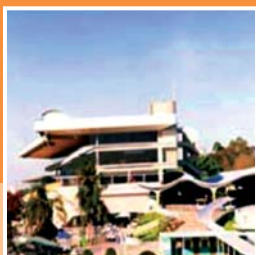
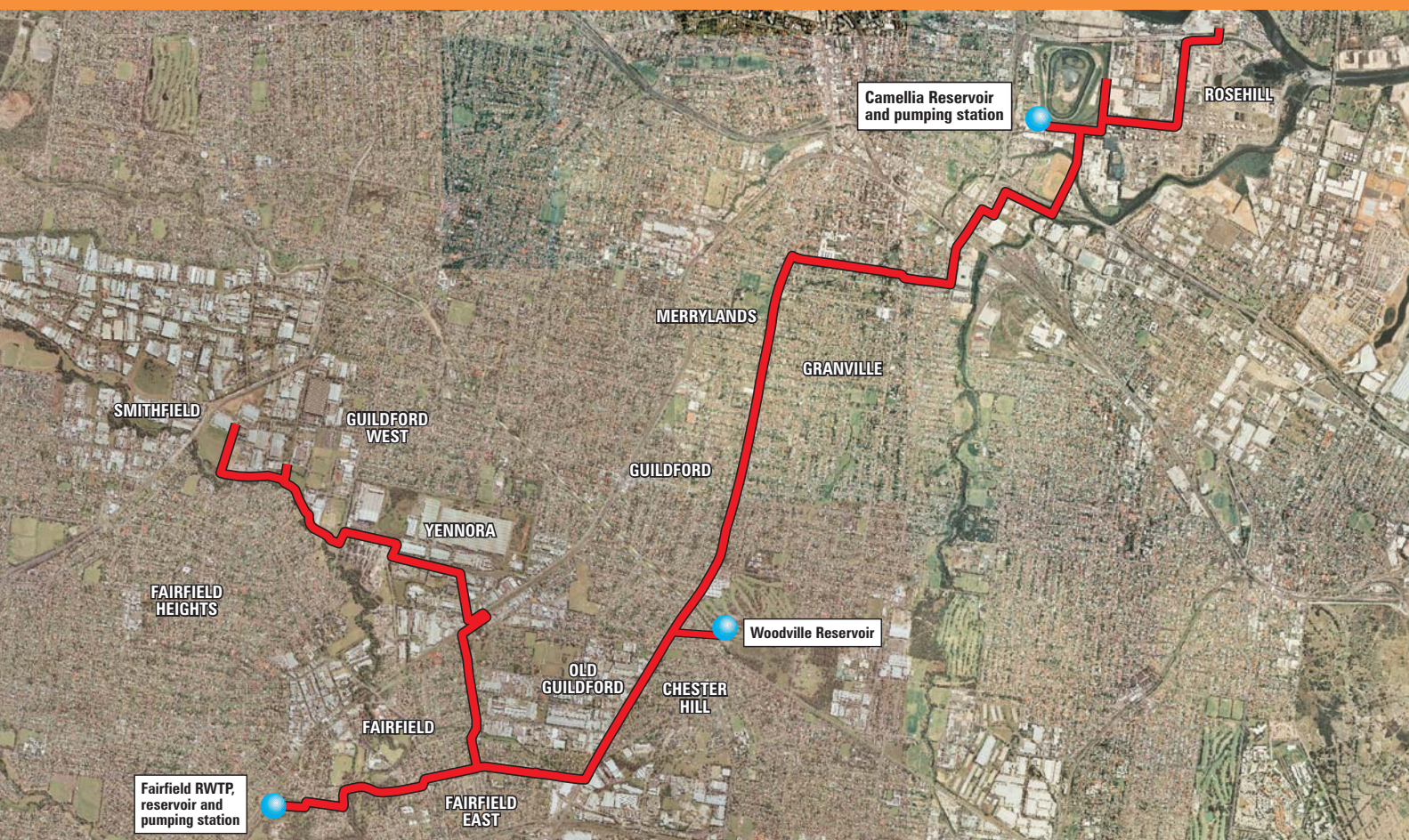


CAMELLIA RECYCLED WATER PROJECT

Preliminary Environmental Assessment Report

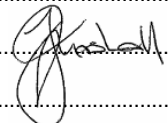


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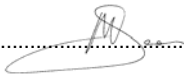
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Executive summary

Background

This report comprises a preliminary environmental assessment for the proposed development of a recycled water scheme between Fairfield and Camellia in western Sydney (the proposal). It accompanies a Major Project Application under the provisions of Part 3A of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act). The purpose of this document is to provide information about the proposal and its potential environmental impacts to enable the NSW Department of Planning to issue formal requirements for a detailed Environmental Assessment of the proposal under the Act.

The proponent of the development is Alinta Asset Management Pty Ltd (Alinta). Alinta is an Australian infrastructure company involved in the development, operation, maintenance and management of infrastructure assets. Alinta was listed on the Australian Stock Exchange (ASX) in October 2000 and is an ASX Top 100 company. It has operations and investments that span five states of Australia and New Zealand.

Proposal description

The proposed Camellia Recycled Water Project would form a component of the NSW Government's 2006 Metropolitan Water Plan. The proposal comprises the construction of a reverse osmosis recycled water treatment plant (RWTP) at Fairfield, approximately 20 kilometres of water main, three above ground storage reservoirs, and pumping stations at two locations along the line of the main. The scheme would initially supply recycled water to 7 'foundation' customers and 6 'non-foundation' customers between Smithfield and Camellia. The scheme would have sufficient capacity for possible future extensions to the Liverpool, Wetherill Park and Parramatta/Westmead areas.

Alinta would construct, own and operate the proposed recycled water distribution network. Alinta would also retail the recycled water to the non-foundation customers. Veolia Water would construct, own and operate the RWTP. Sydney Water is the project sponsor and would initially retail the recycled water to the foundation customers.

The project would take approximately 2 years to build at an estimated cost of \$100 million. The proposal is expected to be operational by 2011.

Planning approval process

Part 3A of the EP&A Act establishes an assessment and approval regime for major infrastructure projects. Part 3A applies to development that is considered to be a major project by either a state environmental planning policy or a ministerial order.

Schedule 1, Group 8, Clause 26 of the State Environmental Planning Policy (Major Projects) 2005 describes development for the purpose of sewage and related wastewater treatment plants that have a capital investment value of more than \$30 million as development to which Part 3A of the EP&A Act applies. The capital investment value of the proposed RWTP is approximately \$50 million, and hence satisfies this criterion.

Clause 75B(3) of the EP&A Act provides that if Part 3A of the Act only applies to part of a project, then all related development shall be assessed as a single project under Part 3A.

The NSW Minister for Planning has formed the opinion that the proposal is development of a kind described in Schedule 1, Group 8, Clause 26 of the State Environmental Planning Policy (Major Projects) 2005, and, therefore, declared it to be a project to which Part 3A of the EP&A Act applies.

In accordance with Section 75F of the EP&A Act, an Environmental Assessment will need to be prepared for the proposal.

Proposed scope of the Environmental Assessment

Based on the preliminary environmental assessment in this report, key issues that would receive detailed consideration as part of the Environmental Assessment of the proposal are:

- construction traffic
- operational noise at the RWTP
- construction impacts to terrestrial and riparian ecology.

These issues would form the focus of the Environmental Assessment and project-specific mitigation measures would be identified for these issues.

The 'other' issues associated with the proposal are expected to be of lesser consequence than the key issues and would be able to be managed through the application of best practice environmental management and mitigation measures and other safeguards. Further investigation of some aspects of the other issues may be required, and would be undertaken during preparation of the Environmental Assessment or at other stages of the environmental assessment process. The other issues are:

- construction noise and vibration
- contaminated soil
- aquatic ecology
- energy use and greenhouse gas emissions
- waste
- air quality
- visual
- erosion and sedimentation
- social and economic benefits
- heritage
- hazards.

Conclusion

A scope for an Environmental Assessment of the proposed Camellia Recycled Water Project has been developed based on the current concept design of the proposal and the preliminary investigations undertaken in conjunction with this preliminary environmental assessment report.

As identified above, there are a number of key issues associated with the construction and/or operation of the proposal that would require further investigation during preparation of the Environmental Assessment. These investigations would assist in further determining the nature and extent of the proposal's potential impacts on the environment.

There are also a number of other issues that could be effectively managed and/or mitigated through the implementation of best practice environmental management and mitigation measures and other safeguards. Further investigation of some aspects of the other issues may be required, and would be undertaken during preparation of the Environmental Assessment or at other stages of the environmental assessment process.

It is expected that the proposed investigations would confirm the current assumptions that the issues can be appropriately managed by standard construction mitigation measures. If unforeseen issues arise during the preparation of the Environmental Assessment, they would be further investigated and documented in the report.

1. Introduction

1.1 Background

This report comprises a preliminary environmental assessment for the proposed development of a recycled water scheme between Fairfield and Camellia in western Sydney (the proposal). It accompanies a Major Project Application under the provisions of Part 3A of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act). This document has been prepared by Parsons Brinckerhoff Australia (PB) on behalf of Alinta Asset Management Pty Ltd (Alinta).

On 1 August 2007, Alinta requested confirmation from the NSW Minister for Planning that the proposal is a project to which the State Environmental Planning Policy (Major Projects) 2005 applies. Alinta also sought the Minister's authorisation for the submission of a project approval under Part 3A of the EP&A Act. The Minister has formed the opinion that the proposal is development of a kind described in Schedule 1, Group 8, Clause 26 of the State Environmental Planning Policy (Major Projects) 2005, and, therefore, declared it to be a project to which Part 3A of the EP&A Act applies (refer Appendix A).

The purpose of this document is to provide additional information about the proposal and its potential environmental impacts to assist the NSW Department of Planning to issue formal requirements for a detailed Environmental Assessment of the proposal in accordance with Part 3A of the EP&A Act. This document, therefore, supports the formal request for environmental assessment requirements.

1.2 Proposal overview

The proposal comprises:

- construction of a reverse osmosis recycled water treatment plant (RWTP) at Fairfield with a peak output of 20 megalitres per day (ML/day) of recycled water
- secondary effluent as feedstock for the RWTP to be sourced from the Liverpool to Ashfield Pipeline (LAP) currently under construction
- approximately 20 kilometres (km) of primary recycled water main in public roads and public reserves through four local government areas, including 5 kilometres of water main to be inserted into isolated Alinta gas mains along Woodville Road between Fairfield East and Granville
- off takes from the water main at seven 'foundation' customers and six 'non-foundation' customers
- sufficient capacity in the water recycling plant to extend the distribution network to the Liverpool, Wetherill Park and Parramatta/Westmead areas to supply additional customers
- two storage reservoirs and a pumping station at Rosehill Gardens Racecourse in Rosehill
- a storage reservoir at Woodville Golf Course at Guildford.

The project would take approximately 2 years to build at an estimated cost of \$100 million.

This document provides general environmental, social and economic information about the proposal context. Detailed information about the proposal and its likely environmental impacts will be provided in the future Environmental Assessment.

1.3 Proposal need and justification

The proposal is a component of the NSW Government's 2006 Metropolitan Water Plan.

The 2006 Metropolitan Water Plan sets out how the NSW Government will achieve its objective of providing a secure supply of water that can meet the long-term needs of Sydney, ensuring that water supplies are adequate during drought, and minimising costs to the community and the environment. The Plan recognises recycled water as delivering multiple benefits including reducing demand on the potable water system and benefits for riverine aquatic habitats by reducing the level of nutrients discharged by wastewater treatment plants. Also, because recycled water supply is not dependent on rainfall, it can reduce the impact of future droughts by reducing pressure on rain-fed storages (NSW Government 2006).

The 2006 Metropolitan Water Plan contains initiatives to increase the current level of recycled water use fourfold, from 15 billion litres per year to over 70 billion litres per year. The Camellia Recycled Water Project is recognised within the Plan as the first of a number of projects with strong prospects of increasing the use of recycled water within Sydney.

1.4 Proponent

The proposal proponent is Alinta Asset Management Pty Ltd (Alinta), an Australian infrastructure company involved in the development, operation, maintenance and management of infrastructure assets. Alinta was listed on the Australian Stock Exchange (ASX) in October 2000 and is a ASX Top 100 company. It has operations and investments that span five states of Australia and New Zealand.

