

North West Growth Centre water related services for first release precincts

Preferred Project Report

July 2008



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Glossary and Abbreviations

ANZECC: Australian and New Zealand Environment and Conservation Council provides a forum for the development of national land use policies to protect environmental quality and for the setting of national objectives for air, land and water quality.

ANZECC Guidelines: Australian Water Quality Guidelines for Fresh and Marine Waters published by ANZECC in 2000. These guidelines provide water quality reference levels.

Aquatic Organisms: Organisms which live in water - stored water, river and streams.

BCO: Biodiversity Certification Order

Biodiversity: Variety and number of different species living in an ecosystem or a defined geographic area.

Biosolids: Solids from wastewater treatment processed into products suitable for beneficial uses such as agriculture or forestry.

Bubble licence: A pollution control licence that covers more than one sewage treatment system and sets limits for total pollutant loads based on the combined discharges from the sewage treatment systems. The bubble licence scheme allows the sewage treatment systems to adjust their individual discharges, provided the total pollutant load limit for the scheme is not exceeded. The South Creek bubble licence sets discharge limits for the combined discharges from the Riverstone, Quakers Hill and St Marys sewage treatment systems.

Bypass: When wastewater bypasses wastewater treatment facilities and is not fully treated. It is caused usually by plant failures or wet weather flows exceeding plant capacity.

Calcium (Ca): A naturally occurring element which can enter the water from the catchments. It may also be added to water in the treatment process to reduce the acidity levels.

Catchment: The area of land draining to a waterway. May also refer to areas served by a wastewater or stormwater system.

Chlorination: The addition of chlorine to drinking water, recycled water, wastewater, or industrial waste to disinfect or to oxidise undesirable compounds.

Chlorine (Cl₂): Chlorine is added to drinking, recycled water supplies and wastewater to kill bacteria that may cause disease. Residual chlorine needs to be present in drinking and recycled water supply pipelines so that the water is disinfected to appropriate levels all the way to the tap.

Chlorophyll A: Produced by plants and algae. Indicates the potential presence of algae in water.

CMP: Conservation Management Plan.

Conservation: Use, management and protection of resources so they are not degraded, depleted or wasted and are available on a sustainable basis for present and future generations.

dB(A): A-weighted decibels

DEC: former Department of Environment and Conservation, now DECC.

DECC: Department of Environment and Climate Change, the primary NSW public sector organisation responsible for protecting the environment.

Dechlorination: A process that neutralises the toxicity of chlorine and chloramines (a by-product of chlorine).

DOP: Department of Planning.

Director General: DG

Disinfection: Inactivation (killing) of pathogens or organisms, capable of causing infectious disease, by chemical or physical processes.

Dissolved oxygen: The amount of oxygen that is dissolved in water.

DPI: Department of Primary Industries.

Drinking Water: Drinking water is defined as water intended primarily for human consumption but which has other domestic uses.

Dual reticulation: A water supply system that provides two types of water services to each property. It requires two separate pipe systems in the roads and properties: a drinking water system suitable for indoor use and requiring high quality water, and a recycled water system for water that can be used outdoors and to flush toilets etc.

DWE: Department of Water and Energy

Ecologically Sustainable Development (ESD): Development that improves the quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

Ecosystem: A community of organisms, interacting with one another, and the environment in which they live. Processes occurring within an ecosystem are the flow of energy by food chains and food webs and nutrient cycling. An ecosystem may be a pond that is dry for half the year, a lake or even a planet.

EEC: Endangered Ecological Community

Effluent: A liquid waste product that is discharged to the environment, usually used to mean wastewater discharged from sewage (wastewater) treatment plants.

Effluent reuse: A process where treated wastewater is recycled for useful purposes and is not discharged to a natural waterway.

EA: Environmental Assessment.

Emission: Anything given off as a result of a process, for example, gases, heat and odours.

EMP: Environmental Management Plan

EMS: Environmental Management System, the framework for the management of environmental issues.

Environmental Flows: Water provided for the environment to sustain and, where necessary, restore ecological processes and biodiversity of water-dependent ecosystems.

Environmental impact: Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products and services.

Environmental indicators: Physical, chemical or biological features that can be monitored and used to measure changes in the environment.

EPA: former Environmental Protection Authority, now part of DECC.

EP&A Act: Environmental Planning and Assessment Act 1979.

EP&A Regulation: Environmental Planning and Assessment Regulation 2000.

EPBC Act: Environment Protection and Biodiversity Conservation Act 1999.

EPLs: Environment Protection Licences issued by the Department of Environment and Climate Change (DECC).

Freshwater: Water found in lakes, rivers, streams; generally containing less than 1,000 mg/L of dissolved solids. (salts)

Greenhouse effect: Process by which sunlight is converted to infrared radiation by the atmosphere and the planet surface, which in turns warms the planet. Elevated levels of carbon dioxide and other gases in the atmosphere contribute to global warming.

Greenhouse gas emissions: Gases such as carbon dioxide and other forms of emissions to the atmosphere, resulting from the burning of fossil fuels (such as coal, natural gas or oil) and land clearing, which contribute to global warming.

GCC: Growth Centres Commission.

Groundwater: Water found below the surface, usually in porous rock or soil or in underground aquifers (natural underground formations that contains sufficient saturated, permeable material to yield significant quantities of water).

ha: hectare.

Horizontal Directional Drilling (HDD): a steerable trenchless method of installing underground pipes, conduits and cables using a surface launched drilling rig, with minimal impact on the surrounding area.

Iron (Fe): A naturally occurring element which occurs at low levels in water and may be responsible for taste and staining problems.

Irrigation: Controlled application of water for agricultural or horticultural purposes through manmade systems to supply water requirements not satisfied by rainfall.

Kilolitre (kL): One thousand litres of water.

LEP: Local Environment Plan - a statutory planning instrument.

LGA: Local Government Area.

Leaching: The removal in solution of soluble minerals and salts as water moves through the soil profile.

Litre (L): A measure of liquid volume.

Macroinvertebrate: Animals without backbones greater than 1 millimetre long that live in the water column, on the water surface or on the bottom of a waterway.

Manganese (Mn): A naturally occurring element that is found in water. It is an essential element in our diet but causes staining of kettles, baths and laundry.

Megalitre (ML): A measurement of volume equal to one million litres.

Microorganisms: The organisms which are invisible or only barely visible with the unaided eye.

Milligram (mg): Unit of measurement which is equivalent to 0.001 of a gram.

Milligrams per litre (mg/L): Unit of measurement which is equivalent to 0.001 of a gram of a substance dissolved in a litre of water.

Mineral elements: Naturally occurring elements which can enter the water from the catchments.

National Guidelines for Water Recycling: Managing Health and Environmental Risks: An authoritative reference for the supply, use and regulation of recycled water schemes. A publication of the Natural Resource Management Ministerial Council, Environmental Protection and Heritage Council and the Australian Health Ministers Conference (2006).

NSW Guidelines for Urban and Residential Use of Reclaimed Water: Guidelines for urban areas where reticulation of non-drinking water supplies derived from treated sewage from a large sewage treatment plant are proposed (NSW Recycled Water Coordination Committee, 1993). These guidelines are no longer in use.

Environmental Guidelines – Use of effluent by irrigation: Guidelines relating to the use of recycled water for irrigation (DEC 2004b).

NH&MRC Guidelines: Advisory standards established by the NH&MRC with respect to the performance of products such as drinking water to ensure they are of appropriate quality. The latest drinking water guidelines were agreed to in 2004.

NH&MRC: The National Health and Medical Research Council, which is an advisory body to the Australian Government.

Nitrogen (N): A naturally occurring element found in soils and organic matter. Often added to soils in fertiliser. Plants use nitrogen as a nutrient for growth and high levels in water may contribute to excessive growth of algae and aquatic weeds.

Non-potable reuse: The use of treated wastewater for purposes that do not require water of a drinkable standard.

Nutrients: Substances required for growth by plants and other organisms. Major plant nutrients are phosphorus and nitrogen.

NPWS: National Parks and Wildlife Service.

OH&S: Occupational health and safety, protection of the health, safety and welfare of employees, contractors and visitors who are at, or may be affected by, a worksite.

Operating Licence: A licence issued under the Sydney Water Act 1994, that defines many of Sydney Water's performance standards.

Organism: Any living animal or plant.

Ozone: A form of oxygen with three rather than the normal two oxygen atoms. A strong oxidising agent which can be used to disinfect water.

PAD: Potential Archaeological Deposit. An area or specific site which may contain the potential for archaeological deposits.

Parasites: Organisms which rely on a host organism to grow.

Pathogens: Potentially disease-causing microorganisms including bacteria, viruses, parasitic protozoa (*Giardia* and *cryptosporidium*) and helminths (intestinal worms).

PEA: Preliminary Environmental Assessment

Per capita: For each head of population.

pH: A measure of the alkalinity or acidity of water expressed on a scale from 1 to 14: 1 is most acidic, 7 neutral and 14 most alkaline.

Phosphorus (P): An element that is essential for all living organisms. It is a nutrient and a common ingredient in fertilisers and washing detergents. The Australian environment is adapted to very low levels of P in soils and water.

POEO Act: Protection of the Environment Operations Act.

Pollutants: Contaminants in water, soil or air that, when in sufficient quantity, may cause environmental degradation.

Pollution: Any harmful or undesirable change in the physical, chemical or biological quality of air, water or soil as a result of the release of chemicals, radioactivity, heat and large amounts of organic matter.

Potable reuse: Reuse of highly treated wastewater for drinking and other purposes that require drinking water quality standards.

Potable: Fit or suitable for drinking and other similar uses.

Receiving water: A stream, river, pond, lake or ocean that receives stormwater or wastewater discharges.

Recycled water: Highly treated wastewater that can be used in industrial processes, for irrigation in agriculture, urban parks and landscapes, and in the home for flushing toilets, car washing and watering gardens. It is not for drinking or personal use.

Recycling: Collecting and reprocessing a resource so that it can be used again.

Regulators: Organisations that set standards and guidelines for Sydney Water.

Renewable resource: A resource that is replenished at the same rate it is used.

REP: Regional Environmental Plan - a statutory planning instrument.

Reservoir: An artificial body of water. Water is transferred from the dams and treatment plants either by gravity or pumping stations to a water storage reservoir. These reservoirs are human-made water storage areas, usually on high land. From these storage facilities the water flows through a system of mains and smaller pipes to homes, shops, factories, schools and public places.

RFP: Replacement Flows Project.

Rouse Hill RWP: Rouse Hill Recycled Water Plant.

Riverstone First Release Precincts: The precincts of Alex Avenue, Area 20, Riverstone, Riverstone West and Colebee.

ROTAP: Rare or Threatened Australian Plants.

Runoff: Water that flows across the land surface and does not soak into the ground.

Sediment: Soil or other particles that settle to the bottom of lakes, rivers, oceans and other waters.

SEPP: State Environmental Planning Policy - a statutory planning instrument.

Sewage: The wastewater from homes, offices, shops, factories and other premises discharged to the sewer. Approximately 99 per cent of sewage is water.

Sewerage system: The network of pipes, pumping stations and treatment plants used to collect, transport, treat and discharge sewage (wastewater).

SPS: Sewage pumping station.

Stakeholder: A stakeholder is any individual or group, which can affect or is affected by an organisation's activities.

Stormwater system: The system of pipes, canals and other channels used to carry stormwater to bodies of water, such as rivers or oceans. The system does not usually involve any treatment.

Stormwater: Rainwater that runs off the land, frequently carrying various forms of pollution such as litter and detritus, animal droppings and dissolved chemicals.

STP: Sewage Treatment Plant - a facility to improve sewage quality before discharge to receiving waters.

SOE: State of the Environment.

Suspended solids: Particles in water that can be removed by sedimentation or filtration.

Sustainable development: Activities that can be maintained over the long term while achieving a balance between the environment, the economy and society.

Sustainability: See ESD.

TIDC: Transport Infrastructure and Development Corporation

TDS (Total Dissolved Solids): Concentration of very small particles (eg. salts) dissolved in water.

TSC Act: Threatened Species Conservation Act 1995.

Turbidity: This is a measure of suspended material in water that may cause it to look muddy or discoloured. It is measured in Nephelometric Turbidity Units (NTU)

Upgrade: To improve something.

Waste: Discarded, rejected, unwanted, surplus or abandoned substances, excluding gas, water, wastewater, beneficially used biosolids and reuse water.

Wastewater: The dirty water or wastewater that goes down the drains of homes, offices, shops, factories and other premises and is discharged into the wastewater system. Also known as sewage.

Wastewater system: The system of pipes and pumping stations for collecting and transporting wastewater from each property to the wastewater (sewage) treatment plant.

Wastewater treatment: Primary - The initial stage of wastewater treatment in which floating or settleable solids are removed by screening and sedimentation.

Wastewater treatment: Secondary - The second stage of wastewater treatment involving the capture and removal of dissolved and fine organic solids and involves a biological process.

Wastewater treatment: Tertiary - The third stage in the purification of wastewater. This process consists largely of the removal of dissolved nutrients and any remaining suspended solids and may include disinfection of the effluent.

Water conservation: Preventing and reducing wasteful, uneconomical, impractical or unreasonable use of water resources.

Water cycle: The continuous cycle of water movement through the environment, including the oceans, atmosphere, surface water systems and ground water.

Water demand: Total water use requirements for drinking, agriculture, industry, recreation and gardening. It is seasonal and highly influenced by the weather.

Water Filtration Plant (WFP): Water filtration plants are treatment facilities that improve water quality. Impurities are removed through a process known as filtration; incoming water is passed through a porous structure or medium, such as a screen, membrane, sand or gravel.

Water pumping stations (WPS): Water pumping stations house mechanical pumping equipment used to lift water from lower ground to higher ground through pipes.

Water quality: Physical, chemical and biological measures of water.

Water reuse: The use of water more than once, following treatment of wastewater to an appropriate quality standard and delivery to the point of use.

Water Sensitive Urban Design (WSUD): Incorporates a range of initiatives designed to reduce the impact of urban stormwater.

Waterways: All streams, creeks, rivers, estuaries, inlets and harbours.

Wetland: A wetland is a low-lying area of land often inundated or permanently covered by shallow water. They play a major role in the water cycle by storing and filtering water and replenishing underground water supplies. Wetlands can also be effective in cleaning polluted water by reducing aquatic plant nutrients, suspended solids and oxygen demands.

WSAA: Water Services Association of Australia

WSWRI: Western Sydney Recycled Water Initiative.

1 Introduction

This chapter introduces the Preferred Project Report for the North West Growth Centre water related services for the First Release Precincts Project. It provides an outline of the purpose of the report, summarises changes to the Project since exhibition of the Environmental Assessment and defines the structure of the report.

1.1 General

Sydney's population is increasing, with an estimated five million people expected to reside within the greater Sydney metropolitan region by 2030. In response to the projected population growth, the NSW Government is planning for Sydney's future through the *Metropolitan Strategy City of Cities – A Plan for Sydney's Future* (the Metropolitan Strategy).

In 2004, the NSW Government confirmed that two major growth centres, the North West and South West Growth Centres, would play a key role in the Metropolitan Strategy. The NSW Growth Centres Commission (GCC) was also established at this time to manage the planning and infrastructure coordination for the Growth Centres. The North West and South West Growth Centres are to contain approximately 66,000 and 115,000 new dwellings respectively, to cater for 30 to 40 per cent of Sydney's growth over the next 30 years.

Six precincts within the North West Growth Centre - North Kellyville, Riverstone, Riverstone West, Alex Avenue, Area 20 and Colebee - have been nominated by the NSW Government as First Release Precincts. To facilitate the planned development within these precincts, new infrastructure for water related services is required.

Sydney Water is responsible for providing this new infrastructure for all the First Release Precincts with the exception of the Colebee Precinct and has commenced the necessary planning. To service the First Release Precincts, Sydney Water proposes to provide a range of new drinking water, recycled water and wastewater infrastructure, in addition to upgrading and amplifying elements of its existing infrastructure in the region (the Project).

An Environmental Assessment (EA) for the Project was prepared which responded to requirements from the Director-General of the NSW Department of Planning (DOP) issued on 17 October 2007. In March 2008, the DOP exhibited an EA for the Project. During the exhibition period the community and government stakeholders were invited to make submissions on the Project as described in the EA.

This Preferred Project Report (PPR) responds to issues raised in the submissions received. Responses to the submissions draw on the findings of the EA, new information gained since the preparation of the EA and changes in response to public inputs.

This report will assist the DOP to advise the Minister for Planning on whether the Project should proceed and the details of conditions of approval.

1.2 Structure of this Report

This report has been prepared in accordance with the NSW Department of Planning guidelines and the Director-General's advice dated 4 March 2008. A summary of the information contained within each chapter of this report is provided below.

Chapter 1:

- ▶ Introduces the PPR
- ▶ Summarises the approval process
- ▶ Summarises the Project presented in the EA
- ▶ Details changes that have been made since the EA was completed.

Chapter 2:

- ▶ Summarises the consultation that was undertaken prior to, during and post exhibition of the EA
- ▶ Outlines the submissions process
- ▶ Summarises the types of submissions received and describes how issues were identified from formal submissions.

Chapter 3:

- ▶ Summarises concerns raised within submissions received from government agencies and councils, other stakeholders, interest groups and potentially affected residents/home owners
- ▶ Provides responses to concerns raised.

Chapter 4:

- ▶ Provides details on the changes to the Project outlined in Chapter 1 and assesses the environmental impacts of the changes
- ▶ Provides details of additional mitigation measures as a result of changes to the Project
- ▶ Defines the Preferred Project.

Chapter 5:

This chapter concludes the PPR by:

- ▶ Providing an amended Statement of Commitments including modifications made since the EA was finalised.

1.3 The Preferred Project Report and the approval process

The Project is being assessed under Part 3A of the *Environmental Planning & Assessment Act 1979* (EP&A Act), which provides the assessment and approval process for major infrastructure projects. The Minister for Planning is the approval authority for all projects assessed under Part 3A.

In a letter dated 13 August 2007, the DOP confirmed that the Project is a development to which Part 3A of the EP&A Act applies.

The EA was prepared and finalised following the Director-General's pre-exhibition evaluation of the document's adequacy. In accordance with EP&A Act, the EA for the Project was publicly exhibited from 27 February 2008 to 2 April 2008. During this time Sydney Water provided community information on the Project, in accordance with DOP guidelines (refer to [Section 2.1](#)).

The DOP received submissions in response to the EA and forwarded them to Sydney Water, the last submission being received on the 5th May 2008. The Director-General also advised that Sydney Water was required to respond to the issues raised in the submissions. If Sydney Water's response requires changes to the Project to minimise its environmental impact or changes to the Statement of Commitments, the Director-General requires a PPR to be prepared and the Statement of Commitments to be revised under Section 75H(6) of the EP&A Act.

Sydney Water has prepared this PPR due to changes to the Project following a technical review and in response to submissions received. The Statement of Commitments has also been revised. If the Director-General considers that the changes to the Project are significant, the PPR may be required to be made available to the public. Sydney Water would advertise and exhibit the PPR in the same manner as the EA. There would not be a formal invitation for further submissions.

Following Sydney Water's submission of the PPR, the Director-General will prepare an EA Report to the Minister for Planning. The Minister for Planning, after considering the EA Report, may issue an approval and set conditions for the construction and operation of the Project.

1.4 Summary of the original proposal

The original proposal consisted of construction and operation (including commissioning and maintenance) of water related services (including drinking water, recycled water and wastewater infrastructure) for the First Release Precincts in Sydney's North West Growth Centre. There are six First Release Precincts; namely North Kellyville, Riverstone, Riverstone West, Alex Avenue, Area 20 and Colebee. The Project components included:

- new drinking water trunk and distribution pipelines
- new recycled water trunk and distribution pipelines
- new wastewater gravity and rising pipelines
- a new sewage pumping station (SPS)
- upgrade of an existing SPS

- ▶ new water pumping stations (WPSs) for drinking and recycled water
- ▶ new surface and elevated reservoirs for drinking water and recycled water
- ▶ upgrade and amplification of the existing Riverstone Sewage Treatment Plant (STP)
- ▶ new recycled water treatment facilities at the existing Quakers Hill STP.

The location of the six First Release Precincts is shown in [Figure 1-1](#). The First Release Precincts are described in more detail in the following sections and shown in [Figure 1-2](#). The locations of the key components of the Project are shown in [Figure 1-3](#). Any new water related infrastructure for the Colebee Precinct would be provided by the Precinct developer, not Sydney Water.

