shared zone. Road 11 is adjacent to Canal Park, and Road 9 forms part of the proposed Linear Park.
Source: Concept Civil Design Plans, prepared by Cardno

Road 12 (accessway reserve)

Road 12 is a north-south accessway between Roads 11 and 10, and is adjacent to the eastern boundary of the site to the retained Sydney Water lands.

The accessway has a reserve of six (6) metres including a 5.4 metre carriageway and a 0.3 metre verge on either side.

A reduced section of proposed Road 12 is provided at **Figure 45** below.

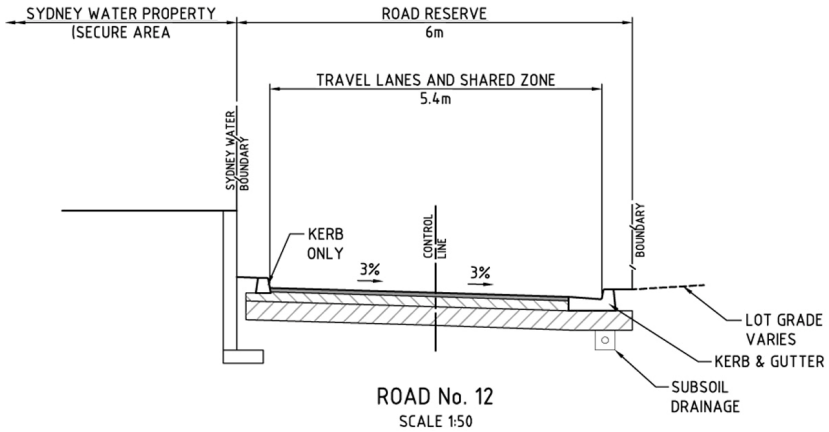

Figure 45 Road 12 section
Road 12 is a minor accessway between Road 11 and Road 10.
Source: Concept Civil Design Plans, prepared by Cardno

Road 13 (Park side local road reserve)

Road 13 is an east-west road providing access into the site off a 'T' intersection with Cooper Road (in accordance with the approved Concept Plan 07_0099) to Road 2. The proposed Brunker Road Park is located along the southern side of Road 13.

The road has a total reserve of 20.1 metres including a 9.2 metre carriageway providing two (2) travel lanes and two (2) parking lanes (one in each direction); and a verge of 5.4 metres on either side including 0.9 metres for plants and services, a 1.2 metre footpath and 3.35 metres for grass and tree planting.

A reduced section of proposed Road 13 is provided at **Figure 46** below.

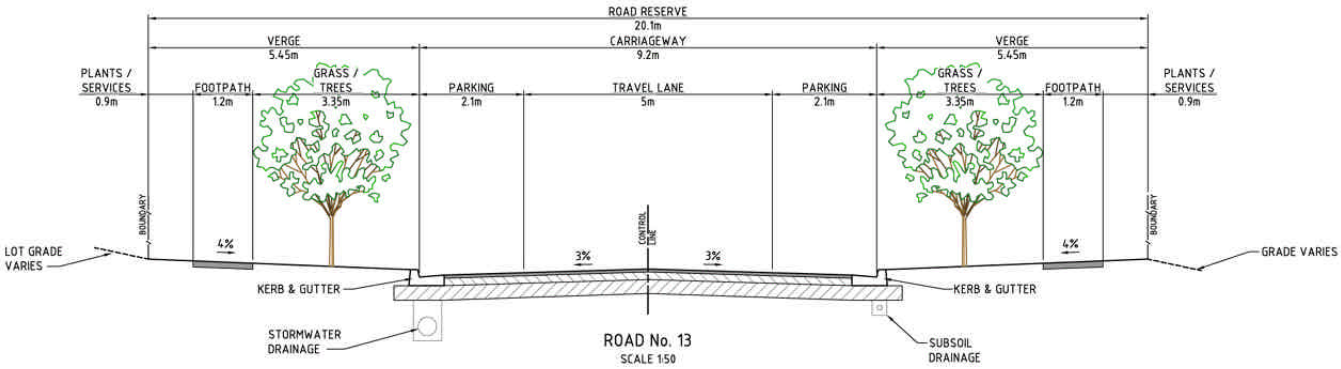

Figure 46 Roads 13 section
Road 13 is an east-west road adjacent to Brunker Road Park. Road 13 intersects with Cooper Road in accordance with the approved Concept Plan 07_0099.
Source: Concept Civil Design Plans, prepared by Cardno

Road geometry

Details of the proposed road geometries, speed limit design, road bends, grades and curves are provided in the Engineering Report provided at **Appendix H**, the Concept Civil Design Plans at **Appendix I**, and the Traffic and Transport Report at **Appendix J**.