The NSW Government called a Registration of Interest (ROI) for the proposal in December 2005. Under the ROI, Sydney Water Corporation (Sydney Water) sought interest from the private sector for the provision of recycled water to industrial users and open space users at Camellia, and the potential to expand the recycled water service to surrounding areas and beyond. The NSW Government assessed the ROIs and received a range of proposals, from which it short-listed three consortiums. Alinta and Veolia Water (the 'AVA Water Consortium') are now in direct consultation with Sydney Water regarding the project.

Alinta would construct, own and operate the proposed recycled water distribution network. Alinta would also retail the recycled water to the non-foundation customers. Veolia Water would construct, own and operate the RWTP. Sydney Water is the project sponsor and would initially retail the recycled water to the foundation customers.

1.5 Stakeholder consultation

Alinta has been an active participant in the consultation process led by the Independent Pricing and Regulatory Tribunal (IPART) and the NSW Department of Water and Energy during the development of the NSW *Water Industry Competition Act 2006* (WIC Act).

Alinta has closely engaged with Sydney Water regarding the scope of the proposal, including access to treated effluent as feedstock, access to Sydney Water owned land for the proposed RWTP, and the retailing and pricing of recycled water generated by the proposal.

Alinta has commenced consultation with the councils for the local government areas affected by the proposal (Bankstown, Fairfield, Holroyd and Parramatta). Alinta has consulted each council regarding the overall project, and specifically in relation to access to local roads and public open spaces.

Alinta is currently developing a Stakeholder and Community Strategy to ensure effective consultation with all relevant stakeholders, including government agencies and the local community, during the planning approval process including during preparation of the Environmental Assessment for the proposal.

2. Proposal description

The key components of the proposed Camellia Recycled Water Scheme are:

- a connection to the Liverpool to Ashfield Pipeline
- a RWTP, feed effluent storage tank and pumping station at Fairfield
- a distribution system including:
 - an elevated surface reservoir at Woodville Golf Course on Barbers Road at Guildford
 - two surface reservoirs and a pumping station at Rosehill Gardens Racecourse at Rosehill
 - approximately 20 kilometre of pipeline.

The key components of the scheme and its connection to the Liverpool to Ashfield Pipeline are described in more detail in the following Sections.

The location of the proposal is shown in Figure 2-1 and the more detailed route maps in Appendix B. The proposed construction methodology for each section of the pipeline is provided in Appendix C.

Liverpool to Ashfield Pipeline

Sydney Water is currently constructing a new 24 kilometres wastewater pipeline from Liverpool Sewage Treatment Plant (STP) to an existing sewer at Ashfield. The Liverpool to Ashfield Pipeline is part of the South Western Sydney Sewerage Scheme and will provide additional wastewater transfer capacity for the growing population of south-western Sydney.

Construction of the Liverpool to Ashfield Pipeline began in November 2006 and is scheduled for completion in late 2008. Secondary effluent is expected to be available in the pipeline no earlier than July 2010.

When the Camellia Recycled Water Project commences operation, the Liverpool to Ashfield Pipeline would supply secondary treated effluent feedstock to the proposed RWTP at Fairfield.

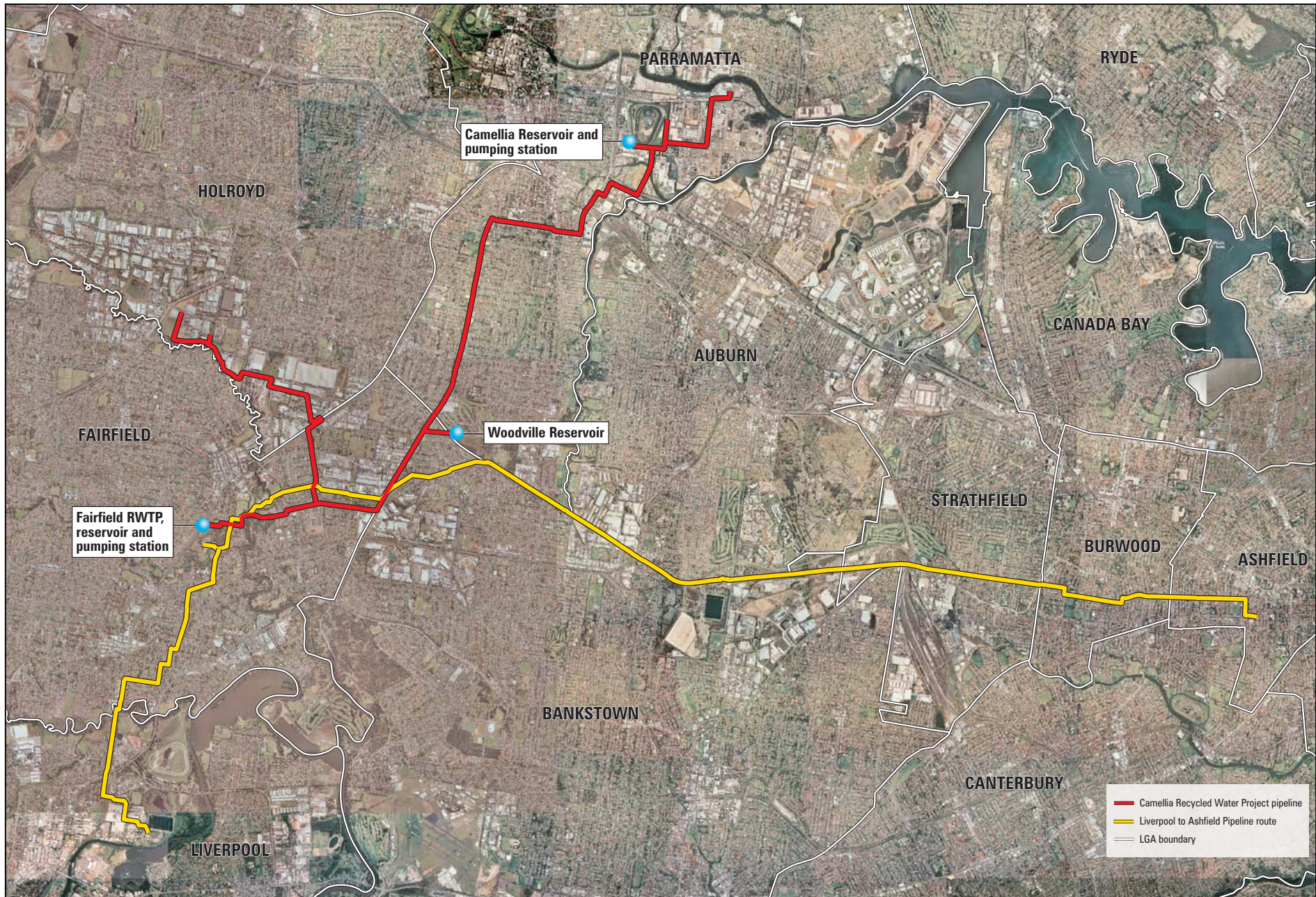


Figure 2-1 Local context

2.1 Recycled Water Treatment Plant

A RWTP, pumping station and storage tank are proposed to be located on a parcel of unused land adjacent to Sydney Water's Fairfield Storm Sewage Treatment Plant (SSTP). The affected land is owned by Sydney Water.

Land uses in the vicinity of the proposed RWTP and pumping station include detached residential dwellings on the northern side of North Street, a railway corridor to the west of the site, and vacant land and the Fairfield SSTP to the east and south of the site.

The RWTP would have an initial treated water output of 20 ML/day and sufficient capacity to expand to an output of 25 ML/day to meet expected future demand for recycled water.

Waste streams generated by the RWTP would include:

- microstrainer backwash water
- ultrafiltration backwash water, chemical enhanced backwash and 'clean in process' waste
- reverse osmosis concentrate.

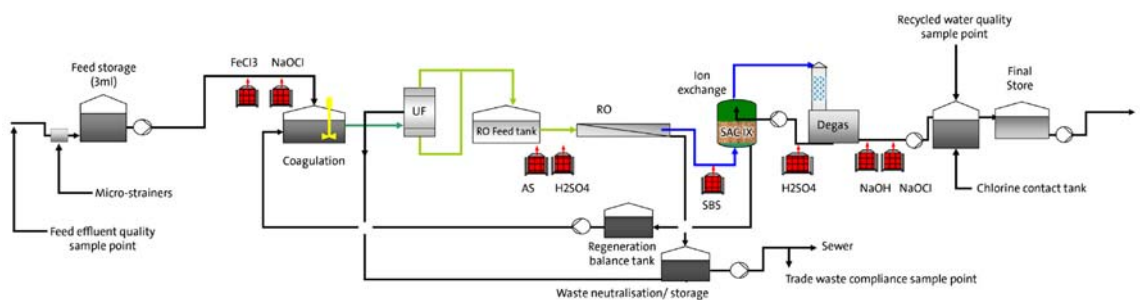
It is proposed that these process wastes be discharged to the sewerage system.

The RWTP would operate 24-hours per day.

A pilot plant investigation would be undertaken for at least five months prior to the design and construction of the RWTP.

Figure 2-2 shows a schematic of the proposed RWTP.

Figure 2-2: Schematic of the RWTP



2.1.1 Feed effluent storage tank

The feedstock to the RWTP would comprise a blend of secondary treated effluent from Glenfield and Liverpool STPs which will be transferred to the RWTP via the Liverpool to Ashfield Pipeline. The plant includes a 3 ML feed storage tank to assist in managing variations in feed effluent quantity and quality. This tank would provide several hours storage of feed effluent at the design recycled water production rate of 20 ML/day.

The plant design incorporates a mechanism to divert recycled water that does not meet Sydney Water’s quality specifications. Instances in which recycled water does not meet Sydney Water’s quality specifications are known as ‘quality excursions’. In most circumstances, as soon as a quality excursion is confirmed, the recycled water would be immediately diverted to a wastewater pit for discharge to the sewerage system (with the process waste). As the sewerage system has a limited capacity, the RWTP would immediately be reduced to the minimum operating rate. Provided that recycled water quality returns to normal within a few hours, it is likely that customers would not be impacted as the pipeline network has sufficient capacity to cater for this duration of downtime.

2.1.2 Fairfield pumping station

The proposed Fairfield pumping station would have a pumping capacity of 28 ML/day. Variable speed pumps are proposed in a duty/duty/standby arrangement.

2.2 Distribution system

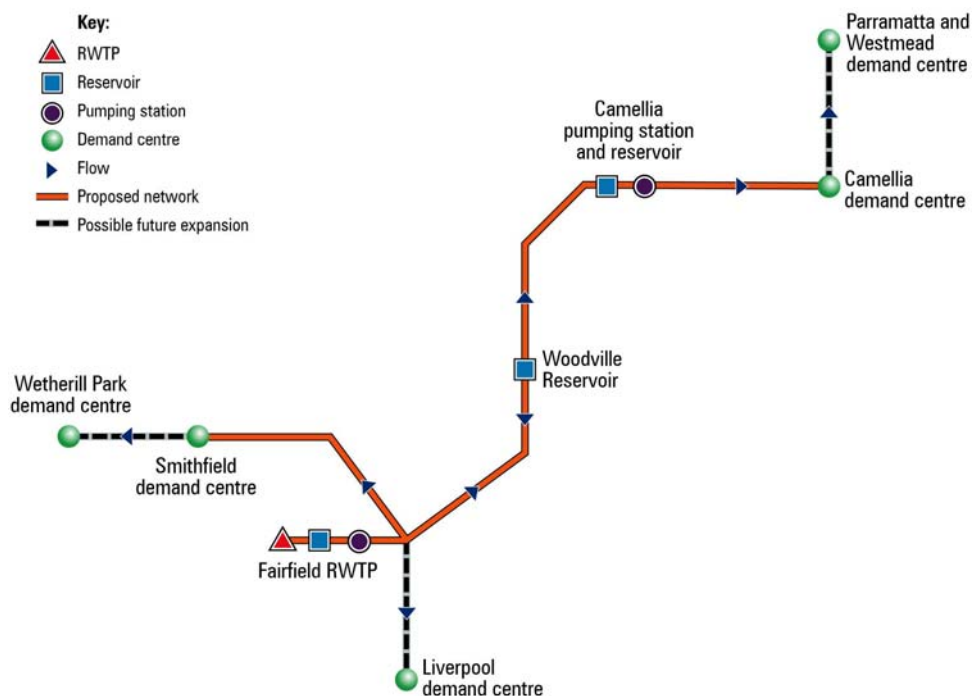
The recycled water distribution system would comprise two key zones based on the demand centres of Smithfield and Camellia.