Figure 1-1 The Project area

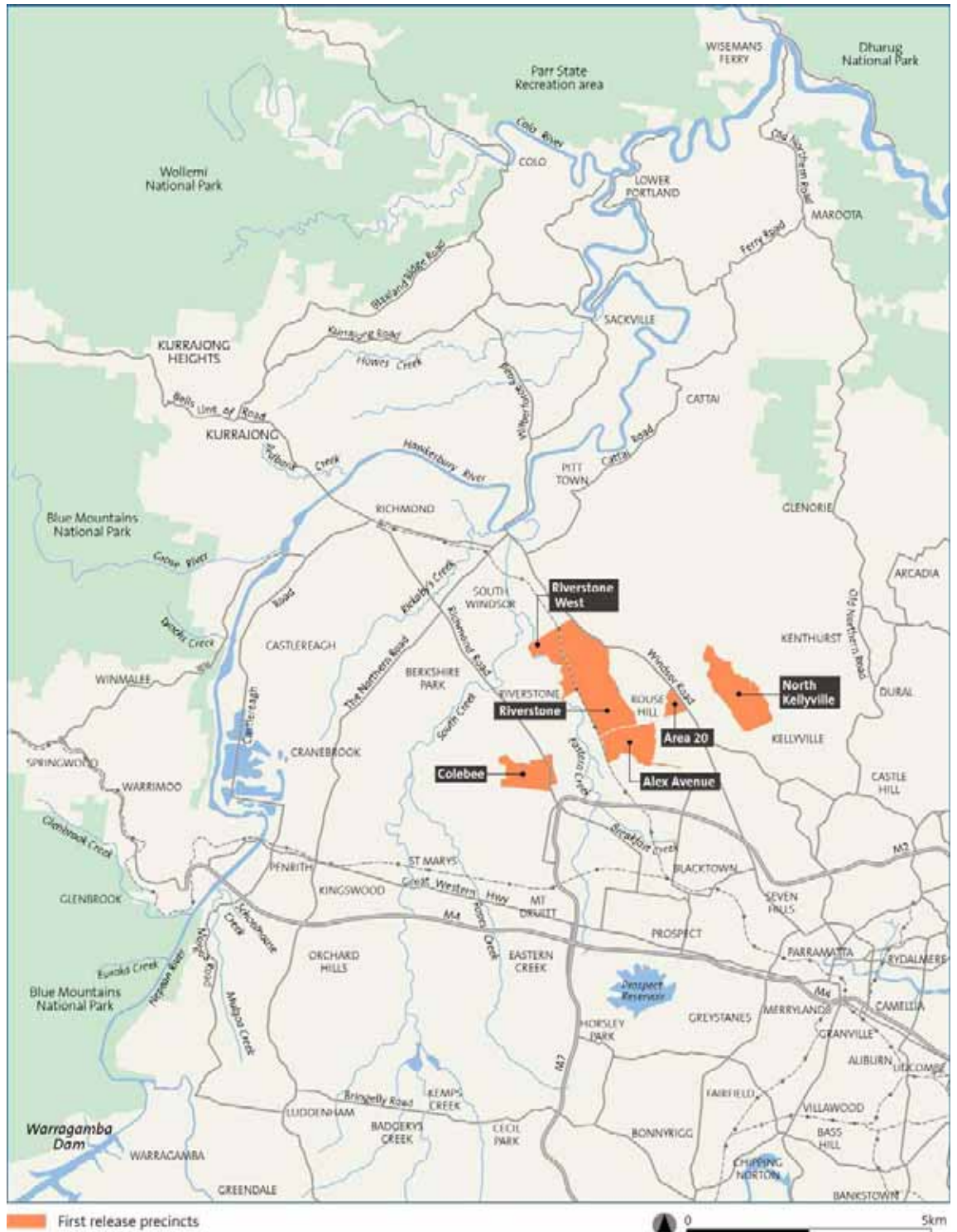


Figure 1-2 The location of the Precincts

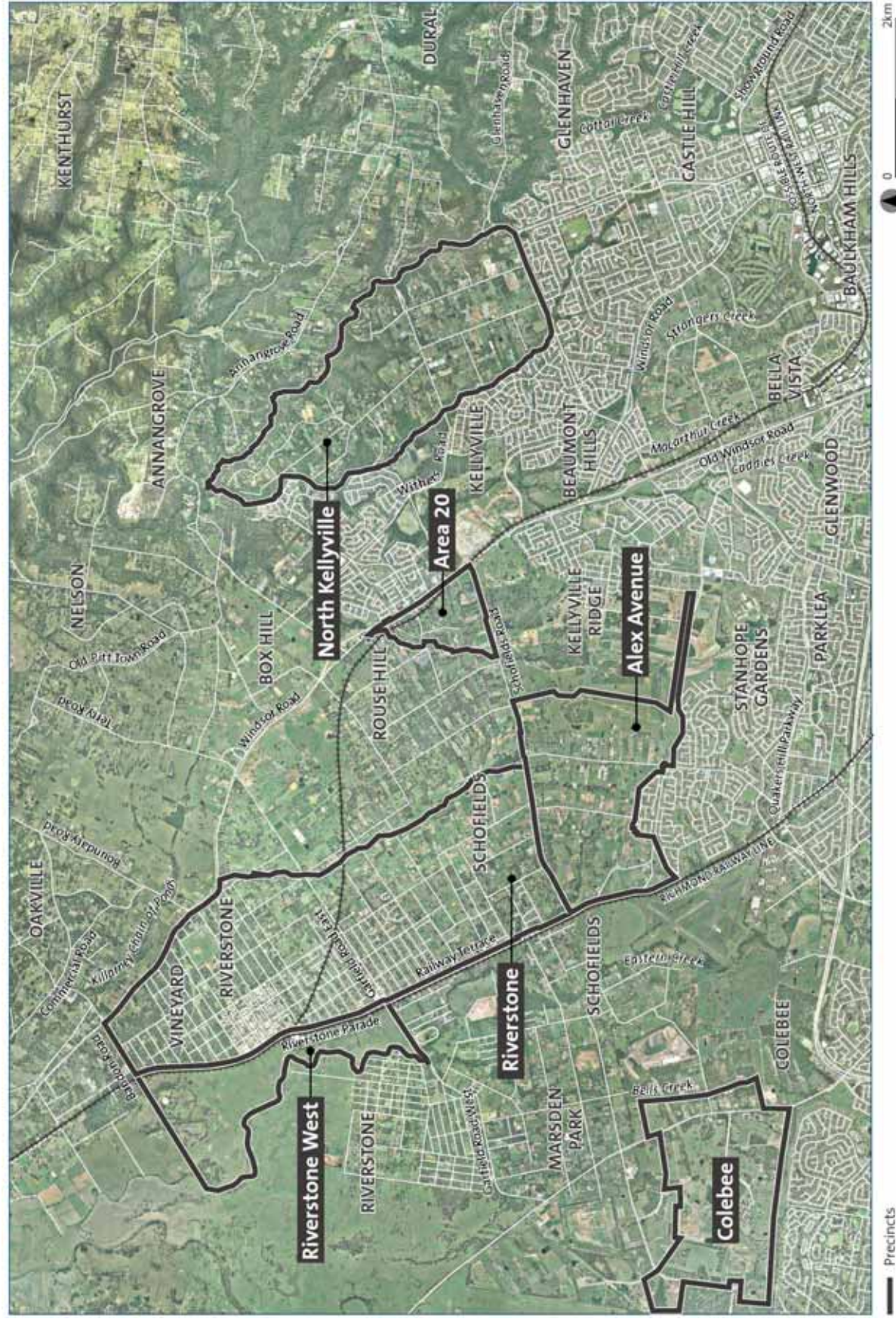
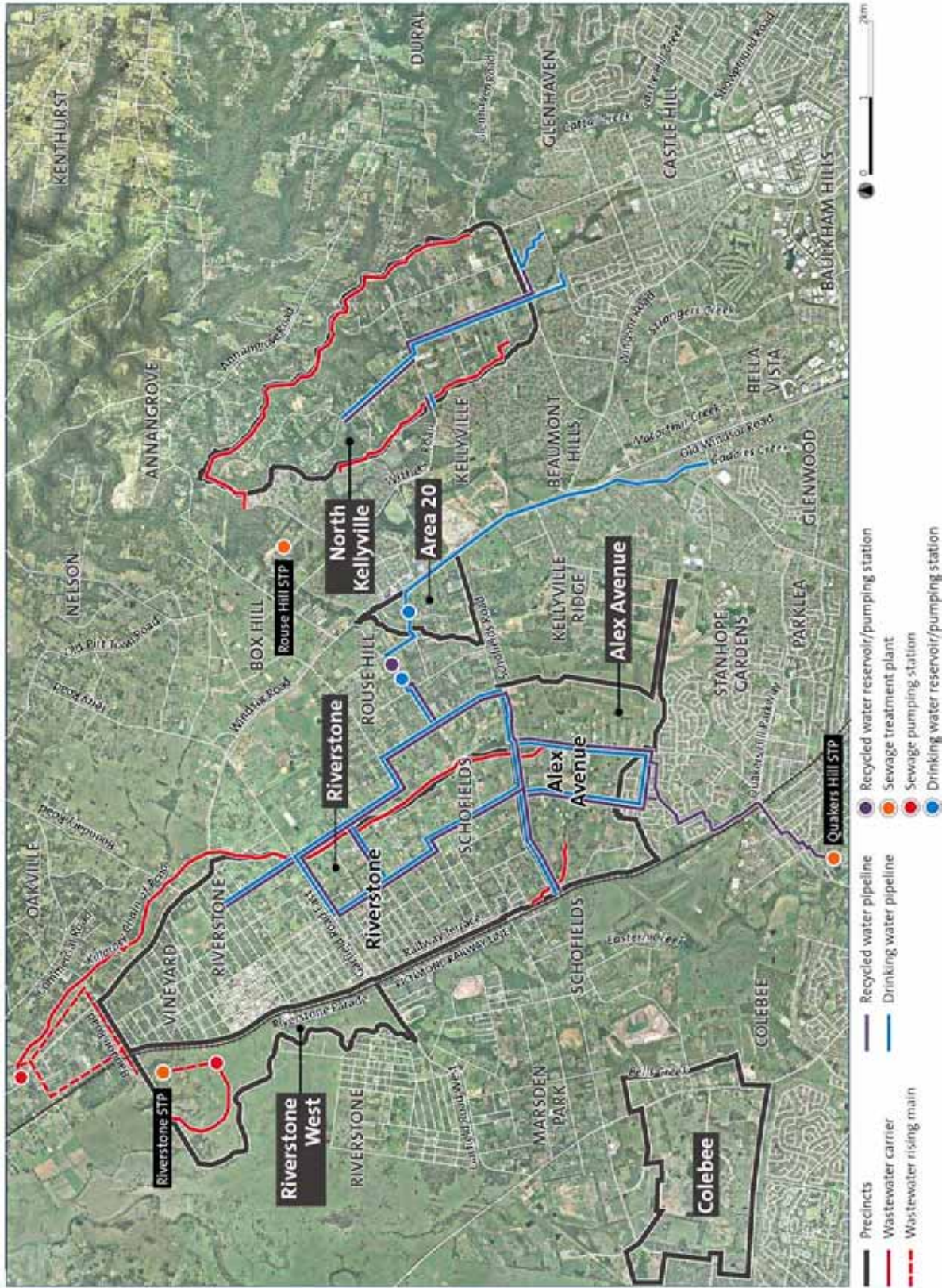


Figure 1-3 Key components of the original Project



1.5 Summary of changes since Environmental Assessment exhibition

The majority of the Project is unchanged from the original proposal considered in the EA. The following aspects of the proposal have changed:

- ▶ Revised drinking water pipeline routes
- ▶ Revised recycled water pipeline routes
- ▶ Relocation of the Rouse Road water pumping station
- ▶ Expansion of Cudgegong Road Reservoir Site
- ▶ Cudgegong Road Reservoir overflow pipeline
- ▶ Revised wastewater pipeline route

1.5.1 Revised drinking water pipeline routes

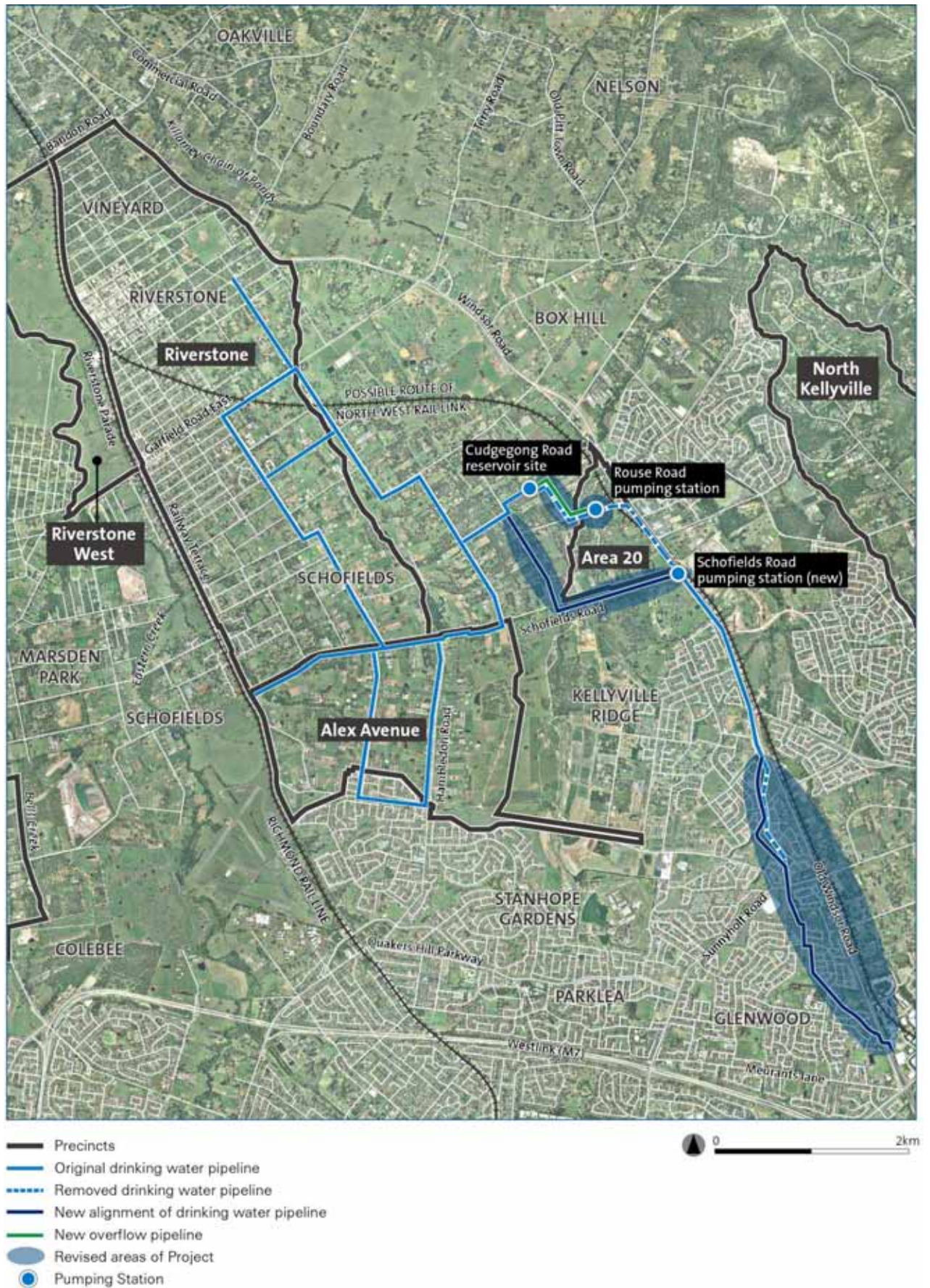
As a result of a submission from the Transport Infrastructure Development Corporation (TIDC) the drinking water pipeline route from Parklea to the Cudgegong Road Reservoir Site has been revised to avoid impacting on the proposed TIDC North West Metro rail link. The revised route would minimise the impacts on future railway infrastructure.

The revised route would also reduce the impact along Windsor Road and would provide the opportunity for the section of pipeline laid along Schofields Road to be coordinated with the proposed construction works for the widening and upgrading of Schofields Road.

Figure 1-4 shows the route of the revised pipeline in comparison with the original pipeline. The revised route would commence at Sunnyholt Road near Clarendon Drive and progress northward within the drainage reserve along Caddies Creek. The pipeline would enter Old Windsor Road on the western side and then continue northward along Windsor Road. The pipeline would then turn left at Schofields Road on the southern side and then turn right into Cudgegong Road. The pipeline would enter the Cudgegong Road Reservoir Site along the existing property access corridor.

During the design refinements it was determined that the drinking water pipeline should extend back to Old Windsor Road at Bella Vista to allow for ultimate servicing of the Parklea-Rouse Hill drinking water delivery system. This extension of the pipeline would generally be through existing Sydney Water owned drainage land that forms part of the Caddies Creek drainage system to Old Windsor Road.

Figure 1-4 Original and revised drinking water pipeline routes



1.5.2 Revised recycled water pipeline routes

The route originally proposed for the recycled water pipeline from Quakers Hill Recycled Water Plant crossed the Richmond rail line at Oppy Reserve. This original route impacted on vegetation communities on the eastern side of the rail line at Oppy Reserve and Commonwealth owned land on the western side of the rail line. To avoid impacting the vegetation communities and Commonwealth owned land, the rail crossing has been moved about 20 metres south as shown in [Figure 1-5](#).

During investigations at the Cudgegong Road Reservoir Site it was determined that there was insufficient space for the required number of pipes along the existing access corridor. The recycled water pipelines at the Cudgegong Road Reservoir Site would utilise a second access corridor about 70 metres north as shown in [Figure 1-5](#).

The route originally proposed for the recycled water pipeline from Quakers Hill Recycled Water Plant crossed the M7 Motorway directly north of the Quakers Hill Sewage Treatment Plant. The revised recycled water pipeline would exit the Quakers Hill Recycled Water Plant along the access road to Quakers Road and then would follow Quakers Road to Quakers Hill Parkway as shown in [Figure 1-5](#). The pipeline would be bored under the M7 Motorway.

1.5.3 Relocation of the Rouse Road water pumping station

Due to the relocation of the drinking water pipeline from Parklea to the Cudgegong Road Reservoir Site the proposed water pumping station at Rouse Road has also been relocated. It is now proposed to locate the new pumping station on the southern side of Schofields Road near the intersection of Windsor and Schofields Road as shown in [Figure 1-4](#).

1.5.4 Cudgegong Road Reservoir Site

Whilst finalising the infrastructure required at the Cudgegong Road Reservoir Site some items were repositioned to accommodate additional associated reservoir infrastructure, such as access roads, servicing units and pipeline spacings. To enable the provision of all required infrastructure the property boundary of the site has been expanded to include an additional hectare of private property adjacent to the Sydney Water owned land as shown in [Figure 1-6](#).

1.5.5 Cudgegong Road Reservoir overflow pipeline

An overflow pipeline discharging drinking and recycled water overflow (from the reservoirs) and stormwater from the Cudgegong Road Reservoir Site into Second Ponds Creek would be installed as shown in [Figure 1-4](#) and [Figure 1-5](#). The proposed overflow pipe would exit the reservoir site onto Worcester Road, turn left onto Rouse Road and end at Second Ponds Creek.

1.5.6 Revised wastewater pipeline route

Two wastewater pipelines from the proposed pumping station at Vineyard to Riverstone STP were proposed in the EA. Both pipelines were proposed to cross the Richmond rail line at Bandon Road. Further investigations found that it was not feasible to accommodate both pipelines in the existing railway crossing at Bandon Road due to pipeline sizes.

The revised Project incorporates one wastewater pipeline railway crossing at Bandon Road and one at St James Road as shown in **Figure 1-7**. It is proposed that both rail crossings would be underbored.

Figure 1-5 Original and revised recycled water pipeline routes

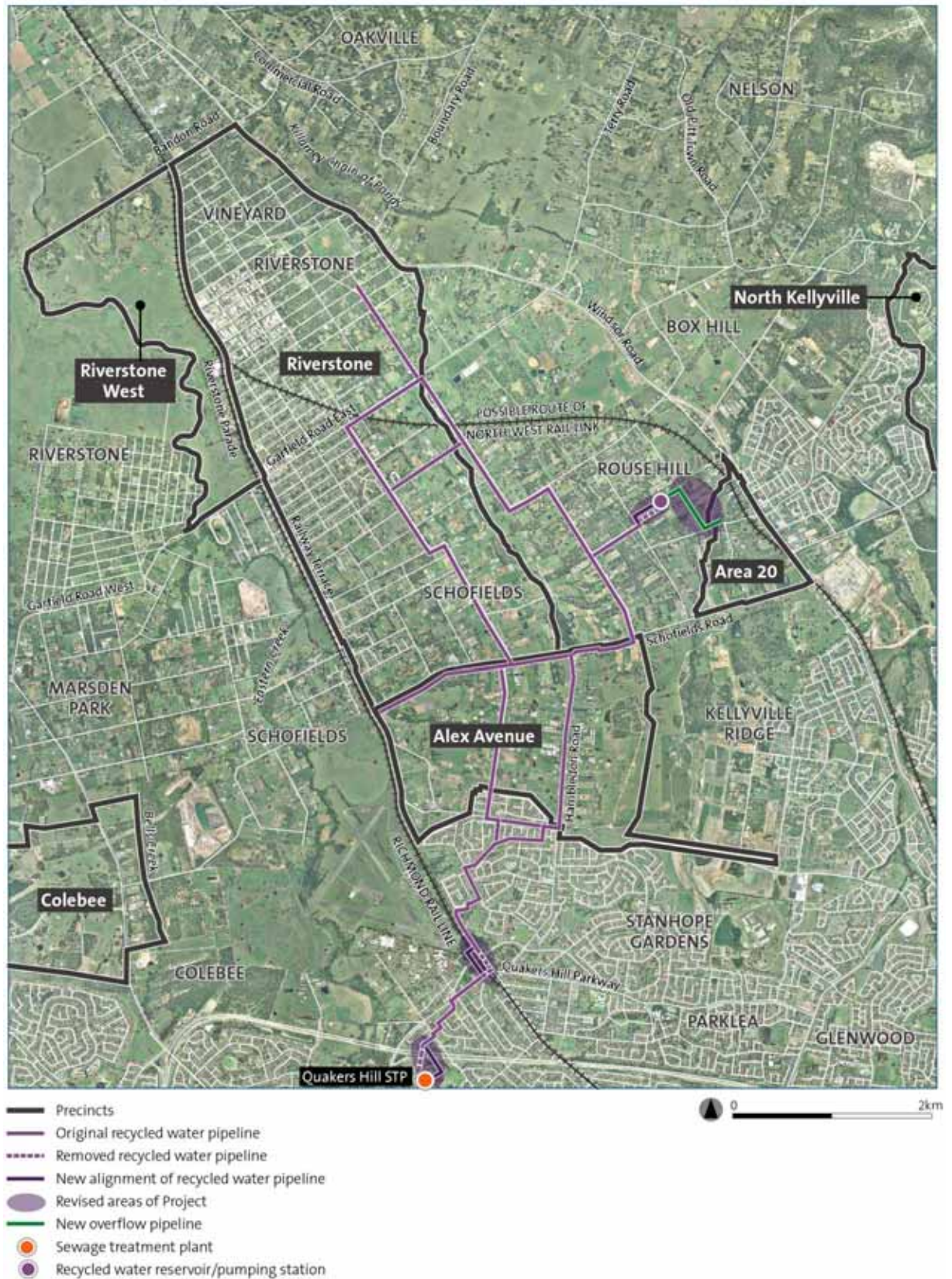


Figure 1-6 Expansion of Cudgegong Road Reservoir Site

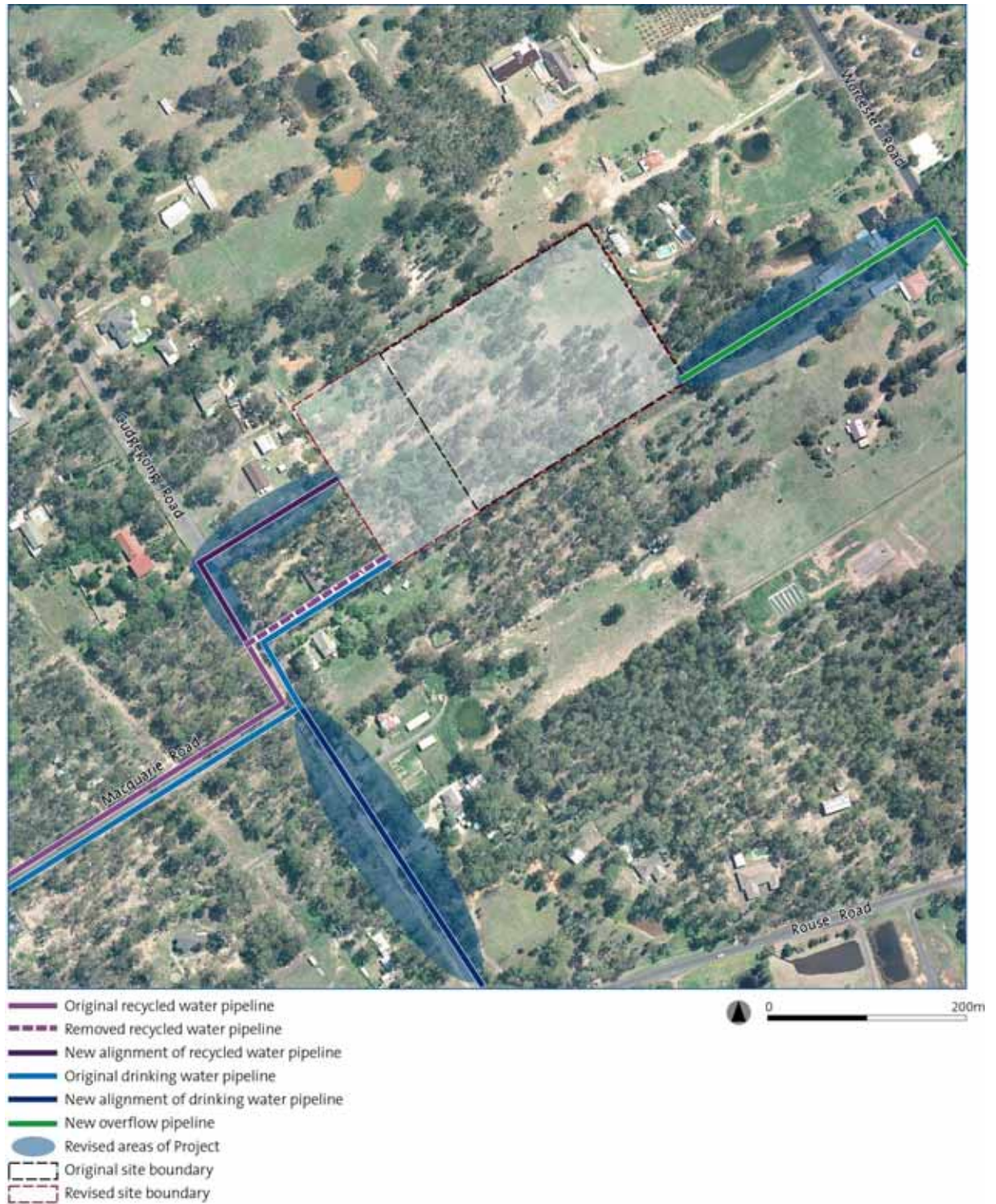
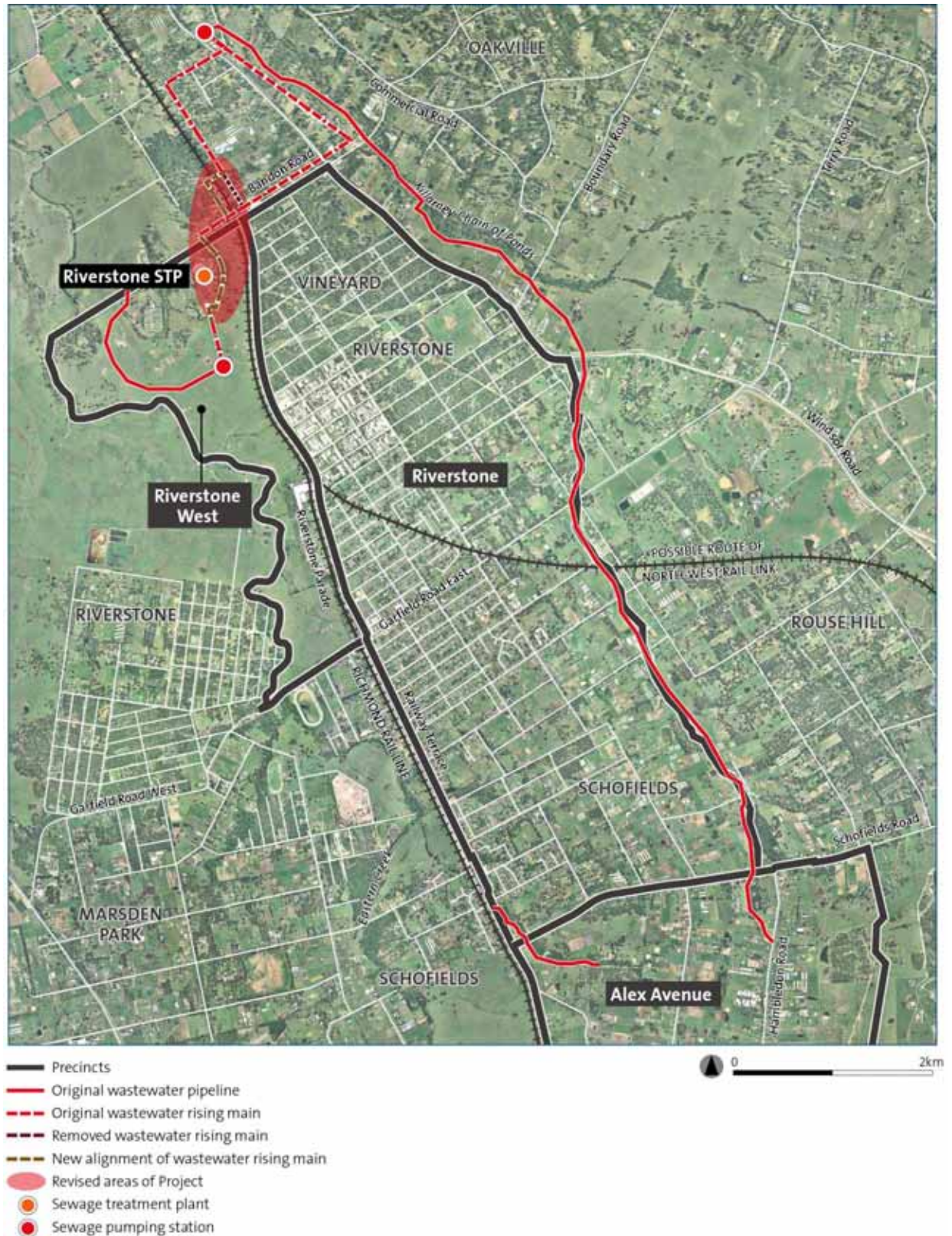


Figure 1-7 Original and revised wastewater pipeline route



1.6 EA Corrections

Since the EA was placed on display several errors and inaccuracies were found in the document. This section corrects or clarifies these errors and inaccuracies.