Turning paths

The proposed road turning paths have been designed to accommodate a 9.9 metre long rigid garbage truck.

Road cross sections

Although a number of road types are proposed, generally it is proposed that all roads (excluding the shared zone), or as otherwise shown on the typical road sections provided in the Concept Civil Design Drawings at **Appendix I**, provide:

- A verge width of between 3.1 metres and 3.9 metres;
- A 1.2 metre wide footpath to Council standards generally 0.9 metres off the boundary except in open space areas;
- A vegetation/planting area between the edge of the footpath and the kerb. This area is generally between 1.6 and 1.9 metres wide.
- Concrete kerb and gutter to Bankstown City Council standards.

- Parking areas 2.1 metres wide.
- Carriageways of various widths.

The shared-ways generally provide an area of 6 metres for combined travel and parking.

Road pavement

It is proposed that road pavement be of 'flexible' construction, consisting of a prepared subgrade, granular subbase course, granular base course and asphalt wearing course.

The proposed road pavement is detailed in the Engineering and Infrastructure Report at **Appendix H**.

External intersections

Three external intersections are proposed in accordance with the approved Concept Plan 07_0099. These intersections include:

- Road 3 and Brunker Road – Modified seagull intersection.
- Road 1 and Cooper Road – Roundabout.
- Road 13 and Cooper Road – 'T' intersection.

Road 3 and Brunker Road

A modified seagull intersection is proposed at the intersection of proposed Road 3 and Brunker Road. This intersection is illustrated at **Figure 47** below.

The intersection will allow for right hand turns into Road 3 off Brunker Road, via a right-hand turning lane. No right turns will be permitted off Road 3 onto Brunker Road.

Associated intersection and road works on Brunker Roads will be undertaken by the Proponent.

An assessment of this intersection in relation to the Concept Plan 07_0099 is provided at **Section 6.6** of this report.

Detailed plans and a description of the proposed intersection are provided as part of the Traffic Report at **Appendix J**.

Figure 47 Intersection of Brunker Road and Road 3
A modified seagull intersection is proposed at Brunker Road and proposed Road 3.
Source: Traffic plans…

Road 1 and Cooper Road

A roundabout is proposed at the intersection of proposed Road 1 and Cooper Road, in accordance with the Concept Plan 07_0099. This intersection is illustrated at **Figure 48** below. Detailed plans and a description of the proposed intersection are provided as part of the Traffic Report at **Appendix J**.

All required intersection and road works will be undertaken by the Proponent. These works include:

- Relocation of the driveway entrance to the Birrong Girls High School carpark to form the 'fourth leg' of the intersection;
- Construction of a new stormwater drainage along the eastern kerb of Cooper Road from Road 1, to the existing low point, approximately 165 metres south of Road 1. This drainage is required to drain the kerb and gutter and low point that will be created following construction of the roundabout.
- Resolution as to whether minor land acquisition is required to permit splay corners at the intersection. This is to be resolved in consultation with affected land owners, and detailed prior to issue of a Construction Certificate.

Figure 48 Intersection of Cooper Road and Road 1
A roundabout is proposed at the intersection of Cooper Road and Road 1. It is also proposed that the entrance to the car park of Birrong Girls High School be relocated to form the 'fourth leg' of the roundabout.
*Source: Traffic and Transport Report provided at **Appendix J**.*

Road 13 and Cooper Road

A 'T' intersection is proposed at the intersection of proposed Road 13 and Cooper Road. This intersection is illustrated at **Figure 49** below.

It is proposed that all construction and road works related to the proposed intersection be undertaken by the Proponent. This includes the resolution as to whether minor land acquisition is required to splay corners of the intersection. This is to be resolved in consultation with affected landowners and detailed prior to the issue of a Construction Certificate.