Recycled water would be pumped from the RWTP to a proposed elevated reservoir at Woodville Golf Course (Woodville Reservoir) and directly to the Smithfield demand centre. Recycled water would gravitate from the Woodville Reservoir to the proposed Camellia Reservoir at Rosehill Gardens Racecourse.

The storage within the distribution system is sufficient to meet the peak daily demand for the seven foundation customers over three consecutive days without the need for top-up with potable water.

A schematic of the distribution system is shown in Figure 2-3.

Figure 2-3: Distribution system overview



Detailed maps and a description of the alignment are provided in Appendices B and C respectively.

2.2.1 Woodville Reservoir

An elevated surface reservoir, the Woodville Reservoir, is proposed on the southern boundary of Woodville Golf Course, on the northern side of Barbers Road. The reservoir would be located between the golf course maintenance building and Sydney Water's water supply pipelines, which are located on the southern boundary of the golf course. Construction of the reservoir would require the removal of approximately 17 Casuarina trees. The location of the reservoir has been agreed in discussions between Alinta and Parramatta City Council, the owner of Woodville Golf Course. Surrounding land uses include a turf business, the water supply pipelines, and detached residential dwellings to the south and west.

The Woodville Reservoir would comprise a single, cylindrical storage tank of approximately 16 metres diameter and 3.6 metres height. The tank would have a storage capacity of approximately 0.7 ML and would be mounted on a supporting structure. The base of the tank would be approximately 5 metres above ground level, resulting in the top of the tank being approximately 8.6 metres above ground level.

Pumping from the pumping station at the RWTP would be controlled by the water level in the Woodville Reservoir and pressure levels measured at a foundation customer site.

The Woodville Reservoir would maintain supply to the Smithfield demand centre when the pumps at the RWTP are not operating.

2.2.2 Camellia Reservoir and pumping station

A surface reservoir, the Camellia Reservoir, and a pumping station are proposed in the south-western corner of the Rosehill Gardens Racecourse at Rosehill. The affected area of the racecourse is a grassed drainage area.

Rosehill Gardens Racecourse is owned by the Sydney Turf Club.

The Camellia Reservoir would comprise two, cylindrical storage tanks of approximately 25.4 metres diameter and 6 metres height. Each tank would have a storage capacity of approximately 3 ML.

Land uses in the vicinity of the Camellia Reservoir and pumping station are industrial. There are no residential receivers in the vicinity.

2.3 Construction methodology

Alinta and its construction contractor(s) would construct the proposed sections of pipeline to minimise disruptions and impacts to traffic and local residents and businesses.

Construction of the proposal would be limited to public roads and public reserves. Construction of the pipeline would occur at an average lay rate of approximately 30 metres per day. Actual lay rates for each section of the pipeline would vary from a few metres per day up to almost 75 metres per day, depending on the construction methodology of the pipeline section and environmental constraints of the location. As discussed in Chapter 4, the proposal would result in traffic and access, noise and other environmental impacts

during construction. A range of methodologies would be implemented to minimise these impacts.

Utilisation of existing isolated Alinta gas mains

A key benefit of the proposed construction methodology is the utilisation of existing isolated Alinta gas mains along Woodville Road between Fairfield East and Granville and underneath the railway corridor at Clyde Railway Station. The methods proposed to utilise these existing gas mains would reduce the amount of surface disturbance required compared to trenching and therefore the extent of impacts to traffic and surface land uses. There would also be reduced generation of spoil.

The following Sections describe the proposed construction methodologies along Woodville Road and at Clyde Railway Station.

Woodville Road, Fairfield East to Granville

Along Woodville Road, an existing 12-inch isolated Alinta gas main would be 'pipeburst' to enable a larger pipe to be inserted.

Pipebursting involves splitting an existing pipeline by a hydraulic or pneumatic nose cone. The nose cone is attached to the new pipeline which is then pulled through the existing pipeline. Once the nose cone has cracked the existing pipe and pushed the pieces out into the surrounding ground, a void is created for the new pipeline to travel into as it follows immediately behind. A risk of pipe bursting is the potential for heaving of the ground surface above the pipebursting works.

Pipebursting of the isolated gas main under Woodville Road would be undertaken in sections. Access pits would be excavated at both ends of each section.

The isolated gas main under Woodville Road dates from the period when coal was used to generate gas, known as town gas. When natural gas was later introduced, the gas distribution was pressurised and many large diameter gas mains were degassed and isolated, including the isolated gas main under Woodville Road.

Town gas mostly comprised of methane, but also included a number of impurities such as ethane, propane, light hydrocarbons, dust, and other substances as a result of the production process. Isolated gas mains that date from the town gas era can retain a film of impurities along their internal surfaces. The impurities can also travel under gravity and collect at low points in the gas distribution network. The isolated gas main under Woodville Road includes several syphons located at low points along the main.

Alinta has surveyed the condition of some sections of the isolated gas main under Woodville Road by passing a camera through the main. The sections of the gas main surveyed were found to be generally dry and dusty. Sludge was observed at the syphons. Where possible, this sludge would be removed prior to the proposed pipebursting works (refer Section 4.2.4). There is potential for the proposed pipebursting works to provide a pathway for impurities to be transferred to the ground around the gas main (refer Section 4.2.1).

Alinta has conducted a pipebursting trial on a section of the isolated gas main under Woodville Road. The trial demonstrated the suitability of pipebursting technology to the development of this section of the recycled water distribution system.

Clyde Railway Station

At Clyde Railway Station, the proposed pipeline would be inserted directly into an existing isolated Alinta gas main. The proposed construction methodology would not affect the existing ground conditions along the line of the existing main.

Boring

Boring is proposed where the pipeline crosses arterial roads to avoid traffic disruptions. Boring is also proposed where the pipeline would cross the railway corridor at Yennora Railway Station and at the railway crossing on Grand Avenue in Rosehill. Proposed boring methods include thrust, case and stitch boring.

Each section of boring would require excavation of a bore and receiving pit.

Horizontal directional drilling

Where the pipeline is proposed to cross waterways it would be constructed by horizontal directional drilling. This construction method involves drilling a small diameter pilot hole using a drill head and drill rod launched from a drilling rig. The pilot hole is then enlarged to construct a borehole of sufficient size to accommodate the recycled water pipe. Drilling and pipe installation is generally carried out using a drilling fluid, usually bentonite slurry. The drilling fluid acts as a lubricant and a method of returning drilling cuttings to the surface for treatment. Drilling can occur across long distances, thereby avoiding impacts at the ground surface under which the pipeline is laid. Construction of the pipeline's crossing of waterways by horizontal directional drilling would therefore avoid direct impacts to these ecologically sensitive areas.

Pipe bridges

A pipe bridge is a section of elevated pipeline. Pipe bridges are proposed where the proposed pipeline intersects with water supply pipelines on Woodville Road and Barbers Road in Guildford and at crossings of some drainage channels.

Trenching

Trenching is proposed along all other sections of the proposed distribution system. Trenching works would occur on a 'block-by-block' basis with blocks being closed to traffic and detours implemented. Excavated spoil would generally be loaded directly onto trucks and transported off-site to a temporary storage compound or directly to a waste disposal facility. Trenching, laying of the pipeline and backfilling of the trench would all occur on the same day so that local residents of the affected block would have vehicular access to their properties outside of construction work hours. Emergency vehicle access would be maintained at all times.

Where trenching of the pipeline is proposed on a section of the alignment adjoining industrial, business or educational land uses, night-time or weekend works and works during school holiday periods would be considered to minimise disruption to these land uses.

Alinta's construction contractor(s) would further develop the construction methodology for the proposal and would prepare construction work method statements. The Environmental Assessment and a Construction Environmental Management Plan would contain measures to manage and minimise construction impacts.

2.4 Options

Various options were considered during the preparation of a concept design for the proposal. The basic parameters that guided the design philosophy of the proposal were:

- sourcing of feed water from the Liverpool to Ashfield Pipeline
- potential to utilise vacant land at the Fairfield SSTP
- supplying recycled water to large industrial and irrigation customers in the demand areas of Camellia and Smithfield
- availability of public roads and public open spaces for network construction
- avoiding major roads and intersections.

The options considered included:

- placement of the RWTP at Woodville Golf Course. This location is at a higher elevation and located closer to the Camellia demand centre than Fairfield SSTP, and would have lower main laying and pumping costs. A disadvantage of this option is the impacts it would have to the golf course
- placement of the RWTP at Camellia. This option would involve using raw sewage as the feedstock to the RWTP. Compared to the proposal, this option would result in a more complex and expensive plant. The industrial nature of the sewage in the Camellia area would also make treatment to suitable standards more difficult
- placement of the RWTP adjacent to the Liverpool STP. Investigation of the feasibility of this option determined that there was insufficient land available at this site to accommodate a RWTP. Also, this option would locate the RWTP further from the foundation customers than the proposal, and would therefore result in an increase in the length of the distribution system, operating costs and, ultimately, the cost of recycled water
- placement of sections of the distribution pipeline within the railway corridor. The benefits of this option include reduced impacts to traffic, however, there would potentially be impacts to rail operations
- installing sufficient pumping capacity at the proposed Fairfield pumping station to avoid the need for storage reservoirs and pumping stations elsewhere in the distribution system. A disadvantage of this option is that there would be no storage in the distribution system to temporarily maintain recycled water supply in the event of pump failure.

In considering options for the alignment of the proposed distribution system, Alinta focussed on the potential to utilise existing isolated Alinta gas mains in the area including along Woodville Road between Fairfield East and Granville and underneath the railway corridor at Clyde Railway Station (refer Section 2.3).

3. Planning considerations

This preliminary environmental assessment has been prepared to provide additional information to that contained in the Major Project Application in order to obtain formal environmental assessment requirements from the Department of Planning. A detailed Environmental Assessment for the proposal will subsequently be prepared as required by Section 75F of the EP&A Act.

The following Sections discuss the Commonwealth, State and local legislative and policy context of the proposal.

3.1 Commonwealth legislation

Part 3 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) states that an action that has, will have or is likely to have a significant impact on a matter of national environmental significance may not be undertaken without the prior approval of the Commonwealth Minister for the Environment and Water Resources, as provided for under the provisions of Part 9 of the EPBC Act. The EPBC Act identifies seven matters of national environmental significance:

- world heritage properties
- national heritage places
- wetlands of international importance (Ramsar wetlands)
- threatened species and ecological communities
- migratory species
- Commonwealth marine areas
- nuclear actions (including uranium mining).

A search of the Commonwealth Department of the Environment and Water Resource's Protected Matters Search Tool has been undertaken. The search results identified the Cumberland Plain Woodland endangered ecological community in the vicinity of the proposed RWTP (refer Section 4.1.3). The search results did not identify any other matters of national environmental significance in the vicinity of the proposal.

Further studies will be undertaken during preparation of the Environmental Assessment to determine whether the proposal would require the approval of the Commonwealth Minister for the Environment and Water Resources.

3.2 State legislation

3.2.1 Environmental Planning and Assessment Act 1979

Schedule 1, Group 8, Clause 26 of the State Environmental Planning Policy (Major Projects) 2005 describes development for the purpose of sewage and related wastewater treatment plants that have a capital investment value of more than \$30 million as development to which Part 3A of the EP&A Act applies. The capital investment value of the proposed RWTP is approximately \$50 million, and hence satisfies this criterion.

Clause 75B(3) of the EP&A Act provides that if Part 3A of the Act only applies to part of a project, then all related development shall be assessed as a single project under Part 3A.

The Minister for Planning has formed the opinion that the proposal is development of a kind described in Schedule 1, Group 8, Clause 26 of the State Environmental Planning Policy (Major Projects), and, therefore, declared it to be a project to which Part 3A of the EP&A Act applies (refer Appendix A).

Environmental Planning and Assessment Regulation 2000

Clause 8F of the NSW Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) identifies linear infrastructure projects as development for which the consent of the owner is not required for a project application. The proposed distribution scheme is considered a linear infrastructure project.

Alinta will give public notice of its major project application by way of an advertisement published in a newspaper circulating in the area of the proposal before the start of the public consultation period for the proposal.

Draft State Environmental Planning Policy (Infrastructure) 2006

The NSW Government is currently undertaking a major overhaul of the NSW planning system. As part of the planning reforms, the draft State Environmental Planning Policy (Infrastructure) 2006 has been developed. The draft SEPP clarifies the planning approvals process by providing greater clarity on the land zonings within which certain types of infrastructure development are permissible with or without consent.