1.6.1 Water quality and hydrology

In Table 6.2 of the EA it should have stated that the east and south east parts of the North Kellyville Precinct drain to Cattai Creek, not Smalls Creek, and the west and south west parts of the North Kellyville Precinct drain to Smalls Creek, not Cattai Creek.

1.6.2 Terrestrial flora and fauna

In Figure 6.4 of the EA, the Eastern Bentwing Bat record at the northern end of the Project area should have been a record of the Eastern Freetail-Bat.

In Figure 6.5 of the EA, several occurrences of the vegetation community Upper Georges River Sandstone Woodland were incorrectly shown as River-flat Eucalypt Forest and Shale Sandstone Transition Forest. The ecological assessment of the impact on vegetation communities used the correct mapping.

The vegetation communities identified outside the North West Growth Centre were not shown in Figure 6.6 of the EA, however the vegetation communities were considered as part of the ecological assessment.

1.6.3 Indigenous (Aboriginal) heritage

In Section 6.5.4 of the EA in the section regarding the Cudgegong Road Reservoir Site on page 6.56 the first two sentences should be replaced with:

"No Aboriginal sites have been found within the Cudgegong Road Reservoir Site as a result of previous studies. No items of Aboriginal heritage were identified in the AHIMS search. The field surveys for this EA identified one Aboriginal archaeological site within the Project impact zone at the Cudgegong Road Reservoir Site."

2 The consultation process and submissions

This chapter provides details of the consultation Sydney Water undertook during the preparation, exhibition and post exhibition of the Environmental Assessment. Details are also provided on the submission process and types of submissions that were received.

2.1 Consultation

2.1.1 Overview of the consultation process

Sydney Water developed a Stakeholder Consultation and Communications Strategy at the commencement of the Project to keep key stakeholders involved and informed throughout the Project. Consultation with the relevant local and State government agencies was undertaken during the preparation, exhibition and post exhibition of the EA. Consultation activities undertaken include:

- ▶ a planning focus meeting, which was held by the DOP on 12 September 2007 and attended by representatives of key NSW Government agencies (DoP, DECC, RTA, TIDC, DPI, GCC, HNCMA, NSW Health, TIDC, RailCorp) and Blacktown City, Baulkham Hills Shire and Hawkesbury City Councils
- ▶ individual discussions and correspondence with representatives from NSW Government agencies and Councils
- ▶ an evening information session at the Rouse Hill Community Centre
- ▶ placement of Project information on Sydney Water's website
- ▶ distribution of approximately 12,000 community newsletters in total, to residents in and around the study area
- ▶ consultation with Aboriginal stakeholders through advertisements in local papers, meetings, involvement of stakeholders in site surveys, provision of reports for review and incorporation of comments into reports, and recommended management measures.

2.1.2 Exhibition of the Environmental Assessment

The DOP exhibited the EA, including Sydney Water's draft Statement of Commitments, from 27 February 2008 to 2 April 2008. During the exhibition period the public was able to review the document, attend public information displays and forward submissions to the DOP to help in its assessment of the Project.

During the exhibition period, Sydney Water consulted with specific stakeholders and provided information for the wider community. This supplemented the formal DOP exhibition process.

The EA exhibition gave the community, Government agencies and stakeholder groups an opportunity to input ideas, raise issues and provide feedback. The Project communications activities are described below.

The communication activities and material prepared for the Project included:

- ▶ Sydney Water Project website
- ▶ newsletters

- newspaper advertisements

Events were held during exhibition to supplement and highlight the written material, including:

- information displays at various locations
- an evening information session at Rouse Hill Community Centre
- meetings with Government agencies.

Other communication channels included:

- newspaper advertisements
- community telephone number
- email facilities: NorthWestGrowthCentre@sydneywater.com.au

The DOP exhibited the EA document for public information and comment at local Councils in the areas potentially impacted by the Project (Blacktown, Baulkham Hills and Hawkesbury Councils). The EA was also available at the DOP Sydney office, Sydney Water head office and the Nature Conservation Council.

An evening information session staffed by Sydney Water personnel was held at Rouse Hill Community Centre. Visitors to the display were given a newsletter and a map of the area and had the opportunity to ask members of the project team questions about the Project.

Project information, including the EA, maps of the study area and community newsletters, was made available on the Sydney Water website at www.sydneywater.com.au. The community could comment on and obtain further information about the Project by contacting Sydney Water or sending an e-mail to NorthWestGrowthCentre@sydneywater.com.au. The concerns raised by phone and e-mail were recorded in a contacts database.

Both Sydney Water and the DOP used newspaper advertisements to notify the community about the exhibition of the EA and the public displays. Sydney Water placed advertisements in local and mainstream press in February 2008 as shown in **Table 2-1**.

Table 2-1 Project advertisement details

Publication	Dates advertised
Sydney Morning Herald	27 February 2008
Blacktown Advocate	27 February 2008
Hills Shire Times	26 February 2008

2.2 Submissions

During the public exhibition of the EA, submissions were invited from the community and other stakeholders. This section summarises issues raised in the submissions to the DOP.

2.2.1 Types of submissions

Submissions received about the Project included:

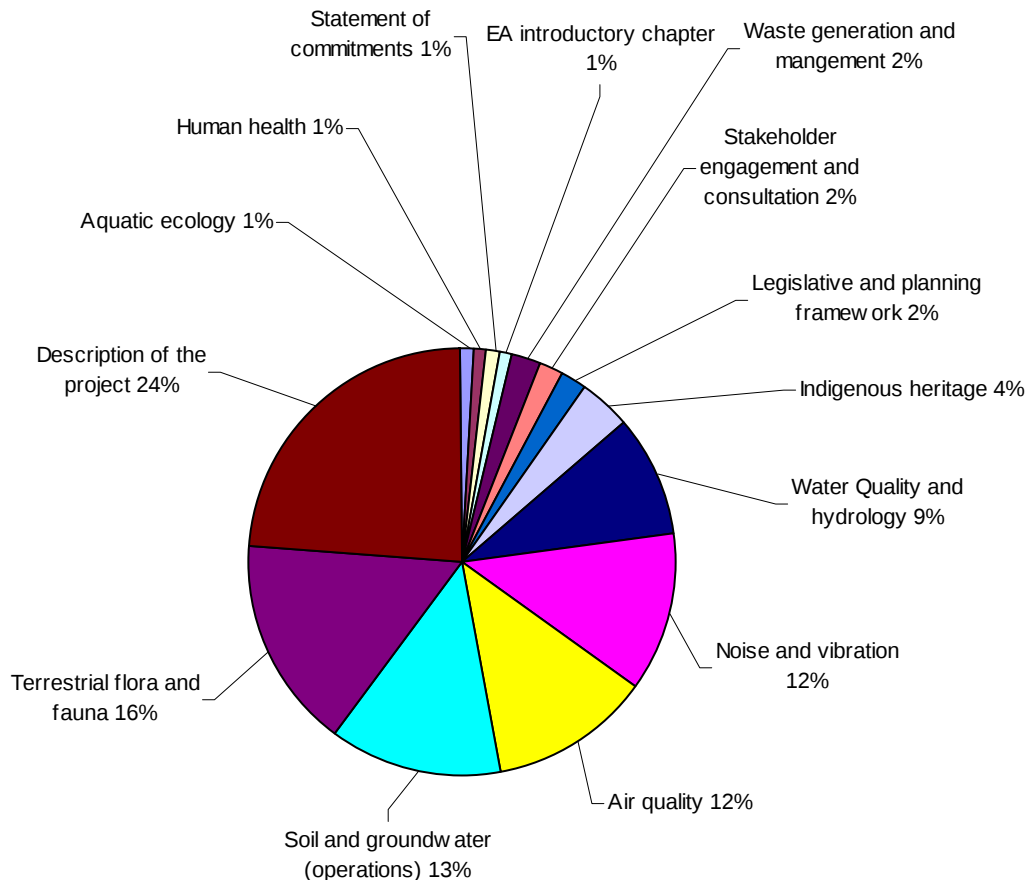
- 11 formal written submissions to the DOP
- informal submissions

2.2.2 Formal submissions

During the public exhibition of the EA submissions were invited from the community and other stakeholders. The DOP received 11 submissions from State and local government agencies, special interest groups and the local community (**Appendix A**). Of the total submissions received one opposed, three supported and seven did not state a clear position. Ten of the submissions raised concerns and comments regarding the proposal. Sydney Water has summarised and addressed these issues.

Sydney Water compiled 84 issues from the 11 submissions received by the DOP and calculated the frequency of occurrence of each issue (**Figure 2-1**). The most common request (24 % of issues) was for clarification on the description of the Project. Issues relating to terrestrial flora and fauna, soil and groundwater (operations), noise and vibration, air quality, and water quality and hydrology comprised 16 %, 13 %, 12 %, 12% and 9 % of all issues raised (respectively). Less frequent issues raised included Indigenous heritage (4 %), stakeholder engagement (2 %), waste generation (2 %), legislative and planning framework (2 %) the statement of commitments (1 %), aquatic ecology (1 %) and comment on the EA introductory chapter (1 %).

Figure 2-1 Frequency of issues raised in submissions (%)



Most submissions received raised more than one issue of concern. **Table 2-2** outlines where in the PPR the issues are discussed and demonstrates the relative importance of the key issues by listing the number of times each issue was raised in the submissions.

Table 2-2 Number of times issues raised in submissions and where addressed in PPR

Issue	Number of times issue raised	Where addressed in PPR
Description of the project	20	Section 3.1
Terrestrial flora and fauna	14	Section 3.6
Soil and groundwater (operations)	11	Section 3.8
Noise and vibration	10	Section 3.12
Air quality	10	Section 3.11
Water quality and hydrology	7	Section 3.4
Indigenous heritage	3	Section 3.7
Waste generation and management	2	Section 3.10
Stakeholder engagement and consultation	2	Section 3.13
Legislative and planning framework	2	Section 3.3
Aquatic ecology	1	Section 3.5
Human health	1	Section 3.9
Statement of commitments	1	Section 3.14
EA introductory chapter	1	Section 3.1

Table 2-3 outlines the issues raised in submissions and are categorised by topic and author. Sydney Water's responses to the concerns are provided in **Chapter 3**.

Table 2-3 Issues raised

#	Issue raised	Submission author
	EA introductory chapter EA Chapter 1, PPR Section 3.1	
1	As noted there are extensive areas of flood-affected rural land in the Riverstone West Precinct, opportunities for recycling effluent for agriculture such as producing fodder could form part of the planned reuse options.	Department of Primary Industries
	Description of the Project EA Chapter 3, PPR Section 3.2	

#	Issue raised	Submission author
2	Request for clarification on infrastructure and land to be serviced within each of the packages. Suggestion for map.	Growth Centres Commission
3	Clarification of the timing of the Alex Avenue or Burdekin Road 250 mm water mains	Growth Centres Commission
4	Concern about the laying of a pipeline in Jocelyn Boulevard due to the road being narrow and commonly used by children. Suggest pipeline be installed on Walker Road, then onto Burdekin Road.	Private individual
5	Request for Sydney Water to consider an alternative location for the Rouse Road and Windsor Road drinking water pipeline due to concern regarding a direct conflict of two infrastructure projects. A stabling facility for the North West Metro rail link alignment is to be located under Rouse Road and the North West Metro rail link alignment would also cross Windsor Road. Option A in Table 4.4 of the EA would avoid direct conflict. Alternatively another option not assessed in the EA is attached for consideration.	Transport Infrastructure Development Corporation
6	Concern regarding location of the Rouse Rd water pumping station as it appears to be in close proximity to the proposed stabling facility. Request for exact location of the water pumping station	Transport Infrastructure Development Corporation
7	Support for the use of micro-tunnelling or horizontal directional drilling techniques under rail lines	Transport Infrastructure Development Corporation
8	Request for Sydney Water to advise if recycled water could be supplied to the stabling facility at Rouse Hill.	Transport Infrastructure Development Corporation
8	Clarification is required as to whether the drinking and recycled water pipelines are proposed to be located within, or outside the mapped riparian corridors. DWE does not support the locating of pipelines within the riparian corridors (with the exception of crossings)	Department of Water and Energy
10	Clarification is required as to whether the wastewater carriers are proposed to be located within, or outside the mapped riparian corridors. If the carriers are proposed to be located in the riparian corridors, alternative options need to be identified.	Department of Water and Energy
11	Comment that the landform of the proposed wastewater pipeline alignment of the Cattai Creek Carrier consists of steep lands, with some areas of extreme slope. Access to these areas, during both construction and operation, should be taken into account during further design phases.	Baulkham Hills Shire Council
12	Request that the location and size of the tributaries which join into the main creeklines of Smalls and Cattai Creeks in the vicinity of the North Kellyville and Cattai Creek Carriers are taken into account during further design phases.	Baulkham Hills Shire Council

#	Issue raised	Submission author
13	Request that access areas for the maintenance of the pipelines should be located outside of the riparian corridors	Department of Water and Energy
14	Maintenance requirements for creek crossings, either underbored or attached to bridges or existing structures, are to be considered.	Baulkham Hills Shire Council
15	Support for pipeline crossings of creeks being either underbored or attached to existing structures.	Department of Water and Energy
16	Comment that careful consideration is required when finalising the locations of the creek crossings under Smalls Creek for the wastewater pipelines.	Baulkham Hills Shire Council
17	Recommendation that underground boring commences from the outer edge of the vegetated buffer and that it is bored for the full width of the watercourses, core riparian zone and vegetated buffer.	Department of Water and Energy
18	Request for DOP to take into account that proposals for extensions to Riverstone Scheduled lands services are likely to be brought forward in the near future.	Landcom
19	The proposal does not propose any wet weather storage at Riverstone STP, using treated wastewater for agriculture could reduce discharges to Eastern Creek.	Department of Primary Industries
20	Proposed water mains within Council's road reserves should be installed at such alignment and levels to match with the future road cross sections and the vertical alignment of the road.	Baulkham Hills Shire Council
21	Restoration of the open trenches within Council's road reserves should be undertaken in accordance with Council's specification for trench restorations and in accordance with Council's process of managing the restorations of road openings.	Baulkham Hills Shire Council
	Legislative and planning framework EA Chapter 5, PPR Section 3.3	
22	Request for details on the extent of any dewatering to enable DWE to determine if a licence under the <i>Water Act</i> is required.	Department of Water and Energy
23	The proponent and its contractors will need to comply with the provisions of the environment protection legislation, including the POEO Act, the <i>National Parks and Wildlife Act 1974</i> and the <i>Threatened Species Conservation Act 1995</i> during the construction of all proposed works	DECC
	Water quality and hydrology EA Section 6.2, PPR Section 3.4	
24	Concern that the EA does not consider potential impacts of scouring and/or erosion issues caused by the outlets. Request for description of the best practice treatment methods for the outlets.	Blacktown City Council

#	Issue raised	Submission author
25	Concern that the EA does not consider the restrictions the installation of the pipelines may have on future amenity of the area including restrictions on future Water Sensitive Urban Design (WSUD) features, street tree planting and other services.	Blacktown City Council
26	Statement that the construction of an online detention basin along Smalls Creek at North Kellyville is not supported and for future reference detention basins should not be located in riparian corridors.	Department of Water and Energy
27	Statement that the disposal of any dewatering needs to be carried out appropriately and in accordance with DECC guidelines/licence requirements.	Department of Water and Energy
28	Statement that the Project will need to be undertaken in a manner that compliments other water related projects in the northwest Sydney area, including the Western Sydney Recycled Water Replacement Flows Project.	DECC
29	Statement that an upcoming review of the regulatory arrangements governing nutrient discharges to the Hawkesbury Nepean River may have implications for future regulatory approaches for nutrient management in the River catchment and may result in modified effluent management practices and limits to those currently required under the STS licenses.	DECC
30	Erosion and sedimentation practices during the construction phases should be stringently followed so that the water quality, aquatic ecology and terrestrial flora and fauna of waterway corridors both within and downstream of the North Kellyville Precinct are not compromised.	Baulkham Hills Shire Council
	Aquatic ecology EA Section 6.3, PPR Section 3.5	
31	Request that the development is not approved on the grounds that, local and regional aquatic health and biodiversity is likely to be severely impacted.	Nature Conservation Council
	Terrestrial flora and fauna EA Section 6.4, PPR Section 3.6	
32	Request for clarification of the different amounts and types of vegetation being offset as there appears to be inconsistencies in the EA. Suggest a clear table is incorporated into the EA summarising the total amount of vegetation to be cleared in certified and non-certified areas, the method of offset and whether or not this is covered by the draft conservation plan.	Blacktown City Council
33	Recommendation that all measures for the protection of biodiversity in the appendices be incorporated into the EA.	Blacktown City Council
34	Concern that the EA does not adequately consider the environmental significance of the Cudgegong Road Reservoir Site or provide	Blacktown City Council

#	Issue raised	Submission author
	appropriate discussion of ameliorative measures proposed in the Species Impact Statement.	
35	A Translocation Plan for the Cumberland Plain Land Snail should be prepared and specific protection measures for <i>Grevillea juniperina</i> ssp. <i>Juniperina</i> should be implemented.	Blacktown City Council
36	Recommend the proposed development is not approved on the grounds that significant flora species, the majority of which are already highly degraded and fragmented, will be disturbed or destroyed.	Nature Conservation Council
37	Recommend the Cudgegong Road Reservoir Site is not the site for the drinking and recycled water pipelines and any other water related infrastructure. Strong suggestion that a buffer or no construction zone is created around the reservoir.	Nature Conservation Council
38	Recommend a replanting strategy is created prior to any development approval to ensure revegetation reflects the natural structure and appearance of the vegetation, especially along creek corridors.	Nature Conservation Council
39	Recommend that the development is not considered for approval until an appropriate and comprehensive threatened species mitigation strategy is developed.	Nature Conservation Council
40	Offer of land that could be revegetated with Cumberland Plain Woodland for use as a potential offset by Sydney Water (Land jointly owned by Landcom and Blacktown City Council).	Landcom
41	Comment that the amount of vegetation to be lost as a result of the proposal is uncertain due to lack of data regarding the width of clearing required for trenching, the extent of drilling that will be used, the quantity and quality of rehabilitation that will be allowed and the extent and consequences of indirect impacts, including edge effects.	DECC
42	Recommendation that the proponent either quantifies the amount of vegetation to be lost prior to approval so that the amount of offset required is known or that the conditions of approval require the proponent to assess the extent of impacts post construction so that the required offset can be determined.	DECC
43	Comment that the proposed offset at the Riverstone STP site is acceptable provided that the protection applied to the site meets the definition of protection in the biodiversity certification order. Recommend an E2 zoning and/or a protective covenant.	DECC
44	Statement that the offset is to be finalised prior to the commencement of construction.	DECC
	Indigenous heritage EA Section 6.5, PPR Section 3.7	
45	Request that a detailed discussion on A7 complex and the management	Blacktown City Council

#	Issue raised	Submission author
	measures recommended by ENSR be included in the EA. Recommend that Sydney Water investigate the viability of realigning the pipeline in this area to either 200 m to the east or west of First Ponds Creek.	
46	Request Sydney Water investigates moving the level crossing carriers in the vicinity of the RV13, RV30 and A1 sites, and the First Ponds creek carrier in the vicinity of the A4 site as recommended by ENSR.	Blacktown City Council
47	Statement that Sydney Water should follow recommendations contained in the Aboriginal Heritage Studies reports (EA Volume 2, Appendix C) as well as the recommendations and requests noted by the representatives of the Aboriginal community during the assessment process.	DECC
	Soil and groundwater - operations EA Section 6.7, PPR Section 3.8	
48	Request that the DWE be consulted in relation to the proposed groundwater monitoring program as groundwater monitoring will require a licence under the <i>Water Act 1912</i> from DWE.	Department of Water and Energy
49	Request that the EA assess the appropriateness of the use of recycled water in the areas of existing high soil salinity and/or a high potential for salinity issues to develop.	Blacktown City Council
50	Request that control measures be put in place to ensure that appropriate construction materials are selected for developments in areas where recycled water is implemented.	Blacktown City Council
51	Request that detailed electro-magnetic survey and soil/groundwater surveys be undertaken in areas for the proposed pipelines and other infrastructure. Request that the design of infrastructure should take into account that salt levels could rise in the soil materials surrounding the infrastructure.	Blacktown City Council
52	Request that the recommendations within the " <i>Phase 1 Environmental Contamination Assessment</i> " (Appendix F) are undertaken.	Blacktown City Council
53	Request that the potential impact of the additional salt loads in the catchment on the freshwater creek system be addressed.	Department of Water and Energy
54	Impacts on garden plants from salinity. EA notes chloride levels of 133 mg/L may be expected and suggests that plants could cope except for the most sensitive plants. However, the Environmental Guidelines: Use of Effluent by Irrigation (p 30 DECC 2004) recommend chloride levels be kept to 5 mg/L for horticultural crops.	Department of Primary Industries
55	Page 82 also notes sodium levels of 127 mg/L, but there is no mention of the sodium adsorption ratio (SAR) number for the treated effluent. To assess whether sodium concentrations applied may cause a problem to the soil structure assessment using SAR may be necessary (p 28-29 DECC 2004)	Department of Primary Industries

#	Issue raised	Submission author
56	Householders will need to receive educational materials about salinity and watering strategies and the need for extra care/caution when applying recycled water on salt sensitive plants in the garden.	Department of Primary Industries
57	Detailed information should be available to residents on the appropriate use and application of recycled water, including its use with other gardening additives, such as fertilizer and mulch. This could be in the form of information leaflets with water bills or information on the internet.	Baulkham Hills Shire Council
58	Comment that Sydney Water could undertake further research into the potential reduction in total dissolved solids and nutrients available in recycled water.	Baulkham Hills Shire Council
	Human health EA Section 6.8, PPR Section 3.9	
59	Statement that from a public health perspective the Director General's requirements have been met.	NSW Health
	Waste generation and management EA Chapter 6.10, PPR Section 3.10	
60	Any approval given for the Project should include conditions that address the treatment and disposal of any spoil from the Project including proposals for the management of any acid sulphate soils.	DECC
61	Any approval given for the Project should include conditions that address the treatment and disposal of any contaminated ground water, surface water and drill water from the directional boring operation.	DECC
	Air quality EA Section 6.11, PPR Section 3.11	
62	Request for revised odour modelling clarifying the odour contours as well as focusing on 'unusual odour events' rather than averages.	Growth Centre Commission
63	Comment that the odour impact assessment for Quakers Hill STP is not provided in the appendices. Request that the assessment is provided for review.	Blacktown City Council
64	Recommend that the DECC considers the odour impact and imposes relevant conditions of approval due to the predicted odour levels being greater than the relevant criteria at Quakers Hill STP.	Blacktown City Council
65	Recommendation that the proponent presents revised odour impact contours that are based on modeling that has taken into account the likely "worst" odour emissions the proposal may generate.	DECC
66	Request for all of the key operational assumptions upon which the odour modeling has been based to be listed.	DECC
67	Request for the proponent to present odour contours for STP operation both at current capacity and at full proposed capacity.	DECC

#	Issue raised	Submission author
68	Recommendation that planning decisions for the Project area be taken to ensure that the most sensitive future receptors, such as dwellings, schools and hospitals not be located within the 2 OU isopleth or to the west of the rail line.	DECC
69	Recommendation that planning decisions for the Project area be taken to ensure that receptors where large numbers of people work such as commercial offices or administration centres not be located within the 2 OU isopleth.	DECC
70	Recommendation that planning decisions for the Project area be taken to ensure that all other sensitive receptors are located in areas such that no future receptor is likely to experience odours that could be considered offensive.	DECC
71	Suggestion that the appropriate planning authority may wish to consider the following complimentary planning strategies: • Annotating Section 149(5) certificates on the title of each property within the 7OU affected area to ensure that buyers of potentially odour affected land are aware of the potential prior to purchasing in the area. • Locating areas of park and recreational lands between the station and residential receivers to the east of the station to reduce the potential for odour impact. • Undertaking very dense tree hedge plantings along the western side of the rail line and around the eastern perimeter of the sewage treatment plant to ameliorate odour impacts. Should this option be considered it is suggested the issue be further discussed with DECC to ensure design of the most effective barrier possible.	DECC
	Noise and vibration EA Section 6.12, PPR Section 3.12	
72	Recommend that DECC considers the noise impact and imposes and enforces relevant conditions of approval	Blacktown City Council
73	Suggestion that any consent for the Project include conditions that limit construction work to the periods between 7 am and 6 pm Monday to Friday, between 8 am and 1 pm Saturdays and at no time on Sundays and public holidays, unless inaudible at any residential premises, and that any work outside of these are by approval only.	DECC
74	Comment that there is no assessment of operational noise levels.	DECC
75	Recommendation that the proposed services be designed and built such that noise and vibration during operation do not exceed criteria derived by application of the NSW Industrial Noise Policy and the DECC publication "Assessing Vibration: a technical guideline".	DECC
76	Comment that predicted noise levels during pipeline construction and	Blacktown City Council

#	Issue raised	Submission author
	the operation of Quakers Hill STP and pumping stations are above the relevant noise criteria.	
77	Statement that the construction criteria of background +5dB(A) applies to the Project. Request that all feasible and reasonable mitigation measures be applied to the construction activities to reduce construction noise levels with an aim to meeting the criteria.	DECC
78	Suggestion that the Project consent includes a requirement for the proponent to prepare and implement a construction noise management plan.	DECC
79	Suggestion that the construction noise management plan include detail outlined in DECC's submission (Appendix A)	DECC
80	Request that works be conducted in accordance with the EA and the recommended mitigation measures suggested in the Noise Impact Assessments.	DECC
81	Suggestion that the construction noise management plan includes vibration from construction activity.	DECC
	Stakeholder engagement and consultation EA Chapter 8, PPR Section 3.13	
82	Recommend that the EA appropriately recognise the importance of the involvement of Blacktown City Council, and ensure appropriate communication measures are implemented with regard to environmental impacts, particularly biodiversity offsets, salinity management and treatment of outlets.	Blacktown City Council
83	It is critical that Sydney Water consult with Council during the design stages to ensure that the proposed alignment and the levels of the pipes are agreed to by Council prior to commencement of the construction. The above requirement is essential to avoid any possible need for relocating these water mains to facilitate the road works as part of development of the North Kellyville Precinct in the near future.	Baulkham Hills Shire Council
	Statement of commitments EA Chapter 10, PPR Section 3.14	
84	Request for Statement of Commitment 25 – <i>Ongoing consultation with the Transport Infrastructure Development Corporation (TIDC) would be undertaken regarding the construction and location of the WPS relative to the proposed stabling yards of the North West Rail Link</i> be amended to include the pipelines at the crossing of Windsor Road and in Rouse Road.	Transport Infrastructure Development Corporation

2.2.3 Informal submissions

Informal submissions were received in the form of telephone calls and emails directly to Sydney Water. Issues raised in these informal submissions included questions

about the extent of the Project and the location of the proposed infrastructure and requests for copies of the EA and newsletter. The concerns raised in these informal submissions have been addressed within this report and project material was provided to each of the individuals who requested information on the Project.