An assessment of this intersection in relation to the Concept Plan 07_0099 is provided at **Section 6.6** of this report.

Detailed plans and a description of the proposed intersection are provided as part of the Traffic Report at **Appendix J**.

Figure 49 Intersection of Cooper Road and Road 13
A 'T' intersection is proposed at Cooper Road and Road 13.
*Source: Traffic and Transport Report provided at **Appendix J**.*

Internal intersections and speed controls

Internal road intersections will generally be treated as standard 'T' or four-way intersections as appropriate. At selected intersections, kerb blisters or similar controls will be provided to reduce the speed environment. Such traffic calming measures may also be incorporated at other locations around the site. Refer to Concept Civil Design Drawings at **Appendix I**.

Other speed controls to be used throughout the intersection, as listed in the Traffic and Transport Report at **Appendix J**, include:

- Road narrowing;
- Provision of on-street parking to introduce friction; and
- Differential paving to define areas of changed conditions such as pedestrian activity areas.

Shared bicycle pedestrian strategy

A shared bicycle/pedestrian strategy is required under Condition B7 of the Concept Plan Approval MP 07_0099 having regard to the 'Guidelines for Walking and Cycling' prepared by the NSW Department of Planning.

In consultation with Council, and in accordance with the Concept Plan MP 07_0099 Statement of Commitments, the Proponent is to construct a pedestrian footpath along the eastern side of Brunker Road and a shared pedestrian/cycle path along the northern side of Brunker Road. The provision of these paths will complement the existing pedestrian and cycle network.

Figure 50 illustrates the proposed pedestrian and bicycle network connections, including the shared cycle/pedestrian path on the northern side of Brunker Road and the pedestrian path along the eastern side of Brunker Road.

Traffic generation

It is estimated that traffic generation of the proposed residential precinct, when occupied, will be significantly less than the concept plan approval. The current plan will generate an estimated 293 traffic movements per hour, compared to 432 under the Concept Plan, as a result of the changes in dwelling yield between the Concept Plan (which included less apartment dwellings) and the current proposal traffic generation calculations.

The traffic distribution resulting from the proposed development is generally consistent with the Concept Plan assumptions. The notable difference between the traffic generated by the proposed development compared to concept plan assumptions is that more traffic is expected to travel from the site, north via Auburn Road and Amy Street. The traffic assessment finds that this will only result in an increase of 4% in traffic flows to Amy Street, which is considered to have an insignificant impact on the local road network.

Traffic generation details are provided in the Traffic and Transport Report provided at **Appendix J**.

Figure 50 Pedestrian/Bicycle plan
This plan illustrates the proposed pedestrian and bicycle links in relation to the surrounding area and uses. The pedestrian paths and bicycle network connect into existing surrounding networks.
Source: Traffic and Transport Report provided at ***Appendix J****.*

4.19 Construction Management

Construction of bulk earthworks and infrastructure is to be undertaken in accordance with the Preliminary Construction Environmental Management Plan provided at **Appendix G**. The Preliminary Construction Environmental Management Plan has been prepared in accordance with Condition B6 of the Concept Plan Approval 07_0099.

As detailed in the Preliminary Construction Environmental Management Plan, the construction management plan applies to the following works (at a minimum):

- Site establishment and security;
- Establishment of Environmental and Safety Controls;
- Establishment of Traffic Control Measures;
- Construction of road/site access;
- Bulk earthworks (cut and fill as required);
- Installation of servicing infrastructure;
- Landscaping; and
- Site disestablishment.

It is proposed that all environmental management works be undertaken in accordance with the Construction Environmental Management Plan and all associated Sub-Plans, in accordance with the Preliminary Construction Environmental Management Plan provided at **Appendix G**.

It is proposed that the Preliminary Construction Environmental Management Plan be updated following approval of this Project Application in accordance with all relevant conditions imposed on the consent.

It is proposed that confirmation be sought as to whether a licence is required from the Department of Environment, Climate Change and Water for the proposed excavation works. Confirmation will be sought prior to the issue of a Construction Certificate. Should a licence be required, the conditions of the licence will be incorporated into the Construction Environmental Management Plan. This is discussed further under **Section 6** of this report.

It is proposed that a detailed Construction Traffic Management Plan be prepared prior to the undertaking of bulk earthworks and construction works on the subject site. The Construction Traffic Management Plan is to be prepared in accordance with the Traffic and Transport Report provided at **Appendix J**.