The draft SEPP does not represent government policy. If gazetted, the SEPP is likely to be relevant to the proposal.

3.2.2 Water Industry Competition Act 2006

The objective of the NSW *Water Industry Competition Act 2006* (WIC Act) is to encourage competition in relation to the supply of water and the provision of sewerage services and to facilitate the development of infrastructure for the production and reticulation of recycled water.

Section 5 of the WIC Act prohibits the construction, maintenance or operation of any water industry infrastructure or the supply of water or provision of sewerage service by means of any water industry infrastructure otherwise than under the authority of a licence issued by the NSW Minister for Water Utilities. Under Section 10 of the WIC Act, the Minister is able to grant a network operator's licence that authorises the licensee to construct, maintain and operate water industry infrastructure.

Alinta proposes to lodge an application for a network operator's licence with the Independent Pricing and Regulatory Tribunal (IPART). It is anticipated that a licence could be granted as early as April 2008.

Under Part 6 of the WIC Act, a licensed network operator may carry out any work in or under a public road or public reserve. In accordance with Section 58, such work (other than routine connections, repairs or maintenance work) may only be carried out after the network operator has notified the local council or roads authority of the proposal and has considered any submissions made in the 40 days following the notice. Section 138 of the NSW *Roads*

Act 1993 does not apply to or in respect of anything done, or to be done, pursuant to this section Section 58 of the WIC Act.

The proposed works are being planned to be carried out either in or under public roads or public reserves in anticipation of construction commencing upon future receipt of a license under the WIC Act.

3.2.3 Energy and Utilities Administration Act 1987

In 2005, a number of changes were made to the NSW *Energy and Utilities Administration Act 1987* (EUA Act) to require large water users to prepare Water Savings Action Plans. A total of 237 business and 39 government sites using more than 50 million litres of water per year as well as 44 councils in Sydney were required to prepare Water Savings Action Plans by March 2006.

The NSW Department of Energy, Utilities and Sustainability will provide oversight and encourage businesses to implement their Plans. Under the EUA Act, the Minister for Water Utilities has the power to mandate implementation of the Plans.

Five of the seven foundation customers and two of the non-foundation customers for the proposal are on the list of organisations required to prepare Water Savings Action Plans.

3.2.4 Protection of the Environment Operations Act 1997

The NSW *Protection of the Environment Operations Act 1997* (POEO Act) establishes a regime for the licensing of certain activities for which the NSW Environment Protection Authority is the appropriate regulatory authority. Activities listed in Schedule 1 of the Act are known as 'scheduled activities' and must be undertaken in accordance with the requirements of an Environmental Protection Licence issued by the Environment Protection Authority. Alinta is in consultation with the NSW Department of Environment and Climate Change (DECC) to determine whether the proposal is an activity for which an Environment Protection Licence would be required.

3.2.5 Regional environmental plans

The Sydney Regional Environmental Plan No. 28 – Parramatta (SREP 28) applies to areas of the Parramatta and Holroyd local government areas including sections of the proposal located in Camellia.

The SREP28 defines a public utility installation as an undertaking for the purposes of providing sewerage services or water that is carried on pursuant to a Commonwealth or State Act. As the works are being conducted pursuant to the WIC Act, the proposal is considered to be a public utility installation for the purposes of the SREP28.

Under SREP28, public utility installations are permissible with consent in all zones in which the works are proposed.

3.3 Local legislation

The proposal is located in the Bankstown, Fairfield, Holroyd and Parramatta local government areas.

The relevant provisions of the local environmental planning instruments for the Bankstown, Fairfield, Holroyd and Parramatta local government areas to the proposal are discussed in the following Sections. The proposal is permissible with consent in all four local government areas. As the proposal is a major project being assessed under Part 3A of the EP&A Act, the consent authority is the NSW Minister for Planning is the consent authority for the proposal.

3.3.1 Bankstown Local Environmental Plan 2001

Within the Bankstown Local Government Area the proposal is proposed to be located within the road reserves of Woodville Road and Barbers Road. The Bankstown LEP provides that utility installations are permissible with consent in all land use zonings.

The Bankstown LEP defines utility installations to include an undertaking carried on pursuant to any Commonwealth or State Act, for the purpose of the provision of sewerage services or drainage services or the supply of water. The proposal is therefore considered to be a utility installation for the purposes of the Bankstown LEP and is permissible with consent in all land use zones within the Bankstown Local Government Area.

The land use zonings of Woodville Road and Barbers Road and the related objectives of the zonings will be reported in the Environmental Assessment.

3.3.2 Fairfield Local Environmental Plan 1994

The Fairfield Local Environmental Plan 1994 (Fairfield LEP) provides that utility undertakings are permissible with consent in all land use zonings.

The Fairfield LEP defines a utility installation to include a building or place used in pursuance of any Commonwealth or State Act for the purposes of the provision of sewerage services or the supply of water. In accordance with this definition the proposal is considered a utility installation for the purposes of the Fairfield LEP and is therefore permissible with consent in all land use zones within the Fairfield Local Government Area.

The land use zonings of land on which the proposal would be located in Fairfield Local Government Area and the related objectives of the zonings will be reported in the Environmental Assessment.

3.3.3 Holroyd Local Environmental Plan 1991

The Holroyd Local Environmental Plan 1991 (Holroyd LEP) provides that utility undertakings are permissible with consent in all land use zonings.

The Holroyd LEP (adopting the EP&A Model Provisions 1980) defines a utility installation to include a building or place used by a public utility installation. The Holroyd LEP defines a public utility installation as an undertaking for the supply of water or provision of sewerage services that is permitted in pursuance of any Commonwealth or State Act. The proposal is

therefore a utility installation for the purposes of the Holroyd LEP and is permissible with consent in all land use zones within the Holroyd Local Government Area.

The land use zonings of land on which the proposal would be located in Holroyd Local Government Area and the related objectives of the zonings will be reported in the Environmental Assessment.

3.3.4 Parramatta Local Environmental Plan 2001

The Parramatta Local Environmental Plan 2001 (Parramatta LEP) provides that public utility undertakings are permissible with consent in all land use zonings.

The Parramatta LEP defines public utility undertakings to include an undertaking carried on pursuant to any Commonwealth or State Act, for the purpose of the provision of sewerage services or drainage services or the supply of water. The proposal is therefore considered to be a public utility installation for the purposes of the Parramatta LEP and is permissible with consent in all land use zones within the Parramatta Local Government Area.

The land use zonings of land on which the proposal would be located in Parramatta Local Government Area and the related objectives of the zonings will be reported in the Environmental Assessment.

4. Summary of environmental impacts

This Chapter contains a preliminary environmental assessment of the construction and operation of the proposal. The potential impacts of the proposal are divided into key and other environmental issues based on the expected significance of the impacts.

4.1 Key environmental issues

During construction of the proposal, the key environmental issues are expected to be temporary disruptions to through and local traffic and noise impacts to local residents, although large areas of the proposal are through industrial areas. There is also potential for some impacts to terrestrial and riparian ecology, although these would be minimised through the proposed use of directional drilling under waterways.

During operation of the proposal, there is potential for noise impacts in the vicinity of the proposed RWTP and pumping stations.

The following Sections describe potential constraints on the proposal for each of the key environmental issues and outline the proposed methodology for the assessment of the potential impact of the proposal.

4.1.1 Traffic

Environmental constraints

Traffic impacts could include partial and full lane or road closures for trenching works, bore and receiving pits and pipe bursting access pits. There could also be construction impacts associated with the siting of construction compounds and the construction traffic.

The construction of the proposal would directly affect 19 traffic routes including 16 local routes, two regional routes and one State route. Table 4-1 identifies these routes and their road classifications.

Table 4-1: Roads directly affected by the proposal

Route	Local Government Area	Classification
Section 1A – RWTP to Woodville Road		
Gordon Street, Fairfield	Fairfield	Local
Tangerine Street, Fairfield East	Fairfield	Local
Section 1B – Tangerine Street to Smithfield demand centre		
Normanby Street – Crown Street, Fairfield East	Fairfield	Local
Ellis Parade – Railway Street, Yennora	Fairfield	Regional
Fairfield Street, Yennora	Holroyd	Regional
Nelson Road – Norrie Road, Yennora	Holroyd	Local
Loftus Road – Dursley Road, Yennora	Holroyd	Local
Section 2 – Woodville Road		
Woodville Road, Fairfield East to Granville	Bankstown, Fairfield, and Parramatta	State
Section 3 – Barbers Road		

Route	Local Government Area	Classification
Barbers Road, Guildford	Bankstown	Local
Section 4 – Granville to Camellia		
Elizabeth Street – New York Street – Third Street, Granville	Parramatta	Local
Factory Street, Granville	Parramatta	Local
Berry Street, Granville	Parramatta	Local
Kendall Street, Granville	Parramatta	Local
Martha Street – Deniehy Street, Granville	Parramatta	Local
Shirley Street, Rosehill	Parramatta	Local
Unwin Street – Colquhoun Street, Rosehill	Parramatta	Local
Devon Street – Durham Street, Rosehill	Parramatta	Local
Grand Avenue, Rosehill	Parramatta	Local
Thackeray Street, Camellia	Parramatta	Local

The proposal would also involve boring under some other State and regional roads but would not directly affect traffic on these routes.

The proposal would include crossings of, or works in the vicinity of several cycleways, including:

- a shared pathway along the western side of Yennora Railway Station
- a shared pathway along the northern side of Martha Street in Granville
- a shared pathway around the perimeter of the proposed RWTP site along East Parade and North Street to Lyndon Street in Fairfield.

Potential traffic impacts during construction of the proposal include:

- reduction in road capacity and subsequent congestion on principle traffic routes due to lane/road closures
- loss of vehicular access to properties
- loss of access for service vehicles and amenities (e.g. maintenance, garbage collections)
- potential delays to public transport services
- road user safety risks with moving traffic around construction work sites and compounds
- disruptions to pedestrians in the vicinity of construction work sites
- traffic and safety implications of construction vehicles (especially heavy vehicles)
- cumulative traffic impacts from other local construction or maintenance works.

From a traffic management perspective, the greatest potential for impacts to traffic is along Woodville Road as this is a major arterial road providing connections between Lansdowne and Parramatta. The affected section of Woodville Road between Tangerine Street and Elizabeth Street) contains 12 signalised intersections.

Proposed assessment methodology

A traffic impact assessment is proposed for the construction of the proposal. The assessment would identify potential impacts to local and through traffic along the proposed pipeline alignment and in the vicinity of construction work sites. Consideration would be given to the function of each road, its importance within the overall road network, traffic mix, traffic volumes, accident history, surrounding land uses, traffic and access demands, public transport provisions, and geometric details. Traffic management procedures that would need to be included in the Construction Traffic Management Plan for the proposal would be identified. The assessment would be prepared in liaison with the NSW Roads and Traffic Authority and the relevant councils.

Management and mitigation measures

The construction methodology outlined in Section 2.3 includes measures aimed at reducing the traffic impacts of the proposal. These include undertaking works on Woodville Road at night-time, and considering the access needs of adjoining land uses when scheduling trenching works. For example, works within industrial areas may be undertaken at night to ensure vehicular access is maintained to adjoining businesses during normal business hours. Also, all trenches would be backfilled and pits plated at the end of each construction day or night, so that vehicular access would be maintained when construction sites are unattended. This would ensure that local residents have morning and evening access to their properties during construction.

Other standard traffic measures relevant to the proposal, such as the preparation of Traffic Control Plans for construction work sites, would be identified in accordance with the relevant Australian standards and Roads and Traffic Authority guidelines and procedures. Alinta would notify local residents and businesses in advance of any proposed works in their vicinity. Alinta would discuss construction access arrangements with the owners of properties with specific property access requirements.

4.1.2 Noise and vibration

Environmental constraints

During operation, there is potential for noise impacts to land uses adjoining the proposed RWTP and pumping stations. The degree of potential impact would be dependent on factors such as the final design of the proposal including the location of the noise sources, characteristics of the receiving environment, and sensitivity to noise of local residential receivers.

Existing noise catchments in the Camellia area are expected to be typical of an urban amenity environment. There are no existing potentially affected sensitive receivers in the vicinity of the proposed Camellia pumping station.

Noise sources influencing current noise profiles in the vicinity of the proposed RWTP and pumping station at Fairfield are the railway line, Fairfield SSTP, and traffic movements along local roads. The only existing sensitive receivers in the vicinity of the proposed RWTP and pumping station at Fairfield are detached residential dwellings on the northern side of North Street and potentially the residential dwellings on the western side of Railway Parade, on the opposite side of the railway to the RWTP.