3 Consideration of submissions

This chapter outlines the concerns that were raised in submissions in response to the exhibition of the EA. Each submission received as a result of the exhibition of the EA for the Project was reviewed. Specific concerns have been identified and categorised based upon the chapters and key issues in the EA.

The concerns raised are presented in boxes and Sydney Water's response is provided below each box. A number of the concerns were common to several submissions and have been grouped together in the dialogue box with a combined response below.

3.1 EA introductory chapter

As noted there are extensive areas of flood-affected rural land in the Riverstone West Precinct, opportunities for recycling effluent for agriculture such as producing fodder could form part of the planned reuse options.

Due to the high demand for recycled water in the North West Growth Centre there is only a limited supply available. In the future, Riverstone STP would be the main source for recycled water for the entire North West Growth Centre. However construction of a recycled water plant at Riverstone STP is not part of this Project. Planning for the future development of the recycled water plant at Riverstone indicates that on an average day the total recycled water available would be required to meet the known demand. If excess recycled water became available, other usage options such as agricultural reuse would be considered.

3.2 Description of the Project

Request clarification on infrastructure and land to be serviced within each of the packages.

In consultation with the Growth Centres Commission Sydney Water would provide the requested information to the Growth Centres Commission as it is finalised.

Clarification of the timing of the Alex Avenue or Burdekin Road 250 mm water mains.

As part of the preparation of the EA, Sydney Water identified the necessary infrastructure required to service the First Release Precincts. The proposed recycled water and drinking water pipelines within Alex Avenue and Burdekin Road were included in the EA (Chapter 3) based on the assumption at the time that pipeline sizes would be large. Further investigations determined that the proposed pipeline sizes, although forming part of the Project, are not large and would be constructed at a later stage.

Concern about the laying of a pipeline in Jocelyn Boulevard due to the road being narrow and commonly used by children. Suggest pipeline be installed on Walker Road, then onto Burdekin Road.

Sydney Water believes that the proposed pipeline in Jocelyn Boulevard is the least disruptive to the community. The current proposal would utilise the existing drainage reserve to minimise the impact on the community. The proposed construction of the pipeline within Jocelyn Boulevard would adhere to strict construction guidelines and provide a safe environment for pedestrian and vehicular access in the vicinity of the

construction site. Construction of the pipeline would be undertaken progressively with about 15-20 metres of trench being open at any one time and approximately 30m of pipeline being laid daily. The overall construction period within Jocelyn Boulevard would be approximately 4 weeks, excluding any unforeseen delays. The local community would be informed prior to any work commencing.

Request for Sydney Water to consider an alternative location for the Rouse Road and Windsor Road drinking water pipeline due to concern regarding a direct conflict of two infrastructure projects. A stabling facility for the North West Metro rail link alignment is to be located under Rouse Road and the North West Metro rail link alignment would also cross Windsor Road. Option A in Table 4.4 of the EA would avoid direct conflict. Alternatively another option not assessed in the EA is proposed.

Concern regarding location of the Rouse Rd water pumping station as it appears to be in close proximity to the proposed stabling facility for the North West Metro rail link. Request for exact location of the water pumping station.

Sydney Water investigated alternative options to remove the direct conflict between the proposed Sydney Water infrastructure and the proposed North West Metro rail link. A revised pipeline route has been developed and is described in [Section 4.1](#).

As a result of the revised pipeline the water pumping station has also been relocated from the proposed Rouse Road location. It is proposed to locate the new pumping station on the southern side of Schofields Road, near the intersection of Windsor and Schofields Road as shown in [Figure 1-4](#). TIDC have confirmed that the revised pipeline and pumping station would have no direct conflict with the proposed North West Metro rail link.

Support for the use of micro-tunnelling or horizontal directional drilling techniques under rail lines.

Noted.

Request for Sydney Water to advise if recycled water could be supplied to TIDC's stabling facility at Rouse Hill.

TIDC's proposed stabling facility at Rouse Hill is within the Parklea North recycled water supply zone. In order for recycled water to be provided to the stabling facility TIDC would need to submit an application to Sydney Water. TIDC would need to provide average and maximum daily demand flow rates to enable Sydney Water to assess the capacity within the Sydney Water system to provide the requested volumes and to determine whether any specific requirements are necessary. Sydney Water would then issue a list of requirements for connection to services including recycled water.

Clarification is required as to whether the drinking and recycled water pipelines are proposed to be located within, or outside the mapped riparian corridors. DWE does not support the locating of pipelines within the riparian corridors (with the exception of crossings).

Apart from a small section of recycled water pipeline located in the drainage reserve between Jocelyn Boulevard, Quakers Hill and the Richmond rail line and the drinking water pipeline from Parklea to Folkstone Terrace Stanhope Gardens all the drinking water and recycled pipelines are located outside the riparian corridors (as defined by DWE). The location of the pipelines within the riparian corridor was unavoidable and

they would be constructed in a manner to minimise the impacts on waterways as outlined in Chapter 6 of the EA and the revised Statement of Commitments in **Chapter 5**.

Clarification is required as to whether the wastewater carriers are proposed to be located within, or outside the mapped riparian corridors. If the carriers are proposed to be located in the riparian corridors, alternative options need to be identified.

The construction of gravity wastewater pipelines is considered to be the most efficient method to sewer the First Release Precincts in terms of cost and ecologically sustainable development because mechanical pumping is not required. Due to the nature of the topography requirements for gravity pipelines, locating the wastewater pipelines in the riparian zones is unavoidable. To minimise the impacts of the pipelines on the local waterways the pipeline would be designed to avoid dry weather overflows and limit wet weather overflows in compliance with regulatory requirements. As Sydney Water already committed in the EA (Chapter 6), the construction of the pipelines would be undertaken in a manner to minimise the impact on the environment and mitigation measures would include weed control, exclusion fencing, limiting soil disturbance, and where possible, restoring all areas to pre-work conditions.

Comment that the landform of the proposed wastewater pipeline alignment of the Cattai Creek Carrier consists of steep lands, with some areas of extreme slope. Access to these areas, during both construction and operation, should be taken into account during further design phases.

It was identified during the development of the concept design that the steep terrain would cause some construction and operational difficulties. The proposed alignment of the Cattai Creek Carrier typically traverses across the contour. The alignment is selected by balancing the maximum area to be serviced against the hydraulic grading and the depth of construction. Access constraints during construction and operation would be considered further during detailed design.

Request that the location and size of the tributaries which join into the main creeklines of Smalls and Cattai Creeks in the vicinity of the North Kellyville and Cattai Creek Carriers are taken into account during further design phases.

Agreed. During the development of the concept design the location of drains, creeks and tributaries were considered to minimise impacts on all waterways. Further consideration would be given to the impact on all waterways throughout the development of the detailed design.

Request that access areas for the maintenance of the pipelines should be located outside of the riparian corridors.

Due to the nature of the topography, locating the wastewater pipelines in the riparian zones is unavoidable. Consequently access for maintenance would be located inside the riparian corridors. As Sydney Water already committed in the EA (Chapter 6), the maintenance of the pipelines would be undertaken in a manner to minimise the impact on the environment and mitigation measures such as weed control, exclusion fencing, limiting soil disturbance, and where applicable, restoring all areas to pre-work conditions.

Maintenance requirements for creek crossings, either underbored or attached to bridges or existing structures, are to be considered.

No pipelines attached to existing bridges or structures are proposed. All creek crossings would be constructed as “maintenance-free”.

Support for pipeline crossings of creeks being either underbored or attached to existing structures.

Comment that careful consideration is required when finalising the locations of the creek crossings under Smalls Creek for the wastewater pipelines.

Noted. Although it was Sydney Water's intention in the EA to construct all creek crossings using underboring further consideration has revealed that in some instances underboring of the pipelines would not have a lesser impact than trenching. This is because the length of a boring run is limited and a portal must be established at the beginning and end of each run. All equipment, including heavy machinery, must be transported to and stored at the portal site. Due to the topography in some locations this would require the construction of access ways along the pipeline routes.

All creek crossings required for the Project would be carefully considered during the detailed design stage of the Project. Site inspections would be undertaken to determine the best crossing locations and best construction methods to minimise environmental impact.

Recommendation that underground boring commences from the outer edge of the vegetated buffer and that it is bored for the full width of the watercourses, core riparian zone and vegetated buffer.

The construction of the pipelines would be carried out using both trenching and underboring techniques. Due to the nature of the topography locating gravity sewer mains in the riparian zones has been unavoidable. Consequently it will not be possible to avoid constructing in the core riparian zone or the vegetated buffer. The construction of the pipelines would be undertaken in a manner to minimise the impact on the environment.

Request for DOP to take into account that proposals for extensions to Riverstone Scheduled lands services are likely to be brought forward in the near future.

Sydney Water is assisting Landcom wherever possible in addressing matters concerning the servicing requirements for the Scheduled Lands. As acknowledged within the submission, a working group including Landcom and Sydney Water staff have met to discuss servicing issues. As outlined in the EA (Section 5.3), Sydney Water would provide major infrastructure to the First Release Precincts in a timely manner enabling Landcom the opportunity to either extend the infrastructure provided or construct the necessary assets to enable the development of the Scheduled Lands.

In the North West Growth Centre it is proposed that the delivery timetable to service the First Release Precincts would include three packages of work over a five year construction period. In the event that Sydney Water is also the service provider for the South West Growth Centre and given the commitment by Sydney Water to meet the Growth Centres Commission's timetable for lot production in both the north west and south west, the subsequent planning effort and capital expenditure for infrastructure to service precincts beyond the First Release Precincts is significant. At this time,

Sydney Water is unable to consider any additional works beyond those identified in the EA.

The proposal does not propose any wet weather storage at Riverstone STP, using treated wastewater for agriculture could reduce discharges to Eastern Creek.

As described in the EA (Section 6.2) additional effluent from Riverstone STP would be discharged to Eastern Creek as a result of the upgrade and amplification of the STP. Concurrently Quakers Hill STP discharge volumes to Eastern Creek would be reduced. The water quality modelling for the Project found that as a result of the overall reduced discharge there would not be a measurable impact on Eastern Creek.

In the future, Riverstone STP would be the main source for recycled water for the entire North West Growth Centre (construction of a recycled water plant at Riverstone STP is not part of this Project). Planning for the future development of the recycled water plant at Riverstone indicates that on an average day the total recycled water available would be required to meet the known demand. If excess recycled water became available, other usage options such as agricultural reuse would be considered.

Proposed water mains within Council's road reserves should be installed at such alignment and levels to match with the future road cross sections and the vertical alignment of the road.

This information would be sought from Council and if available utilised during the detailed design stage.

Restoration of the open trenches within Council's road reserves should be undertaken in accordance with Council's specification for trench restorations and in accordance with Council's process of managing the restorations of road openings.

Noted. Sydney Water's contractors would seek Council advice regarding the restoration of open trenches within Council road reserves during detailed design and construction.

3.3 Legislative and planning framework

Request for details on the extent of any dewatering to enable DWE to determine if a licence under the *Water Act* is required

Under the Part 5 of the *Water Act 1912* a licence is required for sinking or altering a bore unless the work is undertaken by the Crown. Sydney Water sought clarification from DWE regarding this issue and DWE confirmed that Sydney Water constitutes a Crown authority and therefore a licence would not be required.

The proponent and its contractors will need to comply with the provisions of the environment protection legislation, including the *POEO Act*, the *National Parks and Wildlife Act 1974* and the *Threatened Species Conservation Act 1995* during the construction of all proposed works.

As outlined in the EA, Sydney Water and its contractors would comply with all the relevant provisions of environmental protection legislation. Section 75U of the *Environmental Planning and Assessment Act 1979* (EP&A Act) details legislative approvals that are not required for a project that has been approved under Part 3A of the EP&A Act.

3.4 Water quality and hydrology

Concern that the EA does not consider potential impacts of scouring and/or erosion issues caused by the outlets. Request for description of the best practice treatment methods for the outlets

Sydney Water carries out a range of operations and maintenance activities on the water supply system that can involve the discharge of water to the environment or receiving waters. Sydney Water has a number of management systems in place, which provide best practice methods for the discharge of water to the environment, including methods to manage scouring and erosion. Firstly, outlets would be constructed so as to minimise potential destabilisation and scouring. This would involve the construction of appropriate headwalls, dissipaters and other bank stabilisation techniques.

Sydney Water also has protocols to manage scouring and erosion for the following activities:

- ▶ Discharge of drinking water (eg. to permit maintenance or construction work on a water pipeline or reservoir)
- ▶ Cleaning water pipelines (eg. flushing, swabbing & scouring)
- ▶ Cleaning water supply reservoirs
- ▶ Disinfecting water pipelines (eg. new pipelines, existing pipelines following pipeline breaks) or water supply reservoirs
- ▶ Discharge of water from excavation pits
- ▶ Discharge of water in emergency circumstances.

Concern that the EA does not consider the restrictions the installation of the pipelines may have on future amenity of the area including restrictions on future Water Sensitive Urban Design (WSUD) features, street tree planting and other services.

At this stage there is no available information regarding the location of other services, street plantings and WSUD. The major pipelines are proposed to be located along some roads and some of the creeklines which is considered the most appropriate location to allow for greater flexibility for planning future development. During the EA and the preparation of concept designs Sydney Water consulted with authorities/agencies to provide the most desirable designs. During detailed design further consultation would be undertaken with relevant Councils and other agencies for input into design aspects such as the integration of WSUD principles and the future amenity of the area.

Statement that the construction of an online detention basin along Smalls Creek at North Kellyville is not supported.

The construction of a detention basin is not part of the Project.

Statement that the disposal of any dewatering needs to be carried out appropriately and in accordance with DECC guidelines/licence requirements.

Agreed. This is addressed in Sydney Water management systems and protocols.

Statement that the Project will need to be undertaken in a manner that compliments other water related projects in the northwest Sydney area, including the Western Sydney Recycled Water Replacement Flows Project.

The key driver for this Project is the need to supply water related services to allow future urban development within the First Release Precincts in the North West Growth Centre to accommodate Sydney's projected population growth whilst minimising the impact on the Hawkesbury-Nepean River. This Project forms a component of the Western Sydney Recycled Water Initiative (WSRWI), as does the Replacement Flows Project (RFP). The objectives of both these projects were considered when preparing the concept design for the Project to ensure that the projects complimented each other. Further consideration of both projects will be undertaken during the design phase to ensure that all initiatives continue to compliment each other.

Statement that an upcoming review of the regulatory arrangements governing nutrient discharges to the Hawkesbury Nepean River may have implications for future regulatory approaches for nutrient management in the River catchment and may result in modified effluent management practices and limits to those currently required under the STS licenses.

The design of the wastewater pipelines and upgrade of the Riverstone STP have all been undertaken to comply with current requirements of the relevant Environment Protection Licences. In the event that these requirements are altered in response to a regulatory review of nutrient management in the Hawkesbury-Nepean River or South Creek catchment, the STP and sewage network would be appropriately modified to meet the new standards. Any modification to the systems would be subject to further environmental impact assessment.

Erosion and sedimentation practices during the construction phases should be stringently followed so that the water quality, aquatic ecology and terrestrial flora and fauna of waterway corridors both within and downstream of the North Kellyville Precinct are not compromised

An Erosion and Sediment Control Sub-plan would be prepared as part of the Construction Environmental Management Plan prior to commencement of construction. Appropriate and standard mitigation measures as detailed in "Managing Urban Stormwater: Soils and Construction" (Landcom 2004) would be implemented and stringently followed during the construction phases.

3.5 Aquatic ecology

Request that the development is not approved on the grounds that local and regional aquatic health and biodiversity is likely to be severely impacted.

The existing aquatic environment is already significantly degraded due to poor land practices, intensive agriculture and urban development. As assessed in the EA (Section 6.3) the Project would not have a severe impact on the aquatic health and biodiversity of the area during construction or operation. In view of the proposed diversion of effluent to the Quakers Hill RWP and the Replacement Flows Project the overall impact to the regional health of the aquatic system would be low. Mitigation measures, as outlined in the EA (Section 6.3), would be implemented to ensure that the potential impacts on aquatic ecology are minimised.

3.6 Terrestrial flora and fauna

Request for clarification of the different amounts and types of vegetation being offset as there appears to be inconsistencies in the EA. Suggest a clear table is incorporated into the EA summarising the total amount of vegetation to be cleared in certified and non-certified areas, the method of offset and whether or not this is covered by the draft conservation plan.

Comment that the amount of vegetation to be lost as a result of the proposal is uncertain due to lack of data regarding the width of clearing required for trenching, the extent of drilling that is used, the quantity and quality of rehabilitation that will be allowed and the extent and consequences of indirect impacts, including edge effects.

Recommend that the proponent either quantifies the amount of vegetation to be lost prior to approval so that the amount of offset required is known or that the conditions of approval require the proponent to assess the extent of impacts post construction so that the required offset can be determined.

Estimates of vegetation clearing associated with the Project have been confirmed as outlined in **Table 3-1** below. There has been a change to these impacts as a result of changes to the Project assessed in **Chapter 4** of this report. In addition, since the preparation of the EA further progress in design of the pipeline route has resulted in the avoidance of vegetation communities outside the North West Growth Centre that were previously potentially impacted by the Project.

The area of impact on vegetation communities during construction was calculated assuming a 10 metre wide footprint for the proposed pipeline. The 10 metre footprint is a conservative estimate of the impact, taking into account indirect impacts such as edge effects and fragmentation. The actual impacts during construction could be considerably less through the implementation of construction techniques that minimise the footprint of the pipeline. The total direct impact on native vegetation that is not classified as an Endangered Ecological Community (EEC) is 3.47 ha and the total direct impact on EECs is 13.70 ha.

The Minister for Environment and Climate Change granted Biodiversity Certification for the North West and South West Growth Centres through *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* in December 2007. Sydney Water's proposed services for the North West Growth Centre First Release Precincts would fall within both certified and non-certified areas identified in the Biodiversity Certification Order (BCO). Tests of significance under Section 5A of the EP&A Act have been undertaken for the Project where the Project is outside the certified areas.

Table 3-1 Impacts on vegetation as a result of the Project

Vegetation type	Impact in certified areas (ha)	Impact in non-certified area (ha)	Offset required (ha)
Cumberland Plain Woodland (EEC)	5.94	0.43	0.43
Shale Sandstone Transition Forest (EEC)	0.84	0.97	0.97

Vegetation type	Impact in certified areas (ha)	Impact in non-certified area (ha)	Offset required (ha)
River-flat Eucalypt Forest (EEC)	4.48	0.9	0.9
Upper Georges River Sandstone Woodland	1.54	0.2	0.2
Western Sandstone Gully Forest	1.26	0	0
Sandstone Ridgetop Woodland	0.43	0.04	0.04
Shale Gravel Transition Forest (EEC)	0.04	0	0
Swamp Oak Floodplain Forest (EEC)	0.05	0.04	0.04
TOTAL	14.59	2.58	2.58

The Project impacts on a total of 2.58 hectares of vegetation that is within the non-certified areas of the North West Growth BCO. Sydney Water is providing offsets for its impact on existing vegetation within the non-certified areas in the North West Growth Centre First Release Precincts in accordance with the BCO.

An offset site has been identified in the Riverstone West Precinct, on land owned by Sydney Water adjacent to Riverstone STP. This site contains 3.6 hectares of vegetation that has been mapped in the Growth Centres Commission draft Conservation Plan as existing vegetation, consisting of endangered ecological communities with varying levels of conservation. Protecting this vegetation would meet the offsetting requirements of the BCO. The details of this offset are currently being finalised consistent with the submission of the Department of Environment and Climate Change.

Recommendation that all measures for the protection of biodiversity in the appendices be incorporated into the EA.

Agreed where applicable. All the recommendations in the flora and fauna assessments undertaken for the EA that are applicable to the current Project would be applied.

Concern that the EA does not adequately consider the environmental significance of the Cudgegong Road Reservoir Site or provide appropriate discussion of ameliorative measures proposed in the Species Impact Statement.

Recommend the Cudgegong Road Reservoir Site is not the site for the drinking and recycled water pipelines and any other water related infrastructure. Strongly suggest that a buffer or no construction zone is created around the reservoir.

Due to the impacts at the Cudgegong Road Reservoir Site on stands of Cumberland Plain Woodland, several hollow dependent microchiropteran bats and the Cumberland Plain Land Snail, Sydney Water investigated other alternatives for the reservoir site. It

was concluded that the Cudgegong Road Reservoir Site was essential to the Project due to the site:

- ▀ being the highest point available for the reservoirs
- ▀ being centrally located within the Project area
- ▀ proximity to Riverstone STP for the supply of recycled water

Locating the reservoirs at the highest point enables the reservoirs to service a much larger area without increasing the size of infrastructure and the energy requirements of the system. In this instance the reservoirs will not only service the Riverstone and Alex Avenue Precincts but the entire NWGC. To accommodate all the infrastructure required to service the NWGC it is essential that Sydney Water utilise the entire site at Cudgegong Road.

The only alternative site that was high enough to use as a reservoir site was located at Hambledon Road in the Alex Avenue Precinct on the edge of the NWGC. Although this site was slightly lower it would have been able to service the entire NWGC but only if additional infrastructure was provided. In addition the operation of the scheme would have required longer lengths of large diameter pipelines and greater capacity pumping units. It was estimated that locating the reservoirs at this alternative site would increase both construction costs by 10 per cent and energy use by up to 25 per cent. Also the Hambledon Road site is landlocked and as a result servicing the site would create additional impacts to adjacent properties.

Both the Cudgegong Road Reservoir Site and the Hambledon Road site would be supplied with drinking water from the Parklea system. However, the proposed route for the pipeline to supply the Hambledon Road site would traverse existing residential areas causing a greater disruption and impact on the community. Also pipelines to the Hambledon Road site could not be constructed on road edges due to the number of existing services and pipelines within roads surrounding the Hambledon Road site. As a result a suitable pumping station site would have been difficult to locate.

Another factor that affected the selection of the Cudgegong Road Reservoir Site as the preferred site was the hilltop topography. This enables the infrastructure to be designed to minimise noise and visual impacts on surrounding properties.

The combination of factors described above lead to Sydney Water to discount the Hambledon Road site and hence Cudgegong Road was left as the only site available to locate the reservoirs.

A Species Impact Statement (SIS) was prepared to assess the flora and fauna impacts at the Cudgegong Road Reservoir Site. The Species Impact Statement sets out a full description of ameliorative measures that would be implemented, where relevant, to mitigate the impacts on known threatened species, populations and ecological communities. Prior to the commencement of construction at the Cudgegong Road Reservoir Site a detailed Flora and Fauna Management Strategy would be prepared. This strategy would incorporate the mitigation measures specified in the Species Impact Statement prepared for the site.