4.20 Environmental management measures

It is proposed that environmental management measures be implemented in accordance with the Preliminary Sub-Plans provided in the Preliminary Construction Environmental Management Plan at **Appendix G**. The environmental management measures are in relation to the following (discussed further under **Section 7** of this report):

- Air quality and dust management;
- Soil and water management;
- Contaminated land management (subject to separate Section 75W Modification Application to MP 08_0116 MOD 1);
- Waste management;
- Flora and fauna management;
- Indigenous heritage management; and
- Noise and vibration management.

4.21 Section 94 contributions

Condition C8 of the Concept Plan MP 07_0099 Conditions of Approval (provided at **Appendix T**) requires that Section 94 Contributions be determined at each future application. Under the **Concept Plan**, the following Section 94 Contribution commitments were made:

Community services and facilities (social sustainability)

- Community buildings Contribution towards the upgrading of Community Centres in accordance with Bankstown Council's Section 94 Contributions Plan (2002). Contribution to be made prior to issue of subdivision certificate for subsequent applications for residential subdivision within the residential precinct.
- Libraries Contribution towards the upgrading of Library in accordance with Bankstown Council's Section 94 Contributions Plan (2002).
- Contribution to be made prior to issue of subdivision certificate for subsequent application;
- Urban Villages and CBD Public Domain
- Urban Villages and CBD Improvements Contribution towards the upgrading of Urban Villages and CBD in accordance with Bankstown Council's Section 94 Contributions Plan (2002).
- Contribution to be made prior to issue of subdivision certificate for subsequent applications for residential subdivision within the residential precinct.
- Section 94 Administration & Studies Contribution towards Section 94 Administration and Studies in accordance with Bankstown Council's Section 94 Plan (2002) where contributions provided.

  Contribution to be made prior to issue of subdivision certificate for subsequent applications for residential subdivision within the residential precinct.

Open space and recreation

- Open space land Dedication to Bankstown City Council of public open space land, including the revised 'Cooper Rd' park, at no cost to

Council in lieu of S94 contributions for open space acquisition. Quantum of open space to meet or exceed accepted benchmark of 2.83 hectares per 1000 people.

Provision to be made in conjunction with future project applications for residential precincts/ stages. Dedication to occur at a time agreed by Council and applicant.

Open space embellishment

- Embellishment of public open space land, at no cost to Council in lieu of S94 contributions for open space embellishment. Works to be to the satisfaction of Council.

  Embellishment to be detailed in future project applications for residential precincts/ stages. Embellishment works to occur in conjunction with development of associated residential precinct/stage.

Bushland works

- Rehabilitation works to south-west bushland area (proposed "Brunker Park") to an appropriate standard to be confirmed with Bankstown City Council in lieu of S94 contributions for bushland and biodiversity projects.

  Rehabilitation to occur in conjunction with development of associated residential precinct or stage, or earlier date as agreed by applicant and Council.

Council have since update the Section 94 Contributions Plan. The current Plan is the Section 94A Development Contributions Plan 2009. This requires a 1% levy on all development certificates for development over $200,000 outside of the Bankstown City Centre. As stated in the Strategic Social Plan provided at **Appendix U**, the following Section 94 Contributions are recommended for this **Project Application**:

- Embellishment to Council standards and dedication of public open space at no cost to Council in lieu of Section 94A contributions for open space embellishment.
- Provision of a combined cycleway/pedestrian path on the northern side of Brunker Road between Cooper Road and Graf Avenue including a safe crossing of Brunker Road.
- Provision of a footpath on the eastern side of Cooper Road between the Southern Sydney Freight Line and Brunker Road including safe crossings (determined in consultation with Bankstown City Council).
- Provision of a footpath on Bagdad Street to Auburn Road to an appropriate standard.
- Provision of traffic management works on Cooper Road at Birrong Girls High School and Birrong Boys High School.
- Contributions towards the upgrading of Yagoona Multipurpose Centre in accordance with the Section 94A plan.
- Contributions towards the upgrading of libraries and resources in accordance with the Section 94A plan.
- Contribution towards updating Birrong Shopping Centre in accordance with the Section 94A plan.