Noise would be generated at the pumping stations as a result of the operation of the motors connected to each pump unit. The motors would be on duty 24-hours. Considering a typical 120 kilowatts pumping unit, experience has shown that adverse incremental noise impacts may occur during the night time period at distances of up to 800 metres prior to implementing suitable ameliorative measures. Transformers may also be required to meet

power supply demand. While not generally considered a key noise source, transformers frequently contain tonal components that increase the potential for adverse community response.

Some minor impacts may be associated with the movement of road transport delivery trucks (pass by events, compression braking, reversing alarms) during both the operation and construction of the proposal.

During the construction of the proposal there is potential for noise and vibration impacts to land uses adjoining the transient construction work sites and compounds. Although the construction sequence, and intensive activities would be staged to limit emissions potential, night time and weekend construction works may be required. Any such noise and vibration impacts would be temporary and would include noise and vibration from construction and delivery vehicles, boring and drilling machinery and excavation machinery and tools.

Proposed assessment methodology

A noise and vibration assessment would be prepared to comply with current regulatory requirements including the Environment Protection Authority's (2000) Industrial Noise Policy for operation, the Environment Protection Authority's (1999) Environmental Criteria for Road Traffic Noise, the Environment Protection Authority's (1994) Environmental Noise Control Manual and the DECC's (2006) Assessing Vibration: A Technical Guideline. A quantitative noise assessment would be undertaken for the operation of the proposal. A qualitative assessment of noise and vibration impacts from the proposed construction works would also be prepared.

Process (emission data and operational parameters determined in close consultation with the design team) and site (topography, land use categories and meteorological conditions) representative factors would be adopted where possible.

Impacts would be assessed with consideration to potential noise intrusion and/or loss of acoustic amenity in the vicinity of the nearest potentially affected receivers.

Noise impacts would be assessed under both neutral and noise enhancing conditions. Potential impact footprints would be determined for a number of separate operating scenarios.

The assessment would include consideration of noise with annoying characteristics, with modifying correction factors applied consistent with Environment Protection Authority recommendations.

Management and mitigation measures

If the noise and vibration assessment determines that adopted criteria are likely to be exceeded, specific management and mitigation measures would be proposed to address these exceedances e.g. the characteristics of the structure enclosing the pumping station motors.

As necessary, additional management and mitigation measures would be implemented to limit the potential for adverse noise and/or vibration and ensure no long-term degradation in local receiving environs during both the construction and operation of the proposal.

4.1.3 Terrestrial and riparian ecology

Environmental constraints

The proposed pipeline alignment is primarily along roads and road reserves in an urban environment. Native vegetation along the route is highly disturbed, fragmented, and isolated by urban and industrial development. However, there are a number of points along the route where there is the potential to affect threatened biodiversity as listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and/or the EPBC Act. Six threatened ecological communities occur within the vicinity of the alignment, of which three would potentially be directly affected by the proposal:

- River-Flat Eucalypt Forest on Coastal Floodplains — occurs at Prospect Creek in Yennora; Fairfield Park in Fairfield; and North Street in Fairfield
- Cumberland Plain Woodland — occurs at the western end of North Street in Fairfield in the vicinity of the proposed RWTP
- Shale Gravel Transition Forest — occurs at North Street in Fairfield in the vicinity of the proposed RWTP.

These communities are listed as endangered under the TSC Act. Cumberland Plain Woodland is also listed as endangered under the EPBC Act. In addition to these listed communities, significant urban remnant trees occur as street trees along the alignment, particularly at Fairfield (NSW National Parks and Wildlife Service 2002).

Remnant vegetation along the alignment may provide habitat for a range of threatened species including: *Acacia pubescens*, *Dillwynia tenuifolia*, *Pultenaea parviflora*, *Pultenaea pedunculata*, Grey-headed Flying Fox and Green and Golden Bell Frog. Even within the roadside there is potential for threatened species to occur. For example, *Pimelea spicata* and *Wahlenbergia multicaulis* (an endangered population under the TSC Act) are both known to occur within disturbed areas.

Pipeline crossings of waterways would be constructed by horizontal directional drilling and therefore impacts to aquatic habitats would be unlikely, however, many of the waterways are surrounded by native vegetation which may potentially be affected including:

- Duck Creek surrounded by Mangroves and Saltmarsh. Coastal Saltmarsh is listed as an endangered ecological community under the TSC Act and both Mangroves and Saltmarsh are protected under the NSW *Fisheries Management Act 1994*
- Prospect Creek is surrounded by River-flat Eucalypt Forest which is listed as endangered under the TSC Act.

Proposed assessment methodology

A biodiversity assessment of the proposal would be undertaken in accordance with the requirements of the Threatened Species Assessment Guidelines for projects assessed under Part 3A of the EP&A Act (Department of Environment and Conservation 2005). This assessment would include:

- a review of relevant and available documents and databases for information on past land uses and the presence of vegetation communities and threatened flora and fauna

- field surveys of the site:
 - inspection of the RWTP site, reservoir and pumping station sites and pipeline alignment to confirm the condition and nature of the environment determined during desk-top review and a habitat-based assessment
 - detailed surveys of areas containing remnant vegetation: between the proposed RWTP and Bland Street in Fairfield (includes North Street, Fairfield Park and Prospect Creek), along Prospect Creek between the Marubeni Power off take and Fairfield Road in Yennora; and at the Duck Creek crossing in Granville. There is potential for more significant impacts in these areas. Surveys would include confirmation of vegetation mapping, flora surveys, spotlighting, bat echolocation recording (Anabat), and call playback targeting threatened frogs, nocturnal birds and mammals.
- an assessment of impacts to species, populations and communities listed under the TSC Act. Impacts would be assessed following the heads of consideration in the draft Part 3A guidelines (Department of Environment and Conservation 2005)
- an assessment of impacts on species listed under the EPBC Act following the principle significant impact guidelines (Department of the Environment and Heritage 2006)
- a consideration of the proposal against the key thresholds listed under Section 5 of the draft guidelines.

Management and mitigation measures

Management and mitigation measures will be implemented to minimise and, where possible, avoid impacts to flora and fauna. Restoration works to disturbed areas will be undertaken in consultation with the relevant council(s) and may include replanting of disturbed vegetation.

The Environmental Assessment will propose undertaking targeted surveys during the flowering period of cryptic species of plant, such as *Wahlenbergia multicaulis* (generally peak flowering in spring to summer) and *Pimelea spicata* (mostly summer), to assist in developing measures to mitigate impacts to these species. Specific management and mitigation measures may be proposed depending on the outcomes of these targeted surveys.

A Construction Biodiversity Management Plan would be prepared for the proposal.

4.2 Other environmental issues

Other potential environmental impacts of the proposal are expected to be manageable through the application of standard management and mitigation measures. The proposed approach to these issues is outlined in the following Sections.

4.2.1 Contaminated soil

There is potential for excavation of contaminated soil during construction of the proposal. The greatest potential of encountering contaminated soils is at Fairfield SSTP and in the vicinity of existing industrial land uses at Granville (including Clyde), Rosehill and Camellia.

There is also potential for the proposed pipebursting of the isolated Alinta gas main under Woodville Road to result in contamination of the ground around the burst main.

Soil contamination at the RWTP site

Coffey Environments (2007) conducted a Stage 1 and Stage 2 Environmental Site Assessment of the site of the proposed RWTP at Fairfield SSTP for Sydney Water. The site is currently vacant grassland, however, it formed part of a larger site involved in the manufacture of roof tiles from 1926 to 1968. Fragments of asbestos cement sheeting were observed in fill material excavated from four of 18 test pits excavated at the site as part of the assessment. Small bundles of asbestos fibres were also detected in several fill samples taken. No evidence of chemical contamination or groundwater inflows was observed in any of the test pits, although a layer of ash containing elevated polycyclic aromatic hydrocarbons (PAHs) was detected at a depth of greater than approximately 1 metre. Concentrations of PAHs and other potential contaminants were below health investigation levels for commercial/industrial land use. Remediation or management of the site was recommended to address the presence of asbestos. Excavation of the site resulting in ash fill being brought to the surface would also require specific management measures (Coffey Environments 2007).

Alinta commissioned PB to undertake a Phase 2 environmental site assessment of an additional area of land at Fairfield SSTP adjoining the area investigated by Coffey Environments. PB (2007) did not report any soil contaminants of concern at concentrations greater than the site assessment criteria. No contamination was identified within the fill materials sampled and the levels of all contaminants were found to be below the commercial / industrial land use criteria.

Remediation or management of contamination of the RWTP site is proposed in conjunction with the development of the proposal. A fill management plan would be prepared in accordance with legislative requirements and relevant DECC guidelines. Any excavation and off-site disposal of soil from the RWTP site would occur in accordance with the NSW Environment Protection Authority's (1999) *Environmental Guidelines: Assessment Classification & Management of Liquid and Non-liquid Waste*.

Potential soil contamination at Granville, Rosehill and Camellia

Alinta has commissioned a Phase 2 contamination investigation of the entire route alignment and particularly within industrial areas at Granville (including Clyde), Rosehill and Camellia where there is a known history of industrial use and potential for hexavalent chromium contamination. This investigation is being undertaken in liaison with Parramatta City Council. Depending on the results of the investigation, there may be a need for spoil excavated from trenches along this section of the alignment to be classified and disposed in accordance with the Environment Protection Authority's (1999) *Environmental Guidelines: Assessment Classification & Management of Liquid and Non-liquid Waste*. Other management and mitigation measures may also be required depending on the findings of the investigation.

The results of the contamination investigations would be appended to the Environmental Assessment and specific management measures included to address identified issues.

Pipebursting under Woodville Road

As discussed in Section 2.3, the proposed pipebursting of the isolated gas main under Woodville Road has the potential to create a pathway for impurities remaining in the gas main from the town gas era to be transferred to the surrounding ground. The volume of impurities is expected to be small and the paved surface of Woodville Road would reduce the potential for stormwater infiltration and washing of soils and cracked pipes. However, there would remain some potential for transportation of contaminants. Sampling of the dust

lining the isolated gas main would be undertaken to determine the nature of any impurities present. Depending on the results of the sampling, specific management and mitigation measures may be required.

4.2.2 Aquatic ecology

The proposal would traverse six waterways as outlined in Table 4-2.

Table 4-2: Waterway crossings

Waterway	Location	Proposed construction method
Prospect Creek	Fairfield Park in Fairfield	Horizontal directional drilling
Burns Creek	Tangerine Street in Fairfield East	Horizontal directional drilling
Burns Creek	Normanby Street in Fairfield East	Horizontal directional drilling
Duck Creek	Woodville Road in Merrylands	Pipe bridge
Duck Creek	Elizabeth Street in Granville	Pipe bridge
Duck Creek	Between Deniehy Street in Granville and Shirley Street in Rosehill	Horizontal directional drilling

Field assessments conducted for the Liverpool to Ashfield Pipeline (Sydney Water 2005) showed that the waterways listed in Table 4-2 were highly modified environments. Riparian vegetation consisted mainly of weeds and shrubs with mature trees, where they occur, generally located higher on the bank. In sections, the amenity of the waterways was highly degraded with restricted water flow.

As discussed in Section 2.3 and shown in Table 4-2, waterway crossings would be constructed using horizontal directional drilling. An exception is the waterway crossings of Duck Creek at Woodville Road in Merrylands and Elizabeth Street in Granville, where the pipeline would be constructed as a pipe bridge. In these locations Duck Creek is in a fenced concrete channel. These construction methods for waterway crossings would avoid direct impacts to the waterway.

Standard measures would be identified to avoid erosion and sedimentation during construction in the vicinity of waterways (refer Section 4.2.7).

During operation, the recycled water pipeline would be either buried or elevated and would therefore not create a potential for water quality or aquatic biota impacts.

4.2.3 Energy use and greenhouse gas emissions

Energy would be consumed during the construction and operation of the proposal. The proposal would, however, facilitate energy savings elsewhere in the wastewater and potable water supply networks by reducing the need for pumping and treatment of potable and wastewater flows.

During construction, energy would be consumed and greenhouse gases emitted by construction vehicles and plant. Standard management and mitigation measures would be implemented to ensure the efficient use of energy (and other resources) during the construction period, including operating equipment in the most efficient manner possible, switching off idle equipment, and regularly maintaining equipment to ensure it operates at optimal efficiency.