The SIS was prepared prior to the BCO being approved for State Environmental Planning Policy (Sydney Region Growth Centres). The BCO was granted following an assessment of all the vegetation in the Growth Centres and the preparation of a conservation plan on the grounds that the biodiversity values of the Growth Centres would be maintained. The BCO enables the removal of vegetation from the Cudgegong Road Reservoir Site.

Recommend the proposed development is not approved on the grounds that significant flora species, the majority of which are already highly degraded and fragmented will be disturbed or destroyed.

Investigations were undertaken to assess potential impacts on flora as a result of the Project. These assessments are summarised in Section 6.4 of the EA. Further investigations were undertaken during the preparation of this report to assess the potential impact of the refinements to the Project. Two threatened flora species, *Epacris purapurascens* var. *purapurascens* and *Grevillea juniperina* ssp. *Juniperina*, were recorded in the Project area during the investigations undertaken for the EA. No additional locations of threatened flora species were reported in the investigations for this report. The known locations of these species would be protected and would not be impacted by the construction activities.

The EA (Section 6.4) states that there would be some impact on regionally significant flora species. General mitigation measures would be implemented to minimise this impact wherever possible to assist with the conservation of the region's biodiversity. These would include measures such as restricting vegetation clearing to the minimum necessary to safely construct the pipeline, selecting pipeline routes that minimise the damage to native vegetation, controlling weed infestations in the construction areas and using boring techniques under some creeklines to minimise the impacts on waterways.

Sydney Water is committed to minimising significant impacts on threatened flora species during construction of the Project.

A Translocation Plan for the Cumberland Plain Land Snail should be prepared and specific protection measures for *Grevillea juniperina* ssp. *Juniperina* should be implemented.

Recommend a replanting strategy is created prior to any development approval to ensure revegetation reflects the natural structure and appearance of the vegetation, especially along creek corridors.

Recommend that the development is not considered for approval until an appropriate and comprehensive threatened species mitigation strategy is developed.

A Flora and Fauna Management Sub-plan would be prepared as part of the Construction Environmental Management Plan prior to commencement of construction. This Sub-plan would outline details such as a replanting strategy and threatened species management measures. Approval would be sought from the DOP for these management plans prior to commencing construction. The replanting strategy would outline the indigenous plants that could be used and aim to achieve the reestablishment of the natural structure of the original vegetation.

Threatened species management would include general measures such as retaining hollow bearing trees, clearly marking trees near the construction site that are to be retained, checking all vegetation for sheltering animals prior to clearing and minimising open trenches. Species management measures would also be developed including translocation of individual Cumberland Plain Land Snails and timing construction outside of breeding, roosting and torpor times for microchiropteran bats.

Offer of land that could be revegetated with Cumberland Plain Woodland for use as a potential offset by Sydney Water (land jointly owned by Landcom and Blacktown City Council).

Sydney Water considered the land offered by Landcom for use as a vegetation offset for the Project and consulted with the Growth Centres Commission as required by the BCO. The Growth Centres Commission noted that the Landcom land is outside the North West and South West Growth Centres and requested that Sydney Water identify whether there were any practicable vegetation offset options within the Growth Centres.

Sydney Water reviewed the offset options within the Growth Centres and identified an offset site in the Riverstone West Precinct on land owned by Sydney Water adjacent to Riverstone STP. This site contains 3.6 hectares of vegetation that has been mapped in the Growth Centres Commission draft Conservation Plan as existing vegetation consisting of endangered ecological communities with varying levels of conservation value. Protecting this vegetation would meet the offset requirements of the BCO. The details of this offset are currently being finalised.

Comment that the proposed offset at the Riverstone STP site is acceptable provided that the protection applied to the site meets the definition of protection in the biodiversity certification order. Recommend an E2 zoning and/or a protective covenant.

Noted. The details of this offset are currently being finalised consistent with the DECC submission.

Statement that the offset is to be finalised prior to the commencement of construction.

Noted.

3.7 Indigenous heritage

Request that a detailed discussion on A7 Complex and the management measures recommended by ENSR be included in the EA. Recommend that Sydney Water investigate the viability of realigning the pipeline in this area to either 200 m to the east or west of First Ponds Creek.

The A7 Complex is an extensive area of lower slopes and flats adjacent to First Ponds Creek, in the vicinity of Clarke Street and Guntawong Road, and was identified in the surveys undertaken for the EA. The site, which is in close proximity to First Ponds Creek, is about 300 x 150 m (45 000 m²) in size and contains several extensive artefact scatters, namely RV 27, RV 28 and A6. This area could contain subsurface archaeological deposits, since all exposures in the area retain numerous artefacts, and the Potential Archaeological Deposit (PAD) A8 is also located within the A7 Complex.

The A7 Complex has been identified as having high archaeological significance for several reasons, most notably the volume of surface artefacts, the landform types (and their close similarity with Second Ponds Creek) and the integrity of the area (when compared with the rest of First Ponds Creek). Subsequent discussions with the Aboriginal communities and Growth Centres Commission have identified the A7 Complex as the most significant site in the Project area.

Within the A7 Complex RV 27 and RV 28 are several potential scarred trees. These site types are rare in the Cumberland Plains, which historically have been substantially cleared. The scarred trees do not have a high research potential, but they do retain high rarity and low representativeness, and as such are considered of high significance. A6 is an artefact scatter of silcrete, chert and a mudstone flakes which is considered to represent a surface expression of a wider buried archaeological

resource (PAD). The A7 Complex as a whole can be considered both of low representativeness and of high rarity.

The proposed route for the First Ponds Creek Carrier would pass through the eastern bank of First Ponds Creek and is likely to partially impact the A7 Complex through trenching/excavation and other ancillary activities associated with pipeline construction.

As stated in the EA (Section 6.5.5), Sydney Water is committed to minimising disturbance as much as possible in all areas of heritage significance by the use of appropriate boring techniques, in combination with traditional trenching techniques. Consideration would also be given to moving the location of the pipeline within the vicinity of the A7 Complex 200 metres to the east or west of First Ponds Creek and this would be determined during detailed design. In general terms topography requirements for gravity fed carriers place constraints on the location of wastewater pipelines, however preliminary investigations in the specific vicinity of the A7 Complex indicate that options are available for relocating the pipeline.

As also stated in the EA (Section 6.5.5), test excavations would be undertaken for sites with moderate to high heritage significance, such as the A7 Complex, prior to commencement of construction. All test excavations would involve the identification, assessment, recording and salvage of any archaeological remains that are found. Consultation would be undertaken with Aboriginal stakeholders as appropriate.

Request Sydney Water investigates moving the level crossing carriers in the vicinity of the RV13, RV30 and A1 sites, and the First Ponds Creek carrier in the vicinity of the A4 site as recommended by ENSR.

As noted above, topography requirements for gravity fed carriers place constraints on the location of wastewater pipelines. However consideration would be given to moving the pipelines during detailed design. As stated in the EA (Section 6.5.5), Sydney Water commits to minimising disturbance as much as possible in areas of heritage significance by the use of appropriate boring techniques, in combination with traditional trenching techniques. Given the relatively small area covered by each of RV13, RV30, A1 and A4 underboring may be a viable option and this would be determined during design finalisation.

As also stated in the EA (Section 6.5.5), test excavations would be undertaken for sites with moderate to high heritage significance, such as RV13, RV30, A1 and A4, prior to commencement of construction. All test excavations would involve the identification, assessment, recording and salvage of any archaeological remains that are found. Consultation would be undertaken with Aboriginal stakeholders as appropriate.

Statement that Sydney Water should follow recommendations contained in the Aboriginal Heritage Studies reports (EA Volume 2, Appendix C) as well as the recommendations and requests noted by the representatives of the Aboriginal community during the assessment process.

Agreed where applicable. All recommendations in the Aboriginal heritage assessments, including those provided by representatives of the Aboriginal community, that are applicable to the current Project would be applied.

3.8 Soil and groundwater – operations

Request that the Department of Water and Energy (DWE) be consulted in relation to the proposed groundwater monitoring program as groundwater monitoring will require a licence under the *Water Act 1912* from DWE.

Under Part 5 of the *Water Act 1912* a licence is required for sinking or altering a bore unless the work is by the Crown. This includes sinking of bores for groundwater monitoring. Sydney Water sought clarification from DWE regarding this issue and DWE confirmed that Sydney Water constitutes a Crown authority and therefore a licence would not be required. As specified in the Statement of Commitments (**Chapter 5**) a groundwater monitoring program for the Project would be developed in conjunction with relevant stakeholders, which would include DWE.

Request that the EA assesses the appropriateness of the use of recycled water in the areas of existing high soil salinity and/or a high potential for salinity issues to develop.

The soils and groundwater assessment identified areas of known salinity and ascertained that all of the investigation areas have salinity potential. The assessment concluded that the proposed development areas are considered suitable for the use of recycled water for irrigation purposes, provided certain conditions are applied. Sydney Water does not have direct responsibility for ensuring many of the measures identified in the soils and groundwater assessment are implemented, as they would be part of the approval process for specific developments in the First Release Precincts. Sydney Water would, however ensure that total dissolved solids levels in the recycled water are monitored and managed at a level to minimise the risk of significant salinity impacts from irrigation. Sydney Water would also implement all other mitigative measures that are outlined as the responsibility of Sydney Water in the EA.

Request that control measures be put in place to ensure that appropriate construction materials are selected for developments in areas where recycled water is implemented.

The potential impacts of irrigation with recycled water on soil and groundwater salinity within the First Release Precincts can be managed and mitigated in a number of ways. As discussed in the EA (Section 6.7), Sydney Water does not have direct responsibility for ensuring many of the mitigation measures are implemented, as they would be part of the approval process for specific developments in the First Release Precincts. To ensure that appropriate construction materials are selected for developments in areas where recycled water is implemented, the approval process could include typical measures as identified in the *Western Sydney Salinity Code of Practice*. During detailed design of the Project, Sydney Water would ensure that the existing and potential salinity of soils and groundwater would be considered for construction of the Project to ensure that appropriate materials and other features are used to mitigate against the corrosive impacts of high salinity.

Request that detailed electro-magnetic survey and soil/groundwater surveys be undertaken in areas for the proposed pipelines and other infrastructure. Request that the design of infrastructure should take into account that salt levels could rise in the soil materials surrounding the infrastructure.

Sydney Water has conducted preliminary geotechnical and contamination investigations during the design of the Project. Further detailed geotechnical investigations would be carried out during the detailed design stage. During the preparation of the EA electro-magnetic surveys were conducted as part of the soil and

groundwater investigations. Areas where electro-magnetic survey results indicated high salinity (greater than 100 dS/m) would be investigated further, prior to land development, to confirm salinity levels and associated risks.

The final design and material specifications and construction methods for infrastructure would address issues encountered such as groundwater, salinity, potential acid sulfate soils and contamination.

Request that the recommendations within the Phase 1 Environmental Contamination Assessment (Appendix F) are undertaken.

Sydney Water would ensure that soil samples are collected and analysed to confirm the findings of the Phase 1 Contamination Assessment. This would be undertaken in line with the geotechnical investigations prior to construction.

Request that the potential impact of the additional salt loads in the catchment on the freshwater creek system be addressed.

While Sydney Water is responsible for providing recycled water to the First Release Precincts, it does not have direct control or responsibility for approving irrigation with recycled water in specific developments in the First Release Precincts or for surface or sub-surface drainage (except for its own works). As discussed in the EA (Section 6.7), the approval process could include typical measures identified in the *Western Sydney Salinity Code of Practice*. Such measures include the urban stormwater system being designed such that potentially saline runoff is directed to a water body that is able to assimilate the expected salt levels without adverse impacts on aquatic and riparian ecosystems. This information has been provided to the Growth Centres Commission to inform the Precinct Planning Process.

Impacts on garden plants from salinity. EA notes chloride levels of 133 mg/L may be expected and suggests that plants could cope except for the most sensitive plants. However, the Environmental Guidelines: Use of Effluent by Irrigation (p 30 DECC 2004) recommend chloride levels be kept to 5 mg/L for horticultural crops.

Chlorine (Cl_2) is an oxidant and is used as a disinfectant in wastewater treatment whilst chloride (Cl^-) is the ionic non-oxidative form of this naturally occurring element. The Environmental Guidelines: Use of Effluent by Irrigation (DEC 2004d) recommends that chlorine (as opposed to chloride) levels be kept to 5 mg/L for horticultural crops. As tabled in the EA (Section 6.7, Table 6.28), the median chlorine residual concentration of the recycled water to be supplied to the First Release Precinct is below 5 mg/L (1.69 mg/L).

Page 82 also notes sodium levels of 127 mg/L, but there is no mention of the sodium adsorption ratio (SAR) number for the treated effluent. To assess whether sodium concentrations applied may cause a problem to the soil structure assessment using SAR may be necessary (p 28-29 DECC 2004).

The sodium adsorption ratio (SAR) for treated effluent is noted in Volume 1, page 6.66 of the EA (Table 6.28 Quality of recycled water from Rouse Hill RWP July 05- June 06) and Volume 3, page 45, (Table 5.3 Current water quality at the Rouse Hill RWP July 05- June 06). The median SAR level of 5.9 suggests that there is a risk of soil sodicity developing. To overcome this risk, gypsum or lime could be applied to areas where irrigation of landscaping is likely.

Sydney Water does not have direct responsibility for ensuring that application of gypsum or lime is implemented. However, Sydney Water would include information regarding the management of soil sodicity in a recycled water education program for residents, similar to that implemented for the Rouse Hill recycled water scheme.

Householders will need to receive educational materials about salinity and watering strategies and the need for extra care/caution when applying recycled water on salt sensitive plants in the garden.

Detailed information should be available to residents on the appropriate use and application of recycled water, including its use with other gardening additives, such as fertiliser and mulch. This could be in the form of information leaflets with water bills or information on the internet.

Agreed. As discussed in the EA (Section 6.7), recycled water users would be informed of the specific known risks associated with irrigation with recycled water. Sydney Water would carry out a recycled water education program similar to that implemented for the Rouse Hill recycled water scheme.

Comment that Sydney Water could undertake further research into the potential reduction in total dissolved solids and nutrients available in recycled water.

Sydney Water would ensure that total dissolved solids levels in the recycled water are monitored and managed at a level to minimise the risk of significant salinity impacts from irrigation. Nutrient budgets show that nitrogen levels of 10 mg/L or less in recycled water would not result in accumulation of nitrogen in the soils and groundwater. As the nitrogen concentration of the recycled water used for irrigation would be less than 10 mg/L, there would be little risk of nitrogen leaching from soils due to the application of recycled water.

A groundwater monitoring program for the Project would be developed in conjunction with other relevant stakeholders, and implemented by Sydney Water. A monitoring program to assess the impacts of the Project on river health (including water quality, flow, fish migration, macrophytes, macroinvertebrate communities and ecotoxicity testing) would be undertaken in conjunction with NSW State Government agencies under an integrated water monitoring framework for the Hawkesbury-Nepean River. Details of the monitoring program would be determined in consultation with relevant government authorities/stakeholders (including the DECC, DWE and DPI).

3.9 Human Health

Statement that from a public health perspective the Director General's requirements have been met.

Noted.

3.10 Waste generation and management

Any approval given for the Project should include conditions that address the treatment and disposal of any spoil from the Project including proposals for the management of any acid sulphate soils.

Construction would generate excess spoil, which would be reused on site wherever possible. If spoil suitable for reuse was unable to be reused on-site, opportunities for off-site reuse would be investigated. If spoil was unsuitable for re-use due to its geotechnical or contamination characteristics, spoil would be classified according to

DECC's *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes* (DEC 1999) and disposed of at an appropriately licensed facility. Acid sulfate soil management has not been addressed in the EA as acid sulfate soils risk mapping (Department of Infrastructure Planning and Natural Resources 2003) indicates that there is no known occurrence of acid sulfate soils within the First Release Precincts.

Any approval given for the Project should include conditions that address the treatment and disposal of any contaminated ground water, surface water and drill water from the directional boring operation.

As outlined in the EA (Section 6.10), no significant volumes of liquid wastes, including oils or fuels would be generated on site during construction. Cutting heads and drilling equipment used for boring could be lubricated with bentonite slurry. The slurry would be reused in the drilling process, although small quantities of this liquid waste may be produced and would require disposal. Liquid and non-liquid waste would be classified and managed in accordance with DECC's *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes* (DEC 1999).

3.11 Air quality

Request for revised odour modelling clarifying the odour contours as well as focusing on 'unusual odour events' rather than averages.

Recommendation that the proponent presents revised odour impact contours that are based on modelling that has taken into account the likely "worst" odour emissions the proposal may generate

Further modelling was undertaken to clarify the odour contours as shown in **Figure 3-1** and **Figure 3-2**. The odour modelling presented was based upon the average odour emissions from the same type of process units currently planned for Riverstone STP. These data points were collected over the past 10 years. The odour sampling results were all collected during the warmer times of the year between December and May.

When odour modelling is undertaken it simulates the normal day to day operation. 'Worst case' or unusual activity modelling is not undertaken as no data is available for such events.

It should be noted that as the odour samples were all collected in the warmer periods of the year, there is an over prediction of odour emissions from all sources during the winter and spring. This creates a model output that would predict a situation that is worse than normal operation.

Sydney Water consulted the Growth Centres Commission and the DECC to confirm the results of the additional modelling and ensure that the issues had been addressed.

Comment that the odour impact assessment for Quakers Hill STP is not provided in the appendices. Request that the assessment is provided for review.

Recommend that DECC considers the odour impact and imposes relevant conditions of approval due to the predicted odour levels at Quakers Hill STP being greater than the relevant criteria.

No odour impact assessment was carried out for Quakers Hill STP as Sydney Water does not propose to undertake any work at Quakers Hill STP that would cause an increase in odours.

Request for all of the key operational assumptions upon which the odour modelling has been based to be listed

The odour emissions extracted from the Sydney Water odour database and the resultant dispersion modelling are based upon:

- ▶ Odour emission data collected over the past 10 years during the warmer period of the year. The average for each process unit from this data has been employed in the modelling.
- ▶ Odour emissions are assumed to be at the warm month levels during the cold months.
- ▶ Meteorological data was collected at the Riverstone STP site at Vineyard by the DECC. The wind speed and direction data was collected with an electromechanical anemometer.
- ▶ Steady uninterrupted operation of the sewage treatment plant.

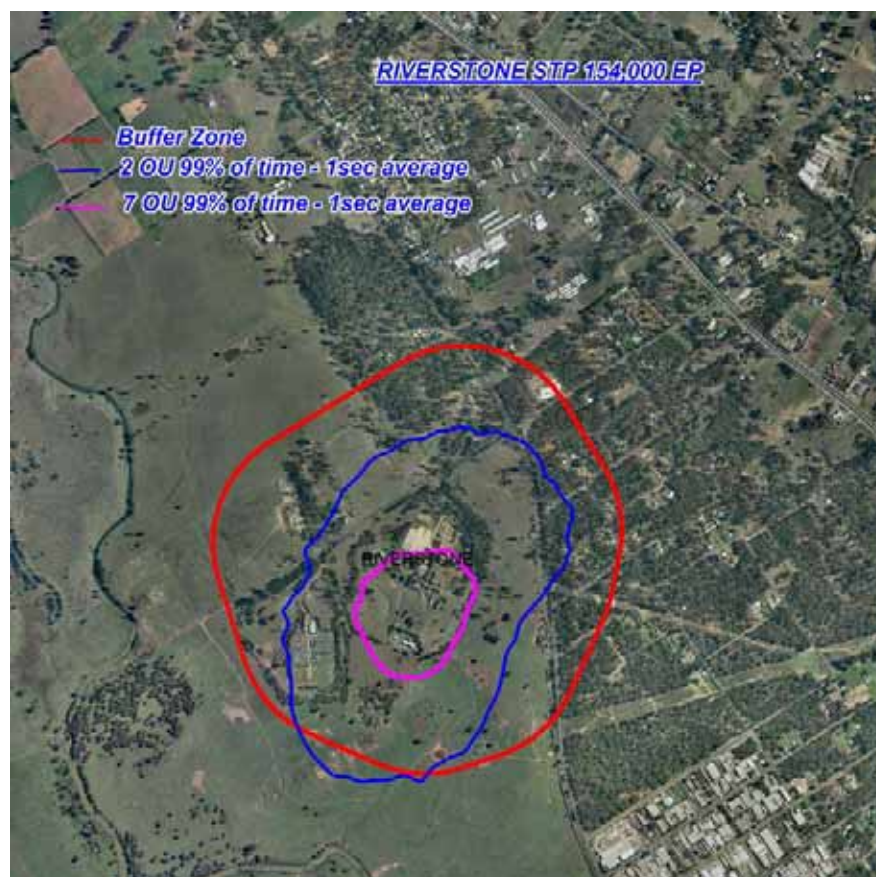
Request for the proponent to present odour contours for STP operation both at current capacity and at full proposed capacity.

See **Figure 3-1** and **Figure 3-2**.

Figure 3-1 Odour contours for the current proposed Riverstone STP capacity



Figure 3-2 Odour contours for the ultimate Riverstone STP capacity



Recommendation that planning decisions for the Project area be taken to ensure that the most sensitive future receptors, such as dwellings, schools and hospitals not be located within the 2 OU isopleth or to the west of the rail line.

Recommendation that planning decisions for the Project area be taken to ensure that receptors where large numbers of people work such as commercial offices or administration centres not be located with the 2 OU isopleth

Recommendation that planning decisions for the Project area be taken to ensure that all other sensitive receptors are located in areas such that no future receptor is likely to experience odours that could be considered offensive.

Sydney Water supports the recommendation that sensitive receptors be excluded from within the 2 OU odour contour. However, Sydney Water is not the responsible authority for precinct planning. The odour impact information has been provided to the Growth Centres Commission with the recommendation that only odour compatible land uses be permitted within the 2 OU odour contour.

Suggestion that the appropriate planning authority may wish to consider the following complimentary planning strategies:

- ▶ Annotating Section 149(5) certificates on the title of each property within the 7OU affected area to ensure that buyers of potentially odour affected land are aware of the potential prior to purchasing in the area
- ▶ Locating areas of park and recreational lands between the station and residential receivers to the east of the station to reduce the potential for odour impact.
- ▶ Undertaking very dense tree hedge plantings along the western side of the rail line and around the eastern perimeter of the sewage treatment plant to ameliorate odour impacts. Should this option be considered it is suggested the issue be further discussed with DECC to ensure design of the most effective barrier possible

Sydney Water supports the suggestion that Section 149(5) certificates for all properties predicted to be within the 7 OU note the potential odour impacts. However, Sydney Water is not the responsible authority for Section 149(5) certificates.

Locating areas of park and recreational lands between the proposed location of Vineyard Station and residential receivers to the east of the station is a good idea, but with odour management practices and design considerations for all or part of the new facility this should not be necessary.

Sydney Water is committed to tree plantings on the eastern boundary of the Sydney Water property. This would not be a dense 'hedge' but an area of revegetated native flora. An extension of this vegetation to the south east of the site on private property would be a good idea as it would visually shield the STP from the future residential zones. However Sydney Water cannot enforce the planting of the vegetation as it is on private property.

3.12 Noise and vibration

Recommend that DECC considers the noise impact and imposes and enforces relevant conditions of approval.

Noted.

Suggestion that any consent for the Project include conditions that limit construction work to the periods between 7 am and 6 pm Monday to Friday, between 8 am and 1 pm Saturdays and at no time on Sundays and public holidays, unless inaudible at any residential premises, and that any work outside of these are by approval only.

Noted. Addressed in Appendix G of the EA.

Comment that there is no assessment of operational noise levels.

Operational noise levels were assessed as part of the EA (Section 6.12). The findings of the operational noise assessment are provided in Appendix G of the EA, *Riverstone and Quakers Hill Water, Wastewater and Recycled Water Service Facilities Acoustic Assessment Report (21 November 2007)* and summarised in Section 6.12 of the EA.

Recommendation that the proposed services be designed and built such that noise and vibration during operation do not exceed criteria derived by application of the NSW Industrial Noise Policy and the DECC publication "Assessing Vibration: a technical guideline".

Comment that predicted noise levels during pipeline construction and the operation of Quakers Hill STP and the operation of the pumping stations are above the relevant noise criteria.

As stated in the EA (Section 6.12), the results of the noise modelling (which is based on the proposed design of the Project) indicate that predicted operational noise levels generated by the STPs would comply with the nominated criteria during all weather conditions at all representative receiver locations during both the day and evening period. During the night period noise levels also comply with the criteria at all but one location where noise levels are predicted to exceed the criteria by 1 decibel (A-weighted) (dB(A)). This exceedence would not be noticeable and is considered insignificant.

The predicted noise levels generated by pumping stations and at the Cudgegong Road Reservoir Site were found to exceed the nominated criteria during all weather conditions for the night time period only. Additional noise attenuation would be required on noise generating infrastructure at the Cudgegong Road Reservoir Site to reduce noise levels at residential receivers to acceptable levels.

The results of noise modelling also indicate that noise generated by the STPs and pumping stations would comply with the sleep disturbance criteria for the majority of receivers, with the exception of two locations. However, at all locations noise levels are below 65 dB(A), which is considered to be the level below which most of the population would remain asleep.

During the noise and vibration assessment for the EA (Section 6.12) it was noted that the nearest residences to the Riverstone and Quakers Hill STP sites are approximately 180m and 400m, respectively, from the vibration sources at the facilities. Furthermore, the pumping station and the proposed reservoir are located in a rural area where the nearest resident is approximately 80m from the vibration source. These distances are considered to be sufficient in providing a safe buffer from any vibration emission due to the operation of mechanical plant and equipment from the proposed upgraded STP facilities. Therefore, vibration impacts from the proposed upgraded STP facilities, pumping stations and reservoir are considered to be insignificant and have not been assessed further.

As stated in the EA (Section 6.12), during the final selection of mechanical plant and equipment, appropriate noise control treatments would be chosen, including:

- ▶ installation of commercially available silencers
- ▶ installation of acoustic screens and barriers between plant and sensitive neighbouring premises
- ▶ installation of partially-enclosed or fully enclosed acoustic enclosures around mechanical plant and pumping stations.

Statement that the construction criteria of background +5dB(A) applies to the Project. Request that all feasible and reasonable mitigation measures be applied to the construction activities to reduce construction noise levels with an aim to meeting the criteria.

As stated in the EA (Section 6.12), mitigation measures would be developed prior to construction to specify how noise and vibration impacts on the community would be minimised. This would be achieved through the implementation of noise control measures, such as those outlined in Australian Standard 2436-1981 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*". Typical mitigation measures would include: use of acoustic barriers, location of plant, specified working hours, monitoring and modification of construction techniques. A Noise Management Plan would be included as a Sub-plan of the Construction Environmental Management Plan (see below).

Suggestion that the Project consent includes a requirement for the proponent to prepare and implement a construction noise management plan.

Suggestion that the construction noise management plan include detail outlined in DECC's submission (Appendix A).

Agreed. The Construction Noise Management Plan for the Project, as provided in Appendix G to the EA, addresses noise and vibration from construction activity. This plan would be further developed for the Project prior to construction and would include detail provided in DECC's submission (Appendix A). The plan would be included as a Sub-plan to the Construction Environmental Management Plan.

Request that works be conducted in accordance with the EA and the recommended mitigation measures suggested in the Noise Impact Assessments.

All the recommended mitigation measures in the EA (Section 6.12) and the noise impact assessments (EA Appendix G) would be applied to the Project where applicable.

Suggestion that the construction noise management plan includes vibration from construction activity.

Agreed. The Construction Noise Management Plan for the Project, as provided in Appendix G to the EA, addresses vibration from construction activity. This plan would be further developed for the Project prior to construction and included as a Sub-plan to the Construction Environmental Management Plan.

3.13 Stakeholder engagement and consultation

Recommend that the EA appropriately recognises the importance of the involvement of Blacktown City Council, and ensures appropriate communication measures are implemented with regard to environmental impacts, particularly biodiversity offsets, salinity management and treatment of outlets.

It is critical that Sydney Water consult with Council during the design stages to ensure that the proposed alignment and the levels of the pipes are agreed to by Council prior to commencement of the construction. The above requirement is essential to avoid any possible need for relocating these water mains to facilitate the road works as part of development of the North Kellyville Precinct in the near future.

Sydney Water recognises the importance of community and stakeholder consultation, including with Blacktown City Council and Baulkham Hills Shire Council. As outlined in the EA (Chapter 8), during construction Sydney Water would ensure that:

- ▶ the community and stakeholders, including local councils, have a high level of awareness of all processes and activities associated with the Project
- ▶ timely and accurate information is provided and easily accessible
- ▶ there is a high level of responsiveness to issues and concerns raised by the community.

Communication processes outlined in the EA (Chapter 8) would be developed and implemented throughout the delivery of the Project. These would include:

- ▶ opportunities for the community to provide input on mitigation measures for construction or operations
- ▶ methods to inform the community of the progress and performance of the Project and issues of interest to the community
- ▶ notification of construction activities to potentially affected local residents, councils and businesses
- ▶ processes to receive and manage complaints in accordance with the Sydney Water customer contract
- ▶ consultation with affected property owners
- ▶ induction and training of construction personnel in communication requirements
- ▶ protocols to notify stakeholders of relevant activities and any incidents should they occur.

3.14 Statement of commitments

Request for Statement of Commitment 25 – Ongoing consultation with the Transport Infrastructure Development Corporation (TIDC) would be undertaken regarding the construction and location of the WPS relative to the proposed stabling yards of the North West Rail Link be amended to include the pipelines at the crossing of Windsor Road and in Rouse Road.

Clarification has been sought from TIDC regarding this concern. TIDC's intent for this item within their submission is for Sydney Water to include in the Statement of Commitment 25 that at locations where TIDC is proposing to cross Windsor or Rouse Roads, Sydney Water would commit to ongoing consultation with TIDC in relation to

any Sydney Water proposal that would impact on the North West Rail Link. Sydney Water agrees to this commitment and has included the request in the revised Statement of Commitments in [Chapter 5](#).

4 The Preferred Project and assessment of changes

This chapter provides details on the changes to the Project outlined in Chapter 1 and assesses the environmental impacts of these changes. It also describes the Preferred Project.

4.1 Description of changes

The majority of the Project is unchanged from the original proposal that was considered in the EA. The following six aspects of the Project have changed:

- ▶ Revised drinking water pipeline routes
- ▶ Revised recycled water pipeline routes
- ▶ Relocation of the Rouse Road water pumping station
- ▶ Expansion of Cudgegong Road Reservoir Site
- ▶ Cudgegong Road Reservoir overflow pipeline
- ▶ Revised wastewater pipeline route

4.1.1 Revised drinking water pipeline routes

The pipeline to provide drinking water from the Parklea to the Cudgegong Road Reservoir has been revised. The revised route would commence at Sunnyholt Road near Clarendon Drive and progress northward within the drainage reserve along Caddies Creek. The pipeline would meet Old Windsor Road on the western side and then continue northward along Windsor Road. The pipeline would then turn left at Schofields Road on the southern side and then turn right into Cudgegong Road. The pipeline would enter the Cudgegong Road Reservoir Site along the existing property access corridor.

The pipeline has also been extended southward back to Old Windsor Road at Bella Vista along the existing Sydney Water owned drainage land.

4.1.2 Revised recycled water pipeline routes

The pipeline to provide recycled water from Quakers Hill STP to the Cudgegong Road Reservoir has been revised. It is proposed to relocate the point where the recycled water pipeline crosses the Richmond rail line 20 metres south of the original railway crossing at Oppy Reserve. The recycled water pipeline entering the Cudgegong Road Reservoir Site has been moved 70 metres north from the existing property access corridor to a second access corridor.

4.1.3 Relocation of the Rouse Road water pumping station

The Rouse Road drinking water pumping station has been relocated to the southern side of Schofields Road, near the intersection of Windsor and Schofields Road.

4.1.4 Cudgegong Road Reservoir Site

The property boundary of the Cudgegong Road Reservoir Site has been expanded to include an additional hectare of private property adjacent to the Sydney Water owned land.

4.1.5 Cudgegong Road Reservoir overflow pipeline

The proposed overflow pipeline would exit the Cudgegong Road Reservoir Site onto Worcester Road, turn left onto Rouse Road and end at Second Ponds Creek.

4.1.6 Revised wastewater pipeline route

Two wastewater pipelines were proposed in the EA from the pumping station at Vineyard to Riverstone STP. Both pipelines were proposed to cross the Richmond rail line at Bandon Road. Further investigations found that it was not feasible to accommodate both pipelines in the existing railway crossing at Bandon Road due to pipeline sizes.

The revised Project incorporates one wastewater pipeline railway crossing at Bandon Road and one at St James Road. It is proposed that both rail crossings would be underbored.

4.1.7 Zoning

A review of the local planning zones for the changes to the Project was undertaken and zonings for additional areas are indicated in [Table 4-1](#). The zonings for the additional areas are the same as those described in Table 5.3 of the EA. No new zones have been identified and the construction and operation of the Project is permissible within all zones.

Table 4-1 Applicable zones under local environmental plans for the changes to the Project

Local Government Area	Land use zones
Blacktown	Zone 1(a) (General Rural Zone)
	Zone 5(a) (Special Uses – General)
	Zone No 5(c) (Local road and local road widening)
Hawkesbury	Zone MA (Mixed Agriculture)
	Zone RL (Rural Living)

4.2 Environmental assessment of the proposed changes

The environmental impacts of the changes to the Project are assessed below. A table showing where applicable issues identified in the Director-General's EA requirements have been addressed is included in [Appendix B](#). New safeguards have been identified where the safeguards proposed in the EA would not adequately mitigate the new impacts identified.

4.2.1 Water quality and hydrology

Existing conditions

The revised pipelines, the expansion of Cudgegong Road Reservoir Site and the Schofields Road pumping station are located within the same geology and soil landscapes as the original pipeline routes, reservoir site and Rouse Road pumping

station. The revised pipeline route includes additional creek crossings at Second Ponds Creek, Caddies Creek, an unnamed tributary of Caddies Creek and a Sydney Water owned drainage channel near Old Windsor Road. The pipeline would also cross a flood detention basin outlet leading to Caddies Creek. All creeks and the detention basin outlet would be underbored, except where underboring would cause more impacts than trenching.

An overflow pipe would discharge stormwater from the Cudgegong Road Reservoir Site and overflow drinking and recycled water from the Cudgegong Road Reservoir into Second Ponds Creek (upstream of the Rouse Hill STP). Second Ponds Creek is highly degraded (Roberts 2003) with the presence of *Salvinia*, Alligator Weed and Water Hyacinth indicating its high eutrophic status. Sydney Water monitoring of Second Ponds Creek, upstream of the Rouse Hill STP has identified elevated nutrient, chlorophyll-a, faecal coliform and enterococci levels ([Table 4-2](#)).

Table 4-2 Second Ponds Creek monitoring results

Analyte	Dry weather (Median)	Wet weather (Median)	Median	ANZECC 2000 guideline
pH (pH units)	7.7	7.5	7.6	6.5-8.5
Conductivity (ms/cm)	62.2	48.9	55.6	<30
TN (mg/L)	1	1.39	1.2	<0.35
NO _x (mg/L)	0.22	0.42	0.32	<0.04
TP (mg/L)	0.062	0.109	0.0855	<0.025
Chl a (µg/L)	7.2	1.5	4.4	<3
Faecal coliforms (cfu/100ml)	80	1.9x10 ³	9.9x10 ²	-
Enterococci (cfu/100ml)	102	3.2x10 ³	1.7x10 ³	-

Source: Sydney Water 2007

Comparison of impact

The potential impacts of the original and revised pipeline routes on water quality and hydrology are expected to be similar. The construction phase has the potential to contaminate soil, groundwater and surface water through the spillage of liquids such as oils or other materials required for construction, and through increased erosion and sedimentation from cleared construction works. While the number of creek crossings has increased, all creeks would be underbored except where boring would cause a greater impact than trenching.

An overflow pipe would be constructed to discharge stormwater from the Cudgegong Road Reservoir Site and overflow of drinking and recycled water into Second Ponds Creek. Discharge from the reservoirs into this creek would be rare. However, inappropriate discharge of drinking and recycled water has the potential to impact on the water quality and hydrology of Second Ponds Creek, Cattai Creek and the

Hawkesbury-Nepean River. There is also the potential for localised impacts such as destabilisation and scouring of banks in Second Ponds Creek.

The revised location of specific pipelines, the expansion of the Cudgegong Road Reservoir Site and the relocation of the Rouse Road pumping station are not expected to impact on the quality of the drinking water, recycled water or wastewater that may potentially overflow into local waterways.

Mitigation measures

Construction impacts on water quality and hydrology due to the revised pipeline route can be mitigated through Sydney Water's standard practices and the safeguards identified in the EA (Section 6.2). No additional safeguards are required.

Discharge of water from the Cudgegong Road Reservoir Site reservoirs would comply with Sydney Water's discharge protocol standard operating procedure (SOP) (Sydney Water 2006). The purpose of this protocol is to provide guidelines for Sydney Water, which:

- ▶ meet Sydney Water's obligation to provide water which satisfies public health requirements
- ▶ permit essential activities to take place, in a cost effective manner
- ▶ demonstrate leadership in water conservation by minimising the wastage of water, and supporting the principles of Ecologically Sustainable Development (ESD)
- ▶ minimise the impact on the environment and receiving waters
- ▶ satisfy the requirements of the regulator for the environment (DECC).

As specified in the procedure, all drinking water discharges greater than 1 ML would be dechlorinated before or during discharge. Sydney Water's Environmental Planning and Management team would assess risks and impacts prior to a planned discharge above 1 ML.

During detailed design, water sensitive urban design (WSUD) measures would be investigated in order to mitigate any stormwater impacts on Second Ponds Creek. The discharge point at Second Ponds Creek would be constructed so as to minimise potential destabilisation and scouring of banks. This would involve the construction of appropriate headwalls, dissipaters and other bank stabilisation techniques. All other water quality and hydrology operational impacts would be managed through the implementation of Sydney Water's safeguards identified in the EA (Section 6.2). No other additional safeguards are required.

4.2.2 Aquatic ecology

Existing conditions

The existing aquatic environment potentially impacted upon by the Project is already significantly degraded due to a number of diffuse wastewater sources/inputs that currently impact on water quality. The revised pipeline route includes additional creek crossings at Second Ponds Creek, Caddies Creek, an unnamed tributary of Caddies Creek and a Sydney Water owned drainage channel near Old Windsor Road. The pipeline would also cross a flood detention basin outlet leading to Caddies Creek. All creeks and the flood detention basin outlet would be underbored to facilitate the revised pipeline routes, except where underboring would have greater impacts than trenching.

An overflow pipe would discharge stormwater from the Cudgegong Road Reservoir Site and water from the Cudgegong Road Reservoir Site reservoirs into Second Ponds Creek (upstream of the Rouse Hill STP). Second Ponds Creek is highly degraded (Roberts 2003) with the presence of *Salvinia*, Alligator Weed and Water Hyacinth indicating its high eutrophic status. Sydney Water monitoring of Second Ponds Creek, upstream of the Rouse Hill STP has identified elevated nutrient, chlorophyll a, faecal coliform and enterococci levels (Table 4-2).

Comparison of impact

The potential impacts of the construction of the original and revised pipeline routes on aquatic ecology are expected to be similar. The construction phase has the potential to disturb creeks through pipeline crossings, sedimentation and erosion from construction areas and spillage from fuels and chemicals. The revised pipeline route includes additional creek crossings, however all creeks would be underbored except where underboring would have greater impacts than trenching.

Discharge of drinking and recycled water into the degraded Second Ponds Creek from the Cudgegong Road Reservoir Site would be rare during the operation phase, however discharge of drinking and recycled water has the potential to impact on the aquatic environment. The discharge of stormwater from the site would also impact the aquatic environment of Second Ponds Creek. There is also the potential for destabilisation and scouring of banks in Second Ponds Creek. The volume of tertiary treated effluent being discharged from the STPs and the volume of wet weather flows from the wastewater system would remain unchanged. As previously stated, even if the quality of the aquatic environment was to improve over time it is anticipated that the revised Project would not have severe adverse impacts.

Mitigation measures

The discharge point at Second Ponds Creek would be constructed so as to minimise potential destabilisation and scouring of banks. This would involve the construction of appropriate headwalls, dissipaters and other bank stabilisation techniques. All other construction impacts on the existing aquatic environment due to the revised pipeline route, the expansion of the Cudgegong Road Reservoir Site and the relocated pumping station can be mitigated through Sydney Water's standard practices and the safeguards identified in the EA (Section 6.3). No additional safeguards are required.

Discharge of water from the Cudgegong Road Reservoir Site reservoirs would comply with Sydney Water's discharge protocol standard operating procedure (SOP) (Sydney Water 2006). The purpose of this protocol is to provide guidelines for Sydney Water, which:

- ▶ meet Sydney Water's obligation to provide water which satisfies public health requirements
- ▶ permit essential activities to take place, in a cost effective manner
- ▶ demonstrate leadership in water conservation by minimising the wastage of water, and supporting the principles of Ecologically Sustainable Development (ESD)
- ▶ minimise the impact on the environment and receiving waters
- ▶ satisfy the requirements of the regulator for the environment, DECC.

As specified in the procedure, all drinking water discharges greater than 1 ML would be dechlorinated before or during discharge. Sydney Water's Environmental Planning and Management team would assess risks and impacts prior to a planned discharge above

1 ML. During detailed design, water sensitive urban design (WSUD) measures would be investigated in order to mitigate any stormwater impacts on Second Ponds Creek. All other aquatic environment operational impacts would be managed through the implementation of Sydney Water's safeguards identified in the EA (Section 6.3). No other additional safeguards are required.

4.2.3 Terrestrial ecology

Existing conditions

The area in the vicinity of the proposed changes to the Project has a long history of grazing and cultivation. However there are patches of vegetation throughout the area that could provide habitat to native flora and fauna species. Field surveys were undertaken to identify the flora and fauna affected by the proposed changes to the Project.

Vegetation Communities

Figure 4-1 - Figure 4-3 show the vegetation communities identified along the revised pipeline routes, at the new location for the water pumping station and at the Cudgegong Road Reservoir Site.

The extension of the drinking water pipeline from Sunnyholt Road south to Old Windsor Road does not contain any significant vegetation, with the exception of an area of River-flat Eucalypt Forest to the east of Parklea Markets adjacent to Caddies Creek. From Sunnyholt Road north to Old Windsor Road the drinking water pipeline is on the western side of Caddies Creek and crosses a tributary of Caddies Creek near Stanhope Reserve. There are some stands of River-flat Eucalypt Forest along this route.

The pipeline along Windsor Road to Schofields Road was assessed in the EA (Section 6.4) and contains no identified vegetation communities. Along Schofields Road and Cudgegong Road there are remnant stands of Cumberland Plain Woodland broken up by cleared areas and there is a stand of River-flat Eucalypt Forest along Seconds Ponds Creek. No vegetation communities were identified at the location of the proposed Schofields Road water pumping station.

The extended property boundary for the Cudgegong Road Reservoir Site contains Cumberland Plain Woodland, some mown lawn areas and a few large Eucalyptus tereticornis trees and planted garden beds. The understorey is mostly introduced weed species, including *Conyza sumatrensis*, *Verbena rigida* and *Seteria gracilis*, however there are some native herb and shrub species present.

The revised wastewater rising pipeline passes adjacent to Shale Gravel Transition Forest. Between St James Road and the Richmond rail line there are a number of large Eucalypts with an understorey of native herbs and shrubs. The western side of St James Road is mostly mown and has considerably fewer species of native trees and herbs.

The revised pipeline at Oppy Reserve is adjacent to the vegetation communities previously identified in the EA (Section 6.4).

Flora

No flora species of National or State conservation significance listed as a ROTAP (Rare or Threatened Australian Plant, Briggs and Leigh 1996) or listed on the

Schedules of the *EPBC Act* or *TSC Act* were located during the field surveys for the changes to the Project.

Fauna

25 native mammals, 167 native birds, 21 reptiles, 14 frogs and one threatened snail had been recorded within the vicinity of the proposed changes to the Project. In addition to the native species recorded, a number of introduced animals were also detected, or indicated as occurring.

One threatened species, the Cumberland Plain Land Snail (*Meridolum corneovirens*) was collected whilst conducting the ground debris searches at the additional land proposed for the Cudgegong Road Reservoir Site. [Figure 4-4](#) shows the location of this record.

Comparison of impact

The impact on terrestrial flora and fauna is expected to be similar for the revised and original pipeline routes. The revised and original routes were designed with the same principal of utilising roads and disturbed areas where possible to avoid impacting sensitive areas. The revised pipelines would not impact vegetation communities and potential flora and fauna habitat identified along the revised routes at Caddies Creek, Stanhope Reserve and Second Ponds Creek provided that these areas are underbored or avoided. The revised pipelines would not impact remnant vegetation and potential fauna habitat identified along the revised routes at Rothbury Terrace, Cudgegong Road and St James Road provided that the pipelines are in the existing roads and disturbed areas. The revised pipeline adjacent to Parklea Markets would be aligned to minimise impact on vegetation and where the vegetation cannot be avoided the pipeline would be underbored.

The revised pipeline at Oppy Reserve will reduce the impact on vegetation by about 0.8 hectares.

The proposed pumping station at Schofields Road would not impact on any identified vegetation communities or threatened species whereas the Rouse Road pumping station would have impacted on 0.14 hectares of Cumberland Plain Woodland.

The extended property boundary for the Cudgegong Road Reservoir Site would impact on an additional 1 hectare of Cumberland Plain Woodland. The additional land for the reservoir would also impact on the Cumberland Plain Land Snail (*Meridolum corneovirens*) which was recorded within the property. The additional 1 hectare of Cumberland Plain Woodland is certified under the Biodiversity Conservation Order for the Growth Centres SEPP and therefore the removal of this vegetation would not have any additional impact on the biodiversity values of the North West Growth Centre. This increase in impacts is offset by the reduced impact (about 0.94 hectares) on Cumberland Plain Woodland from the relocation of the Rouse Road pumping station and the pipeline realignment at Oppy Reserve.

The revised wastewater pipeline would not impact on any additional vegetation communities provided that the pipeline is constructed in the existing road and cleared area.

Based on consideration of the assessment criteria provided under Section 5A of the EP&A Act, flora and fauna assessments undertaken for the changes to the Project found that there would not be a significant impact on the local and regional threatened species and vegetation communities with the exception of the impact on the

Cumberland Plain Land Snail at the Cudgegong Road Reservoir Site. It is not expected that the revised Project would result in an increase in impact on the Cumberland Plain Land Snail compared with the impact predicted in the EA (Section 6.4).

Mitigation measures

In addition to the mitigation measures identified in the EA (Section 6.4) the revised pipelines would be underbored to avoid identified vegetation at Caddies Creek, Stanhope Reserve and Second Ponds Creek.

Figure 4-1 Vegetation communities within the revised Project – south



Figure 4-2 Vegetation communities within the revised Project –north

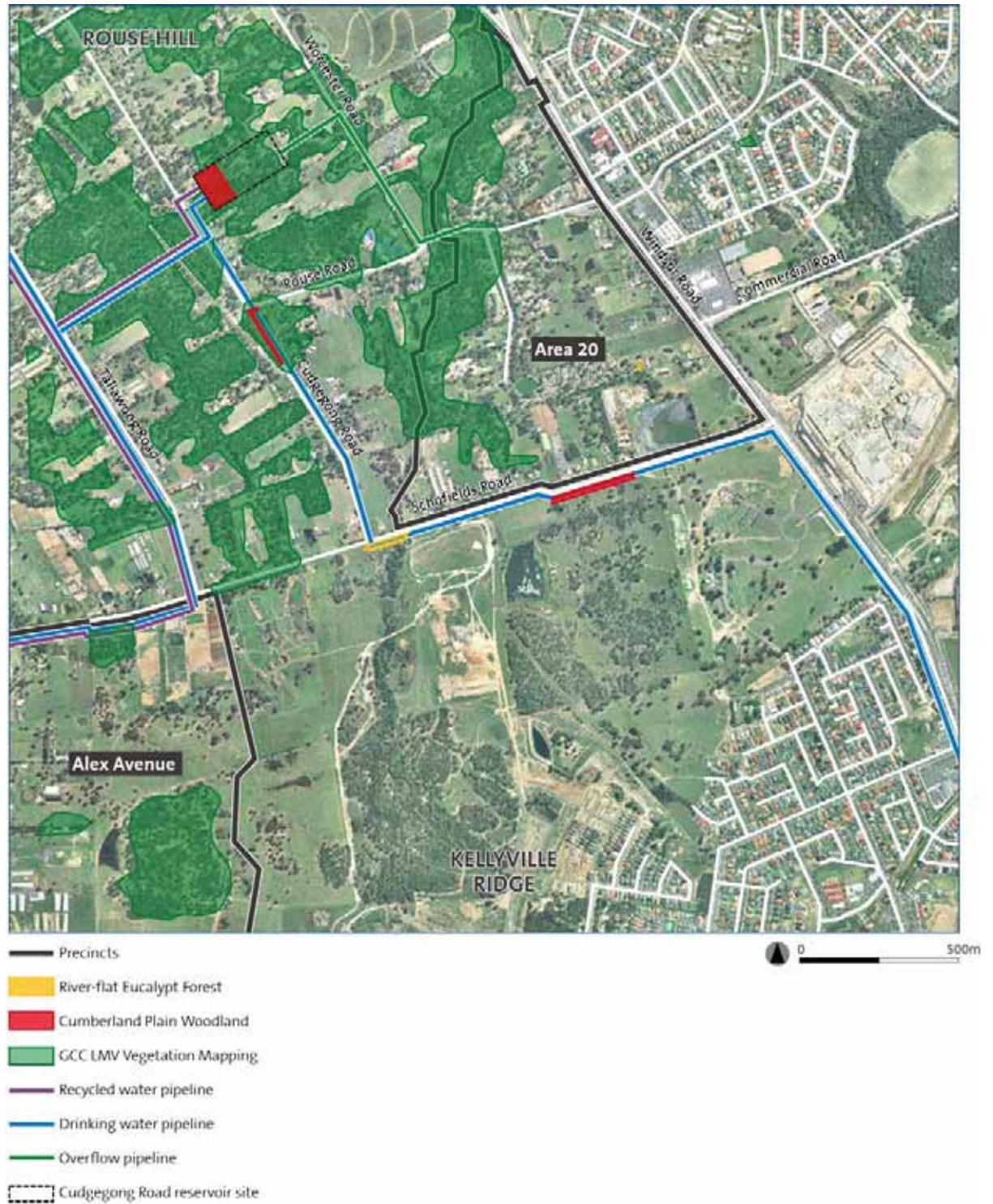


Figure 4-3 Vegetation communities within the revised project – St James Rd



Figure 4-4 Cumberland Plain Land Snail at Cudgegong Road Reservoir Site



4.2.4 Indigenous (Aboriginal) Heritage

Existing conditions

An Aboriginal heritage assessment was undertaken for the revised pipeline route, including a length of drinking water pipeline in the vicinity of Sunnyholt Road and north to Old Windsor Road that was not previously assessed as part of the EA. The assessment included a search of the Department of Environment and Climate Change's (DECC) *Aboriginal Heritage Information Management System* (AHIMS) for a 5 km x 6 km area surrounding the assessment area. The field survey identified 10 sites, including 7 isolated finds, one background scatter and 2 PADs ([Figure 4-5](#)).