4.2.4 Waste

Waste would be generated during the construction and operation of the proposal.

During the pilot plant investigation, it is proposed that process waste be returned to Liverpool STP.

During the operation of the RWTP, waste generated would include:

- microstrainer backwash water
- ultrafiltration backwash water, chemical enhanced backwash and clean in process waste
- reverse osmosis concentrate.

It is proposed that this process waste be discharged to the sewerage system under a Trade Waste Consent issued by Sydney Water. Recycled water would also be disposed to the sewer during quality excursion events.

Waste generated during construction would include spoil, drilling mud, treated water resulting from dewatering of excavated areas such as bore pits, and general domestic waste.

Construction waste would also include any sludge removed from the syphons located at various locations along the existing isolated gas main along Woodville Road. There is potential for the sludge to be contaminated with town gas impurities (refer Section 4.2.1).

Construction waste would be disposed off-site. Any potentially contaminated spoil would be classified and disposed in accordance with the Environment Protection Authority's (1999) *Environmental Guidelines: Assessment Classification & Management of Liquid and Non-liquid Waste*.

The Environmental Assessment would include an estimation of quantities of waste generated during the operation of the RWTP and details of proposed disposal arrangements. Standard waste avoidance and minimisation measures would be implemented during construction of the proposal to avoid waste generation and maximise reuse and recycling of materials, including ordering exact quantities of materials, liaising with suppliers to minimise packaging waste, and salvaging suitable excavation material for reuse.

4.2.5 Air quality

Air quality impacts are not anticipated during operation of the proposal. The main treatment process at the proposed RWTP would be housed inside the filtration building and the feed balance tank would be provided with a roof. This design is expected to control any potential odour impacts.

During construction, there may be some temporary and localised air quality impacts from construction vehicles, construction work sites, and equipment emissions. Standard management and mitigation measures would be implemented to minimise any such air quality impacts, including stabilising disturbed areas to minimise dust generation, and covering materials carried on vehicles travelling to and from construction sites.

4.2.6 Visual

The proposal includes the development of aboveground infrastructure at Fairfield (RWTP, balancing tank and pumping station), Woodville Golf Course (Woodville Reservoir), and Rosehill Gardens Racecourse (Camellia Reservoir and pumping station). This aboveground infrastructure has been sized to meet the water demand of both the foundation and non-foundation customers and also the potential future expansion of the scheme.

At Fairfield, sensitive visual receivers in the vicinity of the proposed RWTP, balancing tank and pumping station include residential dwellings on the northern side of North Street and potentially the residential dwellings on the western side of Railway Parade. The RWTP would include plant and infrastructure of a similar nature to that already existing at the Fairfield SSTP.

The Woodville Reservoir would comprise a single, vertical cylindrical storage tank of approximately 16 metres diameter and 3.6 metres height on the northern side of Barbers Road. The tank would be mounted on a supporting structure. The base of the tank would be approximately 5 metres above ground level, resulting in the top of the tank being approximately 8.6 metres above ground level. Sensitive visual receivers in the vicinity of the Woodville Reservoir include residential dwellings to the south and west of Woodville Golf Course. The construction of the reservoir would require the removal of approximately 17 Casuarina trees. There are three large fig trees at this site that would be protected during construction of the proposal. These three trees would provide visual screening to residential properties in the vicinity of the reservoir. Further plantings would be considered to supplement the screening provided by these trees.

The Camellia Reservoir would comprise two cylindrical surface storage tanks of approximately 25.4 metres diameter and 6 metres high. The Camellia pumping station structure would be approximately 5 metres high, 19.7 metres long, and 6 metres wide. It would have a steel framed sheeting roof and would sit on a concrete slab. There are no sensitive visual receivers in the vicinity of the Camellia Reservoir.

4.2.7 Erosion and sedimentation

The proposed construction method for the proposal was outlined in Section 2.3. A key element of the pipeline construction methodology is the placement of all excavated spoil directly into a truck for transportation off-site. Fill materials for backfilling of trenches would be stockpiled temporarily inside the construction zone. Only the amount of backfill material required for each day would be stockpiled on-site and no stockpiles would be left in the construction zone at the end of each work day.

There is potential for erosion of disturbed soil surfaces and the carriage of soil on the tyres of construction vehicles leaving construction sites which could be washed into the stormwater drainage system. There is also potential for accidental spills and leaks of fuels, chemicals or other pollutants. Drilling mud and treated water resulting from dewatering of excavated areas would be collected and disposed off-site.

These potential impacts would be managed and mitigated by implementing standard erosion and sedimentation prevention procedures including monitoring dewatering activities to ensure that pollution incidents and erosion do not occur. Surface water runoff and groundwater ingress into trenches and bore pits would be disposed in accordance with the Environment Protection Authority's (1999) *Environmental Guidelines: Assessment Classification & Management of Liquid and Non-liquid Waste*.

4.2.8 Social and economic benefits

The primary driver of the Camellia Recycled Water Project is to increase the use of recycled water in Sydney. Economic benefits arising from increasing recycled water use include reduced demand on existing water supplies, increased security of potable water supplies and reduced demand on existing water treatment facilities. The Camellia Recycled Water Project has the potential to save up to 6 billion litres of water per year (NSW Government 2006).

As one of the first investments by the private sector in the water industry in NSW, the successful implementation of the Camellia Recycled Water Project may also trigger greater private sector investment and participation in water infrastructure projects.

4.2.9 Heritage

A review of relevant State and Commonwealth heritage registers and listings was undertaken including the Commonwealth Department of Environment and Water Resources Register of the National Estate, Commonwealth and National Heritage Lists, the NSW State Heritage Register and heritage listings under the relevant local environment plans. This review identified the following heritage items that may be affected by the proposal:

- a tram alignment on Grand Avenue in Rosehill that is listed under Part 2 to Schedule 6 of the Sydney Regional Environmental Plan 28 (Parramatta) as being of state and regional significance
- the water supply pipelines at Woodville Road and Barbers Road are listed under the Parramatta LEP and Bankstown LEP respectively as being of state and regional significance. Pipe bridges are proposed where the proposal would cross the water supply pipelines. No direct impacts to the water supply pipelines are anticipated.

Searches are yet to be undertaken of the National Native Title Tribunal and the DECC's Aboriginal Heritage Information Management System (AHIMS) for registered Aboriginal sites. If these searches identify items of archaeological or cultural heritage in the vicinity of the proposal, the significance of any potential impacts of the proposal to these items would be determined in consultation with the NSW Heritage Office, local governments and the DECC, as appropriate. Management guidelines and mitigation measures would be proposed having consideration of statutory heritage requirements. The Environmental Assessment would include management and mitigation measures tailored specifically to the items of archaeological or cultural heritage identified as being potentially impacted by the proposal. Standard management and mitigation measures would also be proposed as appropriate, including procedures to be followed in the event that the construction works uncover unidentified historical relics.

4.2.10 Hazards

Chemicals are proposed to be stored on-site in storage tanks during the operation of the proposed RWTP. Chemicals that would be stored on-site are those typical of a recycled water treatment plant and would include sodium hypochlorite, ferric chloride, sulphuric acid, antiscalant, caustic soda, sodium bisulphite, and citric acid. The proposed chemical storage tanks would range in size from 2 kilolitres to 20 kilolitres. Chemicals would be transported to the site by either tanker or bulki-bin.

The Environmental Assessment would include an assessment of the potential risk that on-site chemical storage would pose to the surrounding environment.

4.2.11 Consultation

Alinta will consult with Bankstown, Fairfield, Holroyd and Parramatta councils, the DECC, Roads and Traffic Authority and, if required, the Commonwealth Department of the Environment and Water Resources during the preparation of the Environmental Assessment.

5. Conclusions

Alinta proposes to construct a RWTP and recycled water distribution system between Fairfield and Camellia in western Sydney. The proposal forms part of the NSW Government's 2006 Metropolitan Water Plan and would result in an increase in the use of recycled water in Sydney.

The Camellia Recycled Water Project is a major project as defined by the State Environmental Planning Policy (Major Projects) 2005 and, therefore, would require approval from the Minister for Planning under Part 3A of the EP&A Act.

This document supports a Major Project Application, which acts as a format request for the Department of Planning to issue environmental assessment requirements for the proposal. The preliminary environmental assessment of the proposal outlined in this document indicates that the key environmental issues associated with the proposal comprise: potential traffic disruptions during construction; impacts to terrestrial and riparian ecology, and noise during operation. These issues would be assessed in detail as part of the Environmental Assessment for the proposal. Other issues are not expected to result in significant environmental impacts and it is expected that they could be successfully managed through the application of standard mitigation measures and therefore do not require detailed assessment. These issues include: construction noise and vibration; soil contamination; aquatic ecology; energy use and greenhouse gas emissions; waste; air quality; visual; erosion and sedimentation; heritage and hazards.

Upon receipt of the Environmental Assessment requirements from the Director-General of the Department of Planning, Alinta will prepare an Environmental Assessment and submit the assessment to the Department of Planning for approval to construct and operate the Camellia Recycled Water Project.

6. References

Coffey Environments 2007, Stage 1 and 2 Environmental Site Assessment on a Portion of Land within the Fairfield Storm Sewage Treatment Plant (SSTP), Fairfield, prepared for Sydney Water Corporation

Department of Environment and Conservation 2005, Draft Guidelines for Threatened Species Assessment under Part 3A

Department of the Environment and Heritage 2006, EPBC Act Policy Statement 1.1 Significant Impact Guidelines

NSW Environment Protection Authority 1999, Environmental Guidelines: Assessment Classification & Management of Liquid and Non-liquid Waste

NSW Government 2006, 2006 Metropolitan Water Plan, available online at http://www.waterforlife.nsw.gov.au/Resouce_Centre/publications

NSW National Parks and Wildlife Service 2002, Native Vegetation of the Cumberland Plain

PB 2007, Environmental Investigation, Lots 7-10 and 15-16 of Section 1 in DP2728, Fairfield Storm Sewage Treatment Plant (SSTP), Fairfield, NSW

Sydney Water 2005, Liverpool to Ashfield Pipeline Review of Environmental Factors

Sydney Water 2007, Liverpool Ashfield Pipeline website, <http://www.sydneywater.com.au/MajorProjects/LiverpoolAshfieldPipeline/>

Appendix A

Clause 6 opinion



NSW GOVERNMENT

Department of Planning

27 August 2007

Contact: Joanna Bakopanos

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Fax: (02) 9228 6355

Email: joanna.bakopanos@planning.nsw.gov.au

Mr John Fisher
Environmental Engineer
Alinta Asset Management Pty Ltd
18 Huntley Street
AEXANDRIA NSW 2015

Our Ref: 9043378

Dear Mr Fisher

Subject: Proposed Camellia Recycled Water Project – Notice of Opinion

I refer to your letter of 1 August 2007 seeking the Minister's opinion as to the application of *State Environmental Planning Policy (Major Projects) 2005* (Major Projects SEPP) to the proposed Camellia Recycled Water Project.

On 13 August 2007, the Director General of the Department of Planning, under delegation from the Minister for Planning, formed the opinion under clause 6 that the abovementioned project is development of a kind that is described in Schedule 1, Group 8, Clause 26 of the Major Projects SEPP.

The project is therefore declared to be a project to which Part 3A of the *Environmental Planning and Assessment Act 1979* applies and will be assessed and determined by the Minister for Planning. I have enclosed a copy of the record of the Director-General's opinion for your information and reference.

Please do not hesitate to contact me on 9228 6461 or joanna.bakopanos@planning.nsw.gov.au should you wish to discuss or clarify this matter.

Yours sincerely

A handwritten signature in black ink, appearing to read 'J. Bakopanos'.

Joanna Bakopanos
A/Manager, Water and Energy
Major Infrastructure Assessment

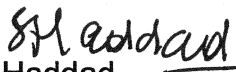
**Record of Minister's opinion for the purposes of Clause 6(1) of the
State Environmental Planning Policy (Major Projects) 2005**

I, the Director-General of the Department of Planning, as delegate of the Minister for Planning under delegation executed on 26 February, 2007, have formed the opinion that the development described in the Schedule below, is development of a kind that is described in Schedule 1, Group 8, clause 26 of *State Environmental Planning Policy (Major Projects) 2005* namely development for the purpose of a waste water treatment plant that has a capital investment value of more than \$30 million. It is therefore declared to be a project to which Part 3A of the *Environmental Planning and Assessment Act 1979* applies for the purpose of section 75B of that Act.