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Of the sites that were identified eight were assessed as being of low archaeological significance, whilst A6 and A9 (PAD) were identified as being of moderate archaeological significance (as summarised in [Table 4-3](#)).

Figure 4-5 Location of Aboriginal heritage sites

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Comparison of Impact

There were no identified Aboriginal heritage sites or PADS at the proposed pumping station at Schofields Road or within the expanded property boundary for the Cudgegong Road Reservoir Site.

Of the 10 identified Aboriginal heritage sites, seven would be impacted by the revised drinking water pipeline and wastewater rising pipeline, as summarised in [Table 4-3](#).

Table 4-3 Summary of potential impacts to Aboriginal sites

Site	Location MGA GDA 94 datum	Site Type	Archaeological Significance	Potential Impact	Specific Impacts
A1	This section has intentionally been left blank To view the contents of this section please contact Sydney Water	Isolated Find	Low	No impact	This section has intentionally been left blank To view the contents of this section please contact Sydney Water
A2		Isolated Find	Low	High impact	
A3		Background Scatter	Low	No impact	
A4		Isolated Find	Low	No impact	
A5		Isolated Find	Low	High impact	

Site	Location MGA GDA 94 datum	Site Type	Archaeological Significance	Potential Impact	Specific Impacts
A6	This section has intentionally been left blank To view the contents of this section please contact Sydney Water	Previously investigated	Moderate	Moderate impact	This section has intentionally been left blank To view the contents of this section please contact Sydney Water
A7		Isolated Find	Low	High impact	
A8		Isolated Find	Low	High impact	
A9		PAD	Moderate	Moderate impact	
#45-5-3355		Isolated Find	Low	High impact	

The impact on Aboriginal heritage is expected to be similar for the revised and original pipeline routes. Of the sites that would be impacted by the revised Project only two are of moderate archaeological significance and these sites would only be partially impacted. The remaining sites are of low significance. The impact on those sites that are of moderate significance would be minimised by the implementation of the mitigation measures detailed below.

Mitigation Measures

There are several identified known sites that lie within the revised Project impact zone. The Project scope incorporates mitigation measures that would ensure that impacts on such sites are avoided. Specifically, the sites would be marked as 'work exclusion zones' on concept plans and working drawings. They would also be enclosed by temporary protective barriers during the entirety of the construction period to direct construction work away from these areas and prevent inadvertent damage by construction activities, including work vehicle and construction staff movement. All Sydney Water personnel and contractors involved in construction would be made aware of the locations of all relevant sites.

Prior to the commencement of construction works, collection of artefacts, in consultation with Aboriginal stakeholders, would be undertaken where items of low Aboriginal heritage significance would be impacted upon. For sites or PADs of

moderate to high heritage significance excavations would be undertaken. In undertaking the test excavations a “landscape” or “regional” approach would be implemented. As identified in *Aboriginal Cultural Heritage Regional Studies: An Illustrative Approach* (DEC 2006) the following four main reasons provide justification for this approach:

- ▶ Predictive modeling - a regional assessment predicts where presently unidentified places are likely to exist in a region.
- ▶ Cultural landscapes - a regional assessment provides a landscape perspective on history and culture and shows the interrelatedness of individual heritage places.
- ▶ Strategic conservation - a regional assessment facilitates conservation planning at a large scale.
- ▶ Community benefits - a regional assessment engages Aboriginal communities throughout the planning and development process.

All test excavations would involve the identification, assessment, recording and salvage of any archaeological remains that are found. Further consultation with Aboriginal stakeholders would be undertaken as appropriate.

Sydney Water would commit to minimising disturbance as much as possible in areas of significance by realigning the pipeline where practical and/or the use of appropriate boring techniques, in combination with traditional trenching techniques, during construction. The use of boring techniques would involve the construction of launch pads and shafts, from which the boring equipment operates to install the pipeline, but would not involve the construction of long lengths of trench. This would result in the sites not being disturbed or any necessary disturbance being kept to a minimum. The most suitable strategy would be chosen following detailed design, further investigations and appropriate consultation with Aboriginal stakeholders.

The mitigation measures are summarised in [Table 4-4](#).

Table 4-4 Specific mitigation measures for Aboriginal heritage sites

Archaeological Site	Mitigation Measures
A1	No archaeological requirements.
A2	The artefact at this site would be moved to outside of the Project impact zone in consultation with the Aboriginal community prior to any form of development.
A3	No archaeological requirements.
A4	No archaeological requirements.
A5	The artefact at this site would be moved to outside of the Project impact zone in consultation with the Aboriginal community prior to commencement of construction.

A6 (PK/CD7)	Consideration would be given to moving the drinking water pipeline or using micro-tunnelling or underboring to avoid impacting this site. Due to other extensive proposed infrastructure (eg road and power) works within this area, a reassessment of this site would be undertaken prior to commencement of pipeline construction to reassess the potential impacts and appropriate mitigation measures. Should artefacts be found, the removal of artefacts to outside of the Project impact zone would be conducted in consultation with a heritage professional and the relevant Aboriginal stakeholders.
A7	The artefact at this site would be moved to outside of the Project impact zone in consultation with the Aboriginal community prior to commencement of construction.
A8	The artefact at this site would be moved outside of the Project impact zone in consultation with the Aboriginal community prior to commencement of construction.
A9	Consideration would be given to moving the drinking water pipeline where practical to avoid impacting this site. Due to other extensive proposed infrastructure (eg road and power) works within this area, a reassessment of this site would be undertaken prior to commencement of pipeline construction to reassess the potential impacts and appropriate mitigation measures. Should artefacts be found, the removal of artefacts to outside of the Project impact zone would be conducted in consultation with a heritage professional and the relevant Aboriginal stakeholders.
#45-5-3355	The artefact at this site would be moved to outside of the Project impact zone in consultation with the Aboriginal community prior to any commencement of construction

In the event that previously undiscovered Aboriginal objects (or potential Aboriginal objects) are discovered during construction, all works in the vicinity of the find would cease and the Sydney Water Project Environmental Representative (PER) would be informed to determine the subsequent course of action. The PER would, if required, notify a heritage professional to obtain advice on how to proceed. Works would not recommence until any heritage requirements identified through this process have been met.

Should suspected skeletal material be uncovered during the course of any site works or through subsidence landscape modification, all works would cease and the DECC, the NSW Police and the NSW Coroners office would be contacted immediately, regardless of any existing environmental approvals. The subsequent management of any Aboriginal skeletal bodies found, should be developed in conjunction with DECC, the Aboriginal communities and trained archaeologists. Management options should include preservation *in situ*, or detailed excavation and recording followed by retrieval. In relation to the latter, consideration to the ultimate location of the remains should also be decided prior to retrieval.

4.2.5 Non-Indigenous Heritage

Existing conditions

One additional non-Indigenous heritage site was identified along the revised drinking water pipeline route, namely a section of Old Windsor Road at Kellyville which is listed on the Register of National Estate.

The revised drinking water pipeline route at Schofields Road and the proposed Schofields Road pumping station would be adjacent to a heritage site, the Battle of Vinegar Hill, which was identified in the EA (Section 6.6). The Battle of Vinegar Hill is listed on Schedule 2 of the Blacktown Local Environment Plan and on the NSW State Heritage Inventory database.

No other additional non-Indigenous heritage items were located at any of the revised areas of the Project.

Comparison of impact

The revised pipeline route would cross the Old Windsor Road heritage alignment. However, all major roads would be underbored and as a result it is expected that there would be minimal impact to the Old Windsor Road heritage site. The original pipeline route did not impact on the Battle of Vinegar Hill site, and the revised pipeline route and pumping station would also not impact on this heritage site. It is anticipated that the other changes to the Project would not impact on non-Indigenous heritage items and the overall impact of the revised Project on non-Indigenous heritage remains consistent with the EA (Section 6.6).

Mitigation measures

The revised pipeline route would be underbored at the crossing of the Old Windsor Road heritage alignment. No additional safeguards further to those specified in the EA (Section 6.6) are required.

4.2.6 Soils and groundwater (operations)

Existing conditions

The revised pipeline routes and the expansion of the Cudgegong Road Reservoir Site are located within the same geology and soil landscapes as the original Project and pass through similar areas of moderate and high salinity potential. The Schofields Road pumping station would be located on land with a high salinity potential.

Comparison of impact

The revised pipeline routes, the expansion of the Cudgegong Road Reservoir and the relocation of the pumping station would have no additional impact on the quality of the recycled water to be used for irrigation or the area of land to be irrigated with recycled water. The operational impacts on the soil and groundwater due to the revised pipeline, expansion of the reservoir site and relocated pumping station would be similar to those outlined in the EA (Section 6.7).

Mitigation measures

The impacts on soil and groundwater through irrigation of household gardens and municipal areas with recycled water would be mitigated through measures identified in the EA (Section 6.7). As there is no change in impacts, no additional safeguards are required.

4.2.7 Human health

Existing conditions

The revised pipelines would be a similar length to the original pipelines and would be constructed in the same manner as described in the EA (Section 6.8). The Schofields Road pumping station replaces the Rouse Road pumping station. The expansion of the Cudgegong Road Reservoir Site is to ensure that the site can be accessed for maintenance and can fit the required infrastructure, however no additional infrastructure to that described in the EA (Section 6.8) is proposed. The treatment process of the recycled water would remain unchanged.

Comparison of impact

The revised pipeline routes, the relocation of the pumping station and the expansion of the Cudgegong Road Reservoir Site would not affect the treatment process of the recycled water and therefore impacts on human health remain unchanged.

Mitigation measures

The impacts on human health can be mitigated through Sydney Water's standard practices and the safeguards identified in the EA (Section 6.8). No additional safeguards are required.

4.2.8 Traffic, transportation and access

Existing conditions

The revised pipeline routes would be located in sections of road or road reserve of four additional single lane Council roads (Cudgegong Road, Schofields Road, Wallace Road and St James Road). The revised drinking water pipeline would cross Old Windsor Road at Bella Vista. There would also be an additional railway crossing at St James Road, north of the Bandon Road railway crossing. Pipelines would no longer be placed in the section of road or road reserve of Windsor Road between Rouse Road and Schofields Road. A pumping station would be relocated from Rouse Road to the corner of Schofields and Windsor Roads. An additional access road to the Cudgegong Road Reservoir Site would be provided between 122 and 130 Cudgegong Road.

Comparison of impact

The operational impacts on traffic, transportation and access due to the revised pipeline and pumping station location and the additional access to the Cudgegong Road Reservoir Site would be similar to those outlined in the EA (Section 6.9).

The revised pipeline route would no longer pose an impact along Windsor Road between Rouse Road and Schofields Road, however four additional local roads (Schofields Road, between Cudgegong and Windsor Road; Cudgegong Road between Macquarie Road and Schofields Road; Wallace Road and St James Road) would be impacted and the revised pipeline would cross Old Windsor Road at Bella Vista. The proposed future road widening of Schofields Road would be taken into account during the detailed design of the revised route. The pipeline route would be located appropriately so as not to interfere with future road widening works. The additional railway crossing at St James Road would allow for a reduction in trench width at the Bandon Road railway crossing. This trench width reduction would reduce the construction impact on motor vehicles using the Bandon Road railway crossing.

The increased traffic due to the revised pipeline route would be similar to the original route and limited to truck movements for the removal of spoil from the sites. The

original and revised pipeline routes are about the same length, and require about the same number of truck movements during construction. It is expected that the proposed changes to the Project would not cause an increase in impacts on traffic, transportation or access.

Mitigation measures

The impacts on traffic and roads that are anticipated due to the changes to the Project can be mitigated through Sydney Water's standard practices and the safeguards identified in the EA (Section 6.9). No additional safeguards are required.

4.2.9 Waste generation and management

Existing conditions

Solid waste generated by construction of the revised pipeline route would predominantly be spoil from excavation. The estimated volume of spoil that would be generated along the revised pipeline is 21000m³ and the number of trucks required to remove the spoil would be approximately 958. This is 158 truckloads less than the amount of spoil and truck movements estimated for the original pipeline alignment.

Wherever possible, suitable excavated spoil would be reused onsite for backfilling, landscaping and other uses. If reuse opportunities were unable to be identified or the spoil was unsuitable for reuse, spoil would be classified according to *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid wastes* (DEC 1999) and disposed of at an appropriately licensed facility.

Other wastes produced during construction would include:

- ▶ green waste from clearing of vegetation
- ▶ packaging waste
- ▶ off-cuts and disused construction materials
- ▶ general waste from construction workers.

During construction, water may enter excavations after rainfall or through groundwater infiltration. When this occurs, trenches and other excavations would need to be dewatered to allow work to continue. The quality of the water would need to be considered before discharge.

Bentonite slurry would be used to lubricate cutting heads and drilling equipment during boring beneath sensitive environmental areas, creeks or roads. The bentonite slurry would be reused in the drilling process, although small quantities of this liquid waste may be produced and would require disposal.

No significant volumes of liquid wastes, including oils or fuels, would be generated on site during construction.

Comparison of impact

The construction impacts of the relocated pumping station, the expanded reservoir site and the revised pipelines would be similar to the impacts from the original Project. These include possible impacts on surface water from dewatering activities due to high levels of suspended solids. Bentonite slurry wastes, although non-toxic, could also impact on surface water quality if inappropriately managed.

Inappropriate material handling or poor management of solid wastes would be avoided so as not to result in excessive waste production, overuse of natural resources and premature filling of local landfill sites.

Mitigation measures

Waste management impacts due to the changes to the Project would be mitigated through standard practices and the safeguards identified in the EA (Section 6.10). No additional safeguards are required.

4.2.10 Air quality

Existing conditions

The revised pipeline routes, pumping station and expansion of the Cudgegong Road Reservoir Site are all located in a similar environment to the original Project. The existing air quality is influenced by surrounding commercial, industrial and residential land uses, vehicular traffic movements and emissions, surface disturbance and exposure of soil associated with construction works.

The proposed changes to the Project would not influence odour emissions in the area.

Comparison of impact

The EA (Section 6.11) indicated that construction of the Project would require only minimal surface disturbance at any one time, as the excavation works and site rehabilitation works would be completed progressively. The revised Project would have the same impacts and as a result impacts on air quality from dust emissions would be similar.

No additional odour impacts are expected as a result of the changes to the Project.

Mitigation measures

Air quality impacts due to the changes to the Project would be mitigated through Sydney Water's standard practices and the safeguards identified in the EA (Section 6.11). No additional safeguards are required.

4.2.11 Noise and vibration

Existing conditions

The revised pipeline route is located in a similar acoustic environment to the original pipeline route. The environment includes residential, industrial and open parkland areas. Sensitive receivers along the revised route include Castlebrook Lawn Cemetery and Crematorium and a primary school. The Schofields Road Pumping Station is in a similar acoustic environment to the original pumping station at Rouse Road. The Cudgegong Road Reservoir Site has been expanded into the residential properties of 122 and 130 Cudgegong Road. As a result the reservoir infrastructure would be about 75 metres closer to the residences on these properties. The revised wastewater pipeline at Vineyard would be further away from the existing childcare centre at Bandon Road.

Comparison of impact

Similar to the original proposal, construction of the changes to the Project would impact on the local acoustic environment and would present a short-term impact to adjoining residents and users of public reserves. Impacts on the acoustic environment during

construction would be short term and localised, normally occurring during daytime hours.

The revised pipeline route would be bored in a number of locations to avoid impacting on creeks, major roads and sensitive vegetation. There would be no boring under residential properties although vibration may impact on properties adjacent to the pipeline route. Vibration generated by construction activities may exceed the DECC criteria for human comfort due to truck movements and when large excavators are in use close to residential locations but are not expected to cause structural damage.

The EA (Section 6.12) predicted that noise levels generated by pumping stations and at the Cudgegong Road Reservoir Site would exceed the nominated criteria during all weather conditions for the night time period only. The proposed pumping station at Schofields Road and the relocated infrastructure on the Cudgegong Road Reservoir Site are also expected to exceed the nominated criteria during all weather conditions for the night time period.

Mitigation measures

Noise and vibration impacts due to the construction of revised pipeline route would be mitigated through Sydney Water's standard practices and the safeguards identified in the EA (Section 6.12). This would include a noise management plan as part of the Construction Environmental Management Plan.

Operational noise impacts due to the relocated pumping station and the relocated infrastructure on the Cudgegong Road Reservoir Site can be mitigated through noise control treatments such as commercially available silencers, acoustic screens and acoustic enclosures as identified in the EA (Section 6.12).

4.2.12 Hazards and risk

Existing conditions

The revised pipeline routes, pumping station and expanded reservoir site are located in a similar environment to the original Project. Construction methods would remain unchanged, and operation of the Project would not lead to an increase in the quantity of potentially hazardous substances delivered to and stored at the STP sites.

Comparison of impact

The changes to the Project would have no additional impact on the transport, storage and use of chemicals and other dangerous goods during the construction and operation phases of the Project.

Mitigation measures

There would be no change in impact, and therefore hazards and risks, as the changes to the project would be mitigated through the safeguards identified in the EA. No additional safeguards are required.

4.2.13 Energy and greenhouse gas emissions

Existing conditions

The revised pipelines would be of similar length to the original pipelines and would be constructed in the same manner as described in the EA (Section 7.2). The Schofields Road pumping station replaces the Rouse Road pumping station. The expansion of the Cudgegong Road Reservoir Site would ensure that the site can be accessed for

maintenance and can fit the required infrastructure. The proposed new layout does not include any additional infrastructure from that described in the EA (Section 7.2).

Comparison of impact

The revised pipeline routes, the relocation of the pumping station and the expansion of the Cudgegong Road Reservoir Site are not expected to increase the energy requirements or greenhouse gas emissions of the Project.

Mitigation measures

The impacts on energy use and greenhouse gas emissions can be mitigated through Sydney Water's standard practices and the safeguards identified in the EA (Section 7.2). No additional safeguards are required.

4.2.14 Visual amenity

Existing conditions

The revised pipelines, as with the original pipeline route, pass through both urban and rural landscapes with the pipeline positioned for the most part within existing road corridors or cleared land. The Schofields Road pumping station would be located at a major intersection on Windsor Road. The expansion of the Cudgegong Road Reservoir Site involves rearrangement of the proposed reservoirs, pumping stations and servicing units to fit additional associated infrastructure such as access roads.

Comparison of impact

The impact of the revised pipeline route on the visual environment is similar to the original route. During construction of the pipelines, trenches would be dug and the pipelines laid in sections along the proposed routes. Construction equipment would be visible to residences where construction work is proposed on roadways. In other areas, visibility would vary depending on the distance, the extent of vegetation and the presence of existing fences. The construction period in the vicinity of any one house or reserve would be short (about 4 weeks per section) and, as such, the anticipated visual impacts would be temporary and minimal.

The revised water pumping station would be located on cleared land owned by and adjacent to Castlebrook Cemetery and Crematorium on the corner of Windsor and Schofields Roads. The presence and operation of construction equipment in this area would affect the visual amenity, however the closest residence is about 520 m from the site.

The changes to the Cudgegong Road Reservoir Site are not expected to increase the impacts to the visual amenity of the area above those discussed in the EA (Section 7.3).

Mitigation measures

The impacts on the visual environment due to changes to the Project would be mitigated through standard practices and the safeguards identified in the EA (Section 7.3). No additional safeguards are required.

4.2.15 Social impacts

Existing conditions

The revised pipelines and the Schofields Road pumping station would be located in similar agricultural and rural residential areas to the original proposal. The expansion

of the Cudgegong Road Reservoir Site would move some components of the reservoir infrastructure closer to existing residences.

Comparison of impact

The revised pipeline routes, the relocation of the pumping station and the expansion of the Cudgegong Road Reservoir Site are not expected to increase the social impacts of the Project.

Mitigation measures

Social impacts as a result of the changes to the project would be mitigated through Sydney Water's standard practices and the safeguards identified in the EA (Section 7.4). No additional safeguards are required.

4.3 Conclusion

Table 4-5 summarises the impacts and additional mitigation measures required as a result of the changes to the Project. The changes to the Project are not considered significant modifications to the nature of the Project. The types of activities and the impacts that would occur during the construction and operation of the Project with the proposed changes would be substantially the same as the proposal considered in the EA. It is considered that the proposed changes to the Project do not increase the overall impact of the Project.

Table 4-5 Assessment of potential impacts of changes to the Project

Aspect	Potential additional impact	Additional mitigation measures
Water quality and hydrology	Impact on the water quality and hydrology of creeks through discharge from an overflow pipe from the Cudgegong Road reservoirs.	Discharge of water from the Cudgegong Road reservoirs would comply with Sydney Water's discharge protocol standard operating procedure (SOP) (Sydney Water 2006).
	Potential for localised impacts such as destabilisation and scouring of banks through construction of an overflow pipe in Second Ponds Creek.	The discharge point at Second Ponds Creek would be constructed so as to minimise potential destabilisation and scouring of banks. This would involve the construction of appropriate headwalls, dissipaters and other bank stabilisation techniques.
Aquatic ecology	Potential impact on the aquatic environment through inappropriate discharge from an overflow pipe from the Cudgegong Road reservoirs.	Discharge of water from the Cudgegong Road Reservoirs would comply with Sydney Water's discharge protocol standard operating procedure (SOP) (Sydney Water 2006).
	Potential impact on the aquatic environment through destabilisation and scouring of banks in Second Ponds Creek.	The discharge point at Second Ponds Creek would be constructed so as to minimise potential destabilisation and scouring of banks. This would involve the construction of appropriate headwalls, dissipaters and other bank stabilisation techniques.

Aspect	Potential additional impact	Additional mitigation measures
Terrestrial ecology	The revised pipelines would not impact on additional vegetation communities and potential flora and fauna habitat provided that appropriate measures such as boring and use of existing cleared areas are implemented. The extended property boundary for the Cudgegong Road Reservoir Site would impact on an additional 1 hectares of Cumberland Plain Woodland. The additional land for the reservoir would also impact on the Cumberland Plain Land Snail (<i>Meridolum corneovirens</i>) which was recorded within the property. The additional 1 hectare of Cumberland Plain Woodland is certified under the Biodiversity Conservation Order for the Growth Centres SEPP and therefore the removal of this vegetation would not have any additional impact on the biodiversity values of the North West Growth Centre. The increase in impact on Cumberland Plain Woodland is offset by the reduced impact (about 1 hectare) on Cumberland Plain Woodland from the relocation of the Rouse Road pumping station and the pipeline realignment at Oppy Reserve.	The revised pipelines would be underbored to avoid identified vegetation at Caddies Creek, Stanhope Reserve and Second Ponds Creek. Any Cumberland Plain Land Snails (<i>Meridolum corneovirens</i>) found in the additional land required for the reservoirs would be relocated with any snails found in the other areas of the site.
Indigenous heritage	Seven of the 10 Aboriginal heritage sites identified would be impacted by the revised pipeline.	Impact mitigation measures outlined in Table 4.4 would be incorporated to ensure that impacts on such sites are avoided.
Non-Indigenous heritage	The revised pipeline would cross the Old Windsor Road heritage alignment.	All major roads would be underbored. No additional safeguards are required.
Soils and groundwater (operations)	The operational impacts on the soil and groundwater remain unchanged.	No additional safeguards are required.
Human health	Impacts on human health remain unchanged.	No additional safeguards are required.
Traffic, transportation and access	Four additional local roads would be impacted due to the revised pipeline route and the relocation of the pumping station.	Proposed future road widening of Schofields Road would be taken into account during the detailed design of the revised pipeline route. No additional safeguards are required.

Aspect	Potential additional impact	Additional mitigation measures
Waste generation and management	Impacts on waste generation and management remain unchanged.	No additional safeguards are required.
Air quality	Impacts on air quality remain unchanged.	No additional safeguards are required.
Noise and vibration	Noise and vibration impacts are similar to those outlined in the EA (Section 6.12), however the location of these impacts has changed due to the relocation of the pumping station and revised pipeline route.	No additional safeguards are required.
Hazards and risk	Impacts on air quality remain unchanged.	No additional safeguards are required.
Energy and greenhouse gas emissions	Impacts on air quality remain unchanged.	No additional safeguards are required.
Visual amenity	Impacts on visual amenity are similar to those outlined in the EA (Section 7.3), however the location of these impacts has changed due to the relocation of the pumping station and revised pipeline route.	Visual amenity impacts due to the revised pipeline route can be mitigated through Sydney Water's standard practices and the safeguards identified in the EA (Section 7.3).
Social	Impacts on air quality remain unchanged.	No additional safeguards are required.

4.4 The Preferred Project

4.4.1 Overview

The proposed modifications to the Project would include changes to the alignment of some sections of pipeline, the addition of an overflow pipe, the expansion of the Cudgegong Road Reservoir Site and the relocation of a pumping station and are summarised as follows:

- The location of the recycled water pipeline railway crossing at Oppy Reserve in Quakers Hill has been moved, as has the recycled water pipeline at the Cudgegong Road Reservoir Site.
- The drinking water pipeline that runs north from Sunnyholt Road adjacent to Old Windsor Road has been relocated. This pipeline has also been extended south of Sunnyholt Road toward Bella Vista.
- The location of the drinking water pipeline leading from Schofields Road to the Cudgegong Road Reservoir Site has also been changed.
- Modifications to the wastewater rising pipeline in Vineyard involves an additional railway crossing at St James Road.
- The Cudgegong Road Reservoir Site has been expanded to better accommodate the reservoir infrastructure.
- An overflow pipe discharging water into Second Ponds Creek from the Cudgegong Road reservoirs and stormwater from the site would be installed.
- The Rouse Road pumping station has been relocated to the corner of Schofields Road and Windsor Road, adjacent to the Castlebrook Lawn Cemetery Crematorium.

The description of the Preferred Project that follows should be read in conjunction with the EA as the Project details remain substantially unchanged, with the exception of those items listed above.

4.4.2 Description of the Preferred Project

The Preferred Project consists of construction and operation (including commissioning and maintenance) of water related services (including drinking water, recycled water and wastewater infrastructure) for the First Release Precincts in Sydney's North West Growth Centre. There are six First Release Precincts, namely North Kellyville, Riverstone, Riverstone West, Alex Avenue, Area 20 and Colebee. The Project components include:

- new drinking water trunk and major reticulation pipelines ([Figure 4-7](#) and [Figure 4-8](#))
- new recycled water trunk and major reticulation pipelines ([Figure 4-10](#) and [Figure 4-11](#))
- new wastewater gravity and rising pipelines ([Figure 4-13](#) and [Figure 4-14](#))
- a new sewage pumping station (SPS) ([Figure 4-6](#))
- upgrade of an existing SPS ([Figure 4-6](#))

- ▶ new water pumping stations (WPSs) for drinking and recycled water ([Figure 4-6](#))
- ▶ new surface and elevated reservoirs for drinking water and recycled water ([Figure 4-9](#))
- ▶ upgrade and amplification of the existing Riverstone Sewage Treatment Plant (STP) ([Figure 4-15](#))
- ▶ new recycled water treatment facilities at the existing Quakers Hill STP ([Figure 4-12](#))

Figure 4-6 Location of the Preferred Project

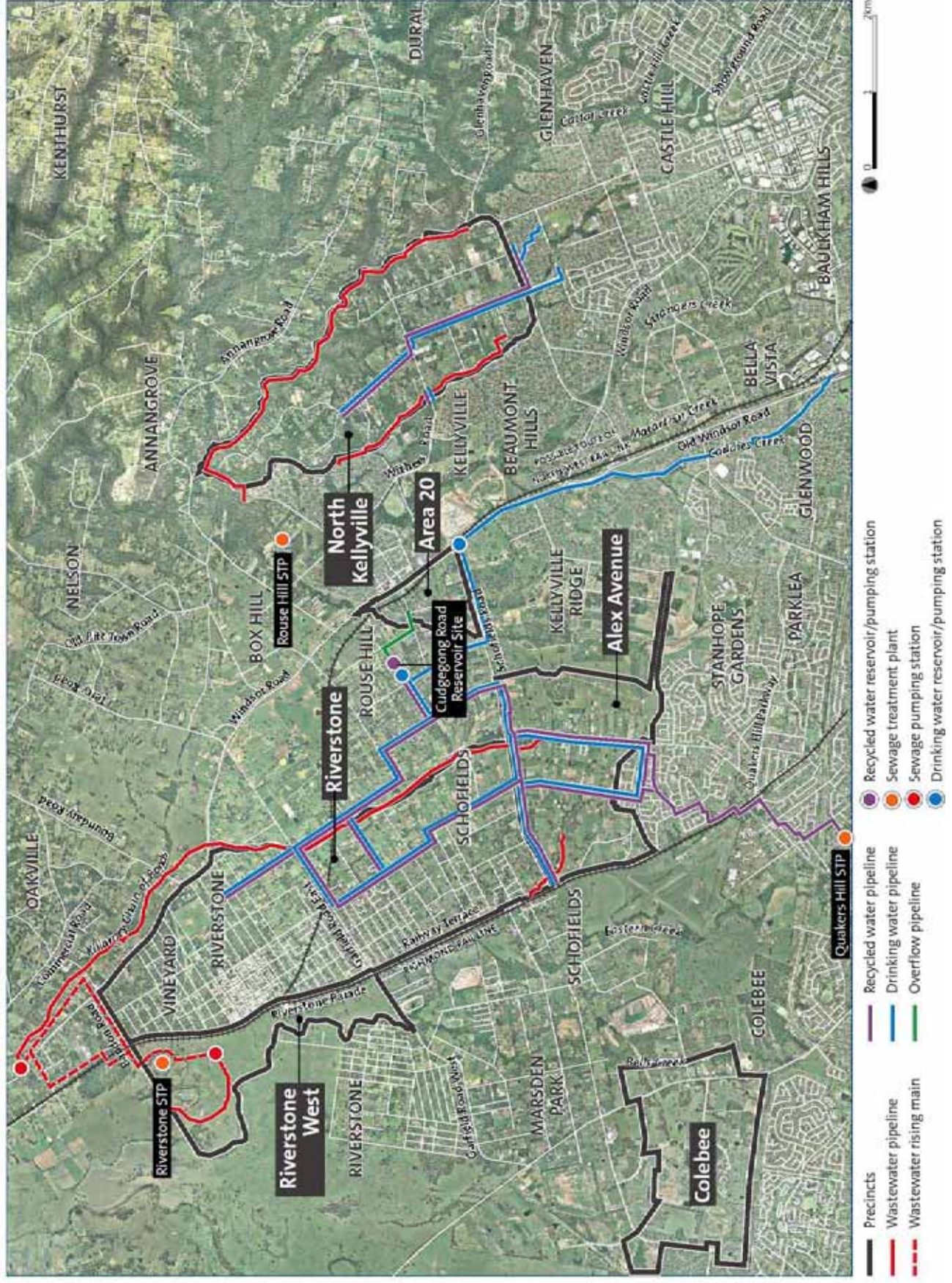


Figure 4-7 North Kellyville drinking water infrastructure

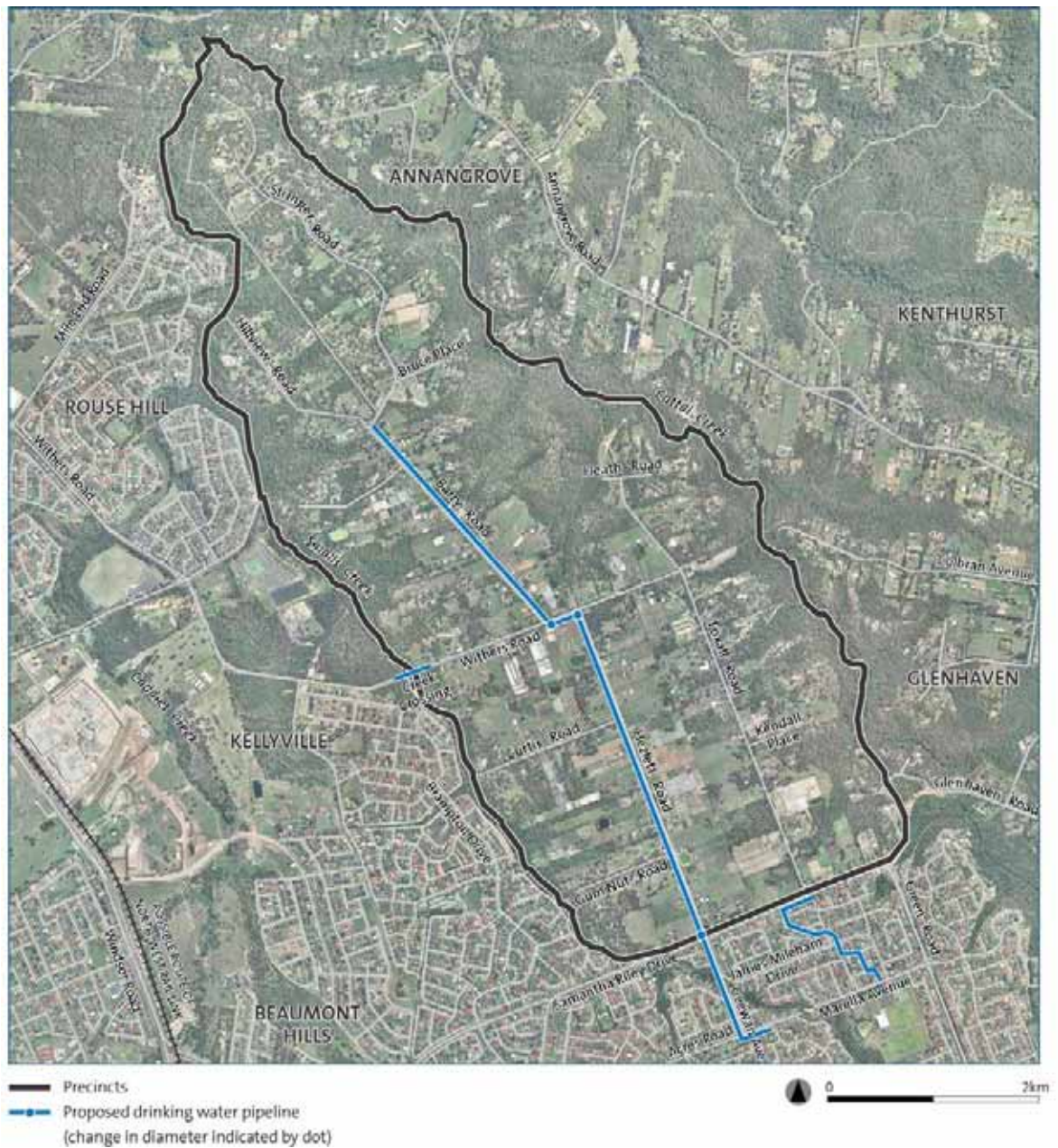


Figure 4-8 Riverstone, Riverstone West and Alex Avenue drinking water infrastructure

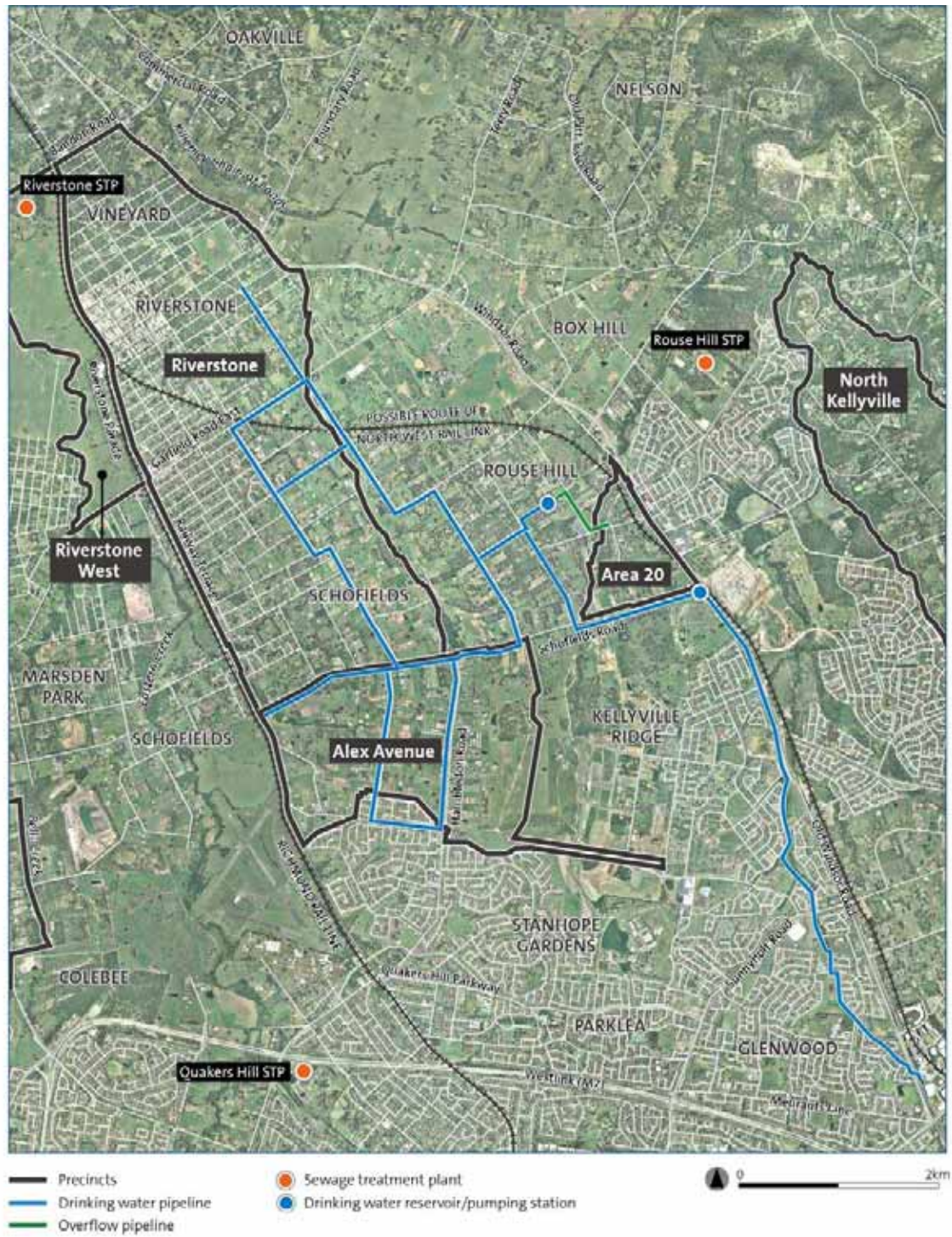


Figure 4-9 Cudgegong Road Reservoir Site

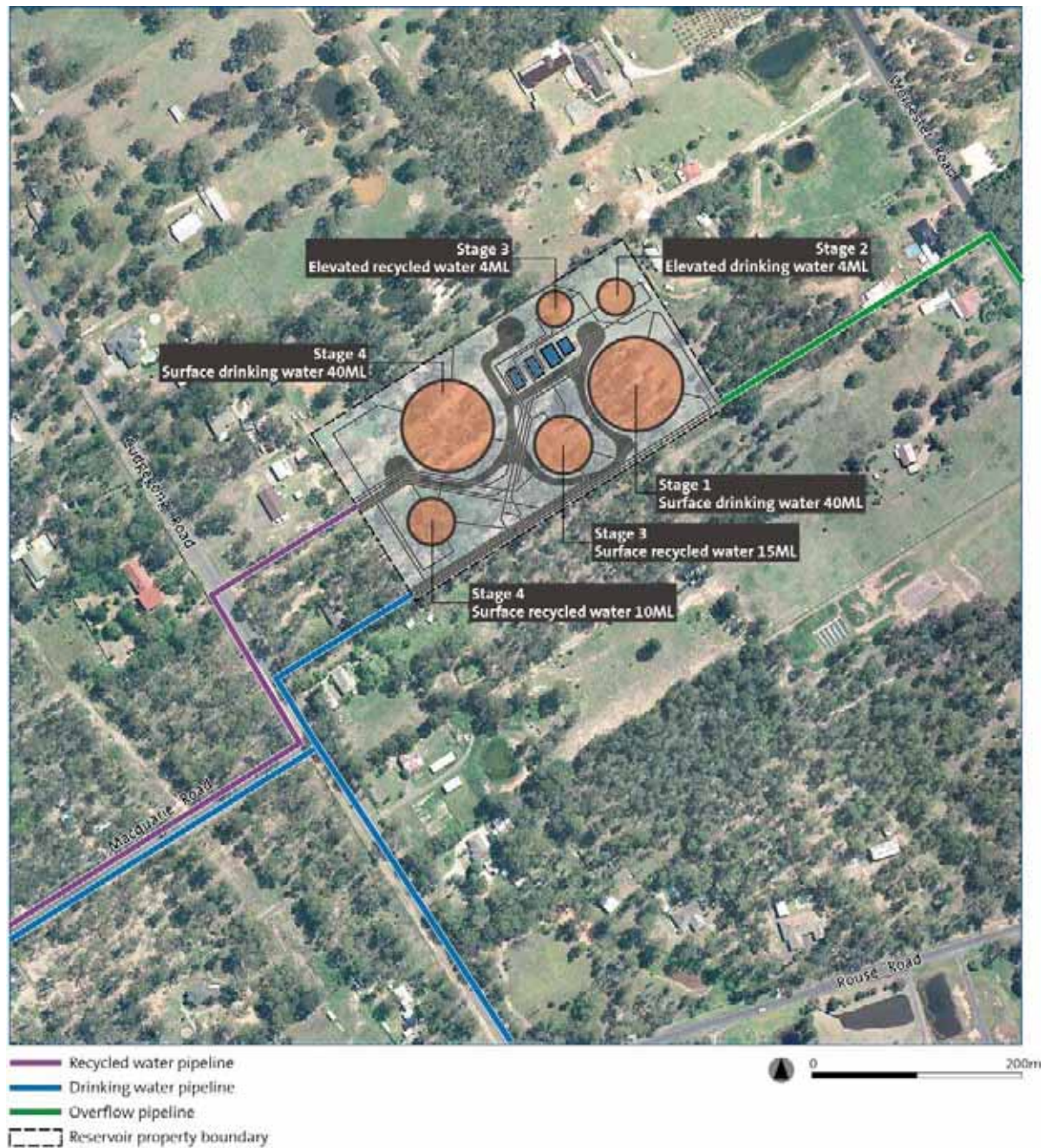


Figure 4-10 North Kellyville recycled water infrastructure

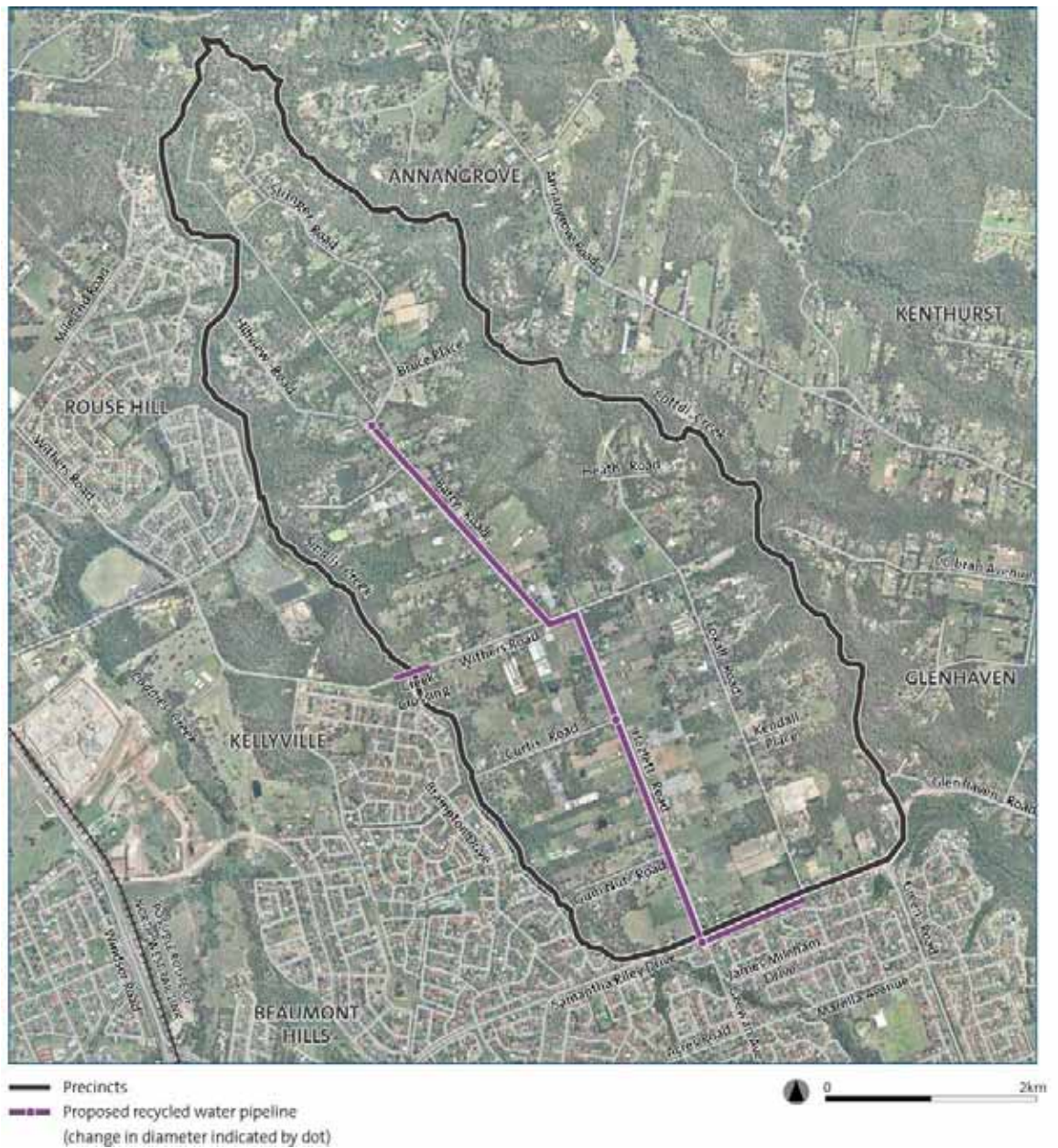


Figure 4-11 Riverstone, Riverstone West and Alex Avenue recycled water infrastructure

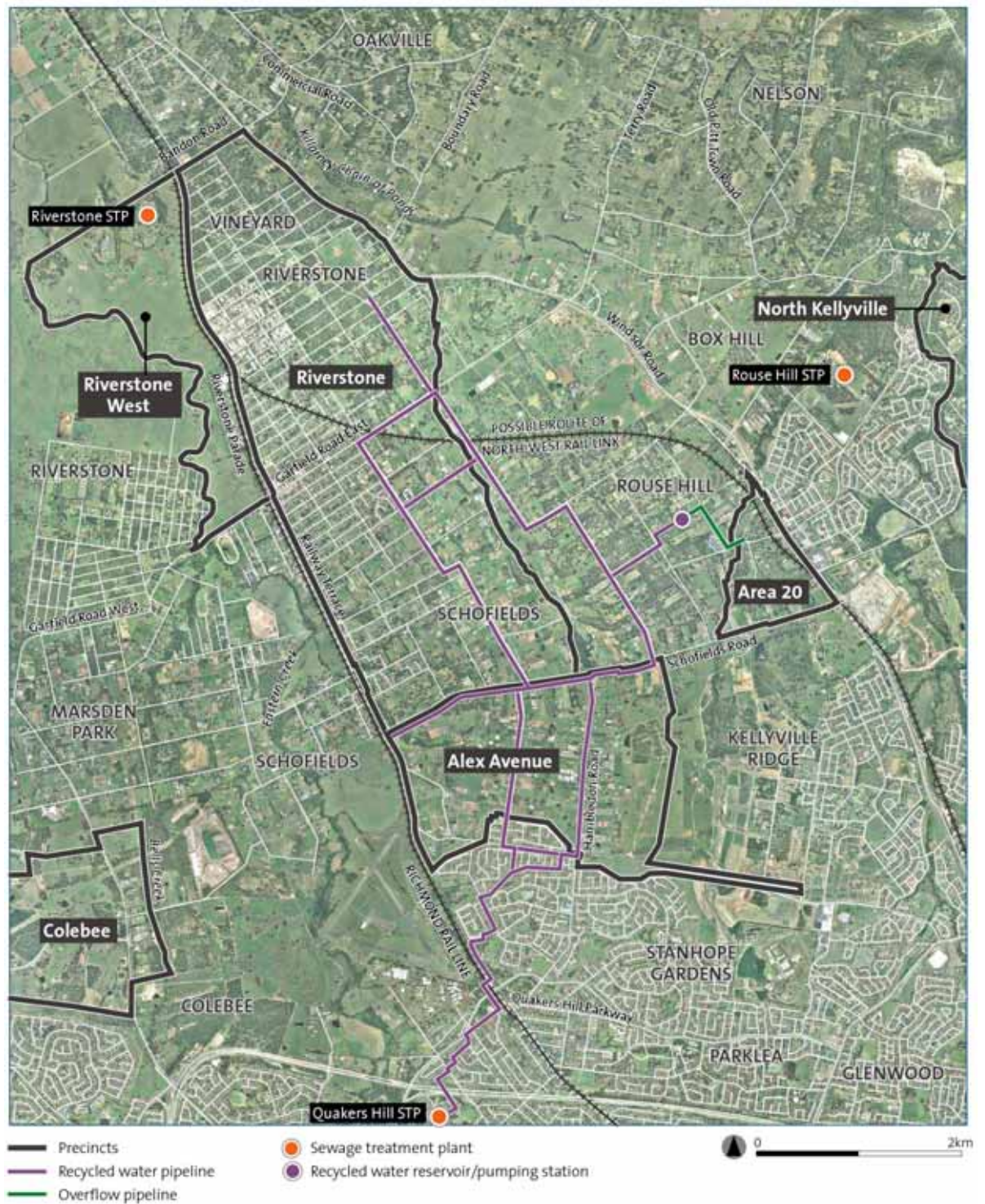


Figure 4-12 Quakers Hill RWP



Figure 4-13 North Kellyville wastewater infrastructure



Figure 4-14 Riverstone, Riverstone West and Alex Avenue wastewater infrastructure