Schedule

Proposed Camellia Recycled Water Scheme

A proposal by Alinta Asset Management Pty Ltd (the Proponent) for the Camellia Recycled Water Scheme, a water recycling plant located within the Fairfield local government area capable of producing 20 megalitres/ day of treated water and including around 20 kilometres of underground reticulation network within the Fairfield, Parramatta and Holroyd local government areas to supply the treated water to customers and two water storage reservoirs along the main line, as generally described in the letter to the Department of Planning dated 1 August 2007 from the Proponent.

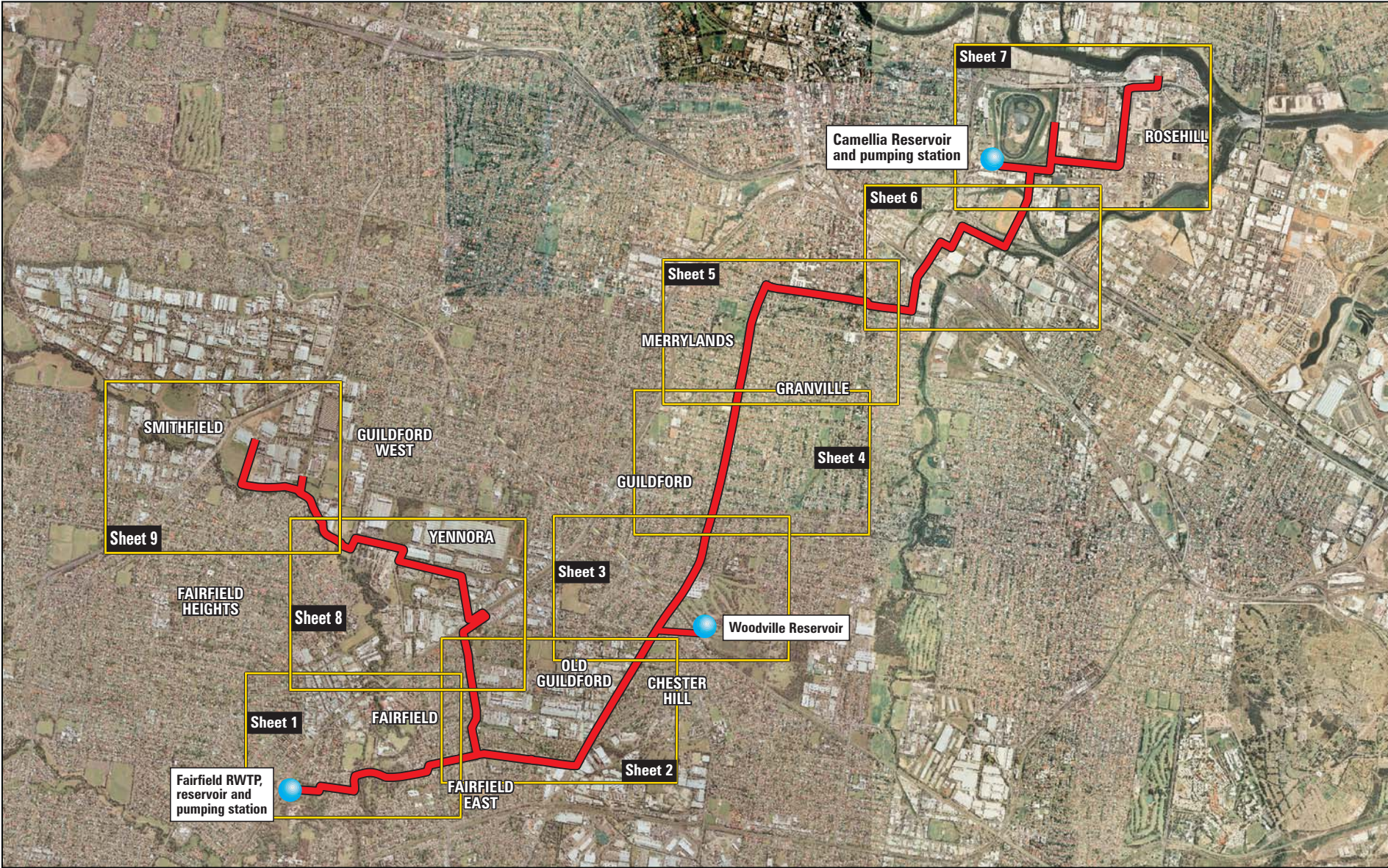


Sam Haddad
**Director-General
Department of Planning**

Date: 13/8/2007.

Appendix B

Detailed maps of the proposed alignment



Camellia Recycled Water Project - Overview

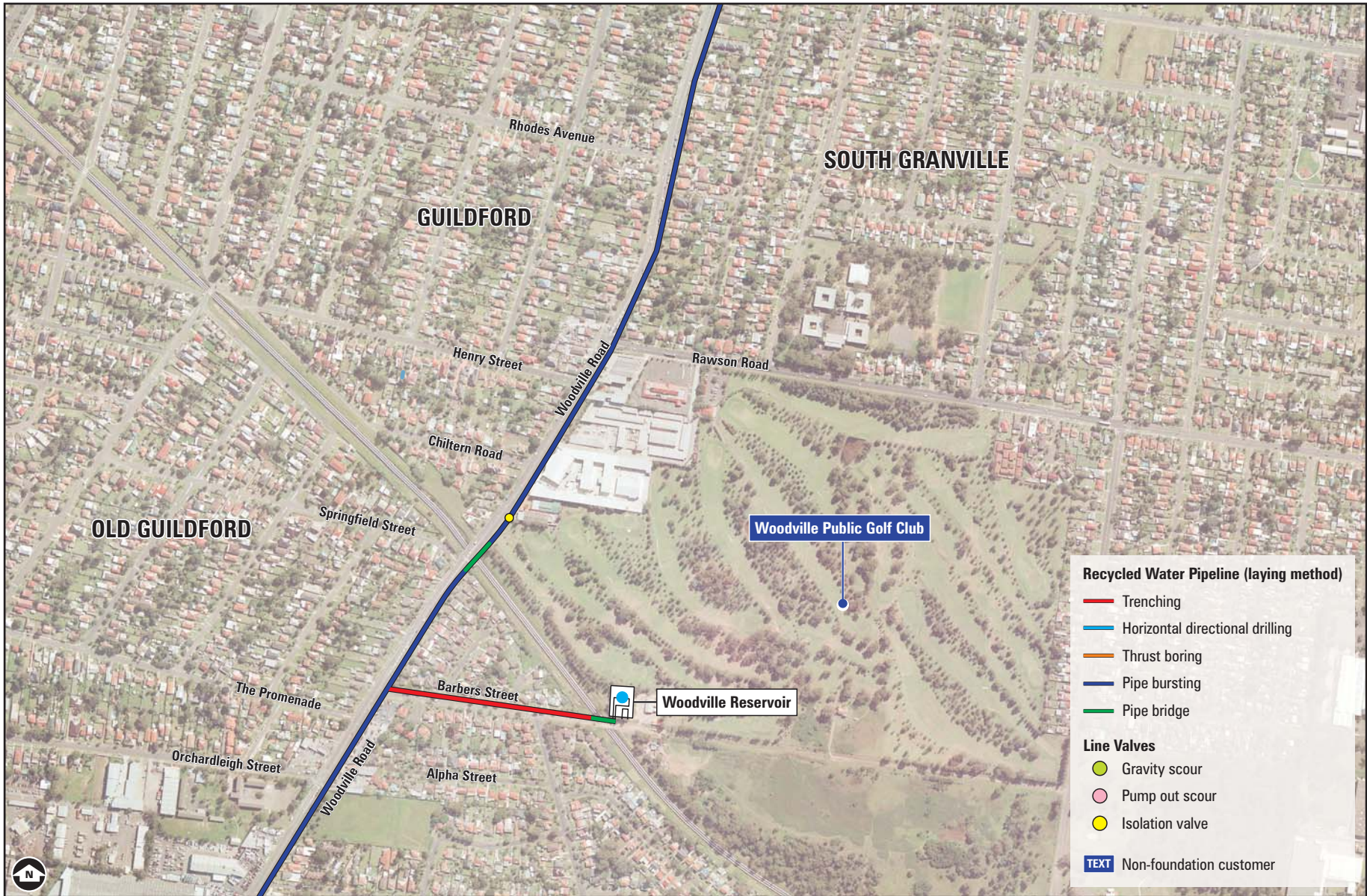


Joins Sheet 8

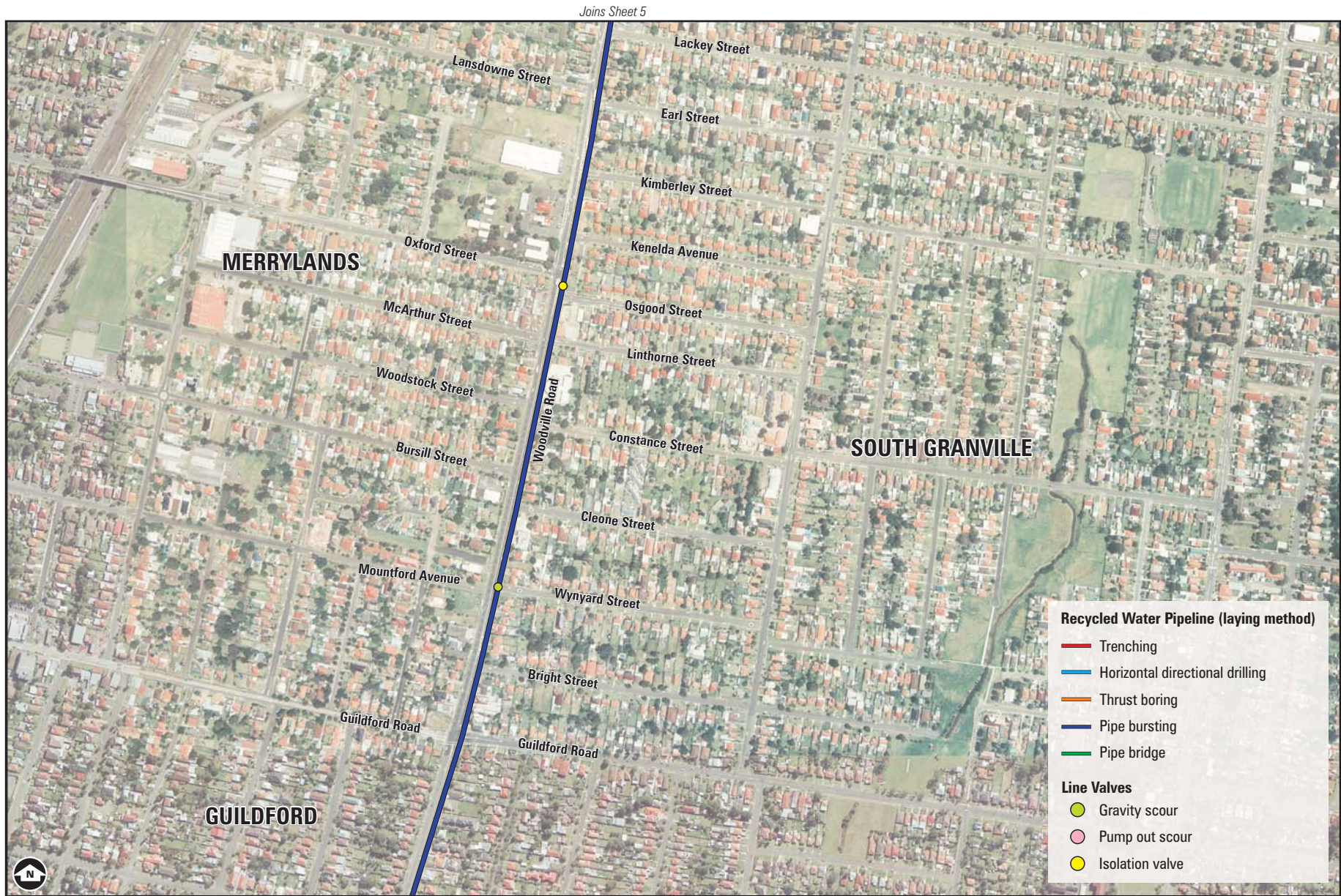


Joins Sheet 1

Joins Sheet 4



Joins Sheet 3



Joins Sheet 5

Joins Sheet 4



Joins Sheet 6

Joins Sheet 4



Joins Sheet 6



Joins Sheet 2



Appendix C

Description of the proposed
alignment

Appendix C Description of the proposed alignment

Table C-1 describes the works proposed for each section of the pipeline alignment.

Table C-1: Description of the proposed alignment

End chainage (m)	Section	Alignment	Construction method	Length (m)	Pipeline internal diameter (mm)	Description of adjoining land uses
Section 1A – RWTP to Woodville Road						
0.0	RWTP at Fairfield SSTP	Vacant land	—	—	—	Fairfield SSTP, railway, residential
247	RWTP to North Street	On vacant land and along Taylor Street, an unsealed road	Trenching	247	460	Fairfield SSTP, residential
565	North Street between Taylor Street and McIntosh Street	Nature strip – south side	Trenching	318	460	Residential
712	McIntosh Street between North Street and the Liverpool to Ashfield Pipeline easement	Nature strip – east side	Trenching	147	460	Residential
1,142	Fairfield Park between McIntosh Street and Prospect Creek	Through park	Trenching	430	460	Public open space
1,162	Prospect Creek within Fairfield Park	Under creek	Horizontal directional drilling	20	450	Public open space
1,213	Fairfield Park between Prospect Creek and Bland Street	Through park	Trenching	52	460	Public open space
1,251	Bland Street between Fairfield Park and Gordon Street (intersection)	Under Bland Street	Thrust boring	38	460	Residential
1,399	Gordon Street between Bland Street and The Horsley Drive	Nature strip – south side	Trenching	148	460	Residential
1,461	The Horsley Drive between Gordon Street and Tangerine Street	Under Horsley Drive	Thrust boring	62	460	Residential, industrial
1,998	Tangerine Street between The Horsley Drive and Jamieson Lane	Nature strip – north side	Trenching	537	460	Residential, retail

End chainage (m)	Section	Alignment	Construction method	Length (m)	Pipeline internal diameter (mm)	Description of adjoining land uses
2,609	Tangerine Street between Jamieson Lane and the Burns Creek culvert	Nature strip – north side	Trenching	610	460	Fairfield Neighbourhood Centre, Villawood North Public School, residential, industrial
2,657	Burns Creek culvert at the eastern end of Tangerine Street	Culvert crossing	Horizontal directional drilling	49	450	Public open space, industrial
2,835	Tangerine Street between the Burns Creek culvert and Woodville Road	Nature strip – north side	Trenching	177	460	Residential, retail, industrial
2,877	Tangerine Street at the intersection with Woodville Road	Tie into isolated main in Woodville Road	Thrust boring	42	402	Residential, retail, industrial
Section 1B – Tangerine Street to Smithfield demand centre						
0	Intersection of Tangerine Street and Normanby Street	—	—	—	—	—
261	Normanby Street between Tangerine Street and Landon Street	Nature strip – west side	Trenching	261	402	Residential
355	Normanby Street between Landon Street and Crown Street	Under the Liverpool to Ashfield Pipeline and Burns Creek	Horizontal directional drilling	94	380	Residential
827	Crown Street between Hanson Street and Fairfield Street	Nature strip – east side	Trenching	472	402	Residential
860	Crown Street on the southern side of the intersection with Fairfield Street	Footpath – east side. Requires pavement restoration	Trenching	33	402	Retail
888	Fairfield Street between Crown Street and Ellis Parade	Cross Fairfield Street to the western side of Ellis Parade	Trenching or thrust boring – construction contractor to determine	28	402	Retail
958	The southern end of Ellis Parade, just north of the intersection with Fairfield Street	Footpath – west side. Requires brick and concrete restoration	Trenching	70	402	Residential, retail
1,170	The northern end of Ellis Parade to Railway	Nature strip – west side	Trenching	212	402	Residential, Yennora

End chainage (m)	Section	Alignment	Construction method	Length (m)	Pipeline internal diameter (mm)	Description of adjoining land uses
	Street					Public School
1,437	Railway Street between Ellis Parade and the northern end of Yennora Railway Station	Nature strip and car park – west side	Trenching	267	402	Railway, car parking residential, Yennora Public School, industrial
1,482	Rail crossing between Railway Street and Nelson Road, at the northern end of Yennora Railway Station	Under the railway corridor	Thrust boring	45	402	Railway, car parking, cycleway, industrial
2,035	Nelson Road and Norrie Street between the northern end of Yennora Railway Station and Loftus Road	Nature strip – north side	Trenching	553	402	Industrial
2,049	Loftus Road at the intersection with Norrie Street	Road crossing	Trenching or thrust boring – construction contractor to determine	14	402	Industrial
2,638	Loftus Road between Norrie Street and Pine Road	Nature strip – north side	Trenching	589	402	Industrial
2,803	Pine Road between Loftus Road and Dursley Road	Nature strip – east side	Trenching	165	402	Industrial
3,235	Dursley Road between Pine Road and Fairfield Road	Nature strip – north side	Trenching	432	402	Industrial
3,282	Fairfield Road at the intersection with Dursley Road	Case bore to west side of Fairfield	Thrust boring	47	402	Industrial
3,344	Fairfield Road between Dursley Road and Fairfield Road Park	Nature strip – west side	Trenching	62	402	Public open space, industrial
4,090	Fairfield Road Park between Fairfield Road and Visy Paper off take	In park adjacent to footpath	Trenching	746	402	Public open space, industrial
4,252	Intersection of Fairfield Road Park and Visy Paper off take	In park beside Visy Paper	Trenching	162	280	Public open space, industrial
4,820	Fairfield Road Park between Visy Paper off take and Marubeni Power off take	Adjacent to footpath – south side	Trenching	568	402	Public open space, industrial
5,262	Easement between Fairfield Road Park and	Run parallel to sewer and	Trenching in/or	442	325	Public open space,

End chainage (m)	Section	Alignment	Construction method	Length (m)	Pipeline internal diameter (mm)	Description of adjoining land uses
	Marubeni Power off take	gas pipe on west side	adjacent to easement			industrial
Section 2 – Woodville Road						
0	Intersection of Woodville Road and Tangerine Street	—	—	—	—	Residential, retail and industrial
1,706	Woodville Road between Tangerine Street and Springfield Street	Within existing isolated Alinta gas mains	Pipebursting and cleaning in place	1,706	400	Residential, industrial, retail, Old Guildford Public School
1,755	Woodville Road between Springfield Street and Woodville Golf Course	—	Pipe bridge over the water supply pipelines	49	400	Residential, Woodville Golf Course
4,495	Woodville Road between Woodfield Golf Course and Meadows Street	Within existing, isolated Alinta gas mains	Pipebursting and cleaning in place	2,740	400	Residential
4,509	Woodville Road between Meadows Street and Louis Street, at the Duck Creek crossing at Woodville Park	Culvert crossing	Pipe bridge over Duck Creek	14	400	Granville Park, residential
4,931	Woodville Road between Louis Street and Elizabeth Street	Within existing isolated Alinta gas mains	Pipebursting and cleaning in place	423	400	Residential, retail
Section 3 – Barbers Road						
0	Intersection of Barbers Road and Woodville Road	—	—	—	—	Residential and retail
380	Barbers Road between Woodville Road and the water supply pipelines		Trenching	380	2 x 375	Residential, day care centre
400	Crossing of the water supply pipelines		Pipe bridge over the water supply pipelines	20	2 x 375	Residential, day care centre, water supply pipelines, golf course
Section 4 – Granville to Camellia						
0	Intersection of Woodville Road and Elizabeth Street	—	—	—	—	—
681	Elizabeth Street (west) between Woodville Road and Duck Creek	Nature strip and car park	Trenching	681	402	South Western Sydney Institute of TAFE

End chainage (m)	Section	Alignment	Construction method	Length (m)	Pipeline internal diameter (mm)	Description of adjoining land uses
						Granville College), Granville TAFE Children's Centre, residential, vacant land
689	Pipe bridge over Duck Creek	Culvert crossing	Pipe bridge over Duck Creek	8	402	Public open space
754	Park between Elizabeth Street (west) and pipe bridge	Park	Trenching	65	402	Public open space
774	Park between pipe bridge and Elizabeth Street (east)	Park	Trenching	20	402	Public open space
956	Elizabeth Street (east) between park and Blaxcell Street	Nature strip and car park	Trenching	182	402	Residential
996	Blaxcell Street between Elizabeth Street (east) and New York Street	Road crossing	Trenching	40	402	Residential
1,129	New York Street between Blaxcell Street and The Trongate	Footpath – north side	Trenching	133	402	Residential
1,145	Intersection of The Trongate and New York Street	Road crossing	Trenching	16	402	Residential
1,270	New York Street between The Trongate and Clyde Street	Nature strip and car park – south side	Trenching	125	402	Residential
1,290	Clyde Street between New York Street and Third Street	Road crossing	Trenching	19	402	Residential
1,399	Third Street between Clyde Street and Factory Street	Roadway – north side	Trenching	110	402	Residential, industrial
1,729	Factory Street between Third Street and Clyde Railway Station	Nature strip – west side	Trenching	329	402	Residential, industrial
1,869	Rail corridor crossing between Factory Street and Berry Street, at the western end of the Clyde Railway Station platforms	Use 15 inch CL isolated gas main	Insert	141	402	Railway corridor, industrial
2,117	Berry Street between Clyde Railway Station and Parramatta Road	In roadway – east side	Trenching	247	402	Industrial, retail
2,230	Parramatta Road east of Berry Street	In roadway – south lane	Trenching	113	402	Industrial

End chainage (m)	Section	Alignment	Construction method	Length (m)	Pipeline internal diameter (mm)	Description of adjoining land uses
2,264	Parramatta Road between the grassed area outside Mitsubishi Motors Australia and Kendall Street	Under Parramatta Road	Case boring	34	402	Industrial
2,457	Kendall Street between Parramatta Road and Martha Street	Roadway – east lane	Trenching	193	402	Industrial, Roads and Traffic Authority motorcycle training centre, cycleway
2,902	Martha Street between Kendall Street and Deniehy Street	Roadway (alignment yet to be determined)	Trenching	446	402	Industrial, riparian corridor (Duck River)
3,244	Deniehy Street between Martha Street and Duck Creek	Roadway (alignment yet to be determined)	Trenching	342	402	Parramatta City Raceway, heliport, industrial, riparian corridor (Duck River)
3,397	Duck Creek between Deniehy Street and Shirley Street	Under Duck Creek (alignment yet to be determined)	Horizontal directional drilling	152	402	Riparian corridor
3,683	Shirley Street between Duck Creek and Unwin Street	Roadway – west lane	Trenching	287	402	Industrial, riparian corridor
4,054	Unwin Street between Shirley Street and Rosehill Gardens Racecourse	Nature strip – north side	Trenching	370	402	Industrial, Rosehill Gardens Racecourse
4,422	Unwin Street between Rosehill Gardens Racecourse and Colquhoun Street	Nature strip – north side	Trenching	368	402	Industrial, Rosehill Gardens Racecourse
4,601	Unwin Street between Shirley Street and Colquhoun Street	Nature strip – north side	Trenching	179	402	Industrial
4,707	Colquhoun Street between Unwin Street and Devon Street	Nature strip – west side	Trenching	106	402	Industrial
5,238	Devon Street between Colquhoun Street and Shell Refinery off take	Nature strip – south side	Trenching	531	402	Industrial
5,591	Colquhoun Street between Devon Street and Rosehill Gardens Racecourse off take	Nature strip – west side	Trenching	353	122	Industrial
5,715	Devon Street between Shell Refinery off take and Durham Street	Nature strip – south side	Trenching	123	270	Industrial

End chainage (m)	Section	Alignment	Construction method	Length (m)	Pipeline internal diameter (mm)	Description of adjoining land uses
5,991	Durham Street between Devon Street and the James Hardie off take	Nature strip – east side	Trenching	277	270	Industrial
6,425	Durham Street between the James Hardie off take and Grand Avenue railway crossing	Nature strip – east side	Trenching	434	270	Industrial
6,479	Grand Avenue railway crossing between Durham Street and Grand Avenue	Under dual rail lines to the south side of Grand Avenue	Thrust boring	53	125	Industrial
6,702	Grand Avenue between the Grand Avenue railway crossing and Thackeray Street	Roadway – south side	Stitch boring	223	167	Industrial
6,729	Grand Avenue crossing at the intersection with Thackeray Street	Under Grand Avenue	Thrust boring	28	167	Industrial
6,807	Thackeray Street between Grand Avenue and Boral off take	Nature strip – east side	Trenching	78	167	Industrial
7,027				220	270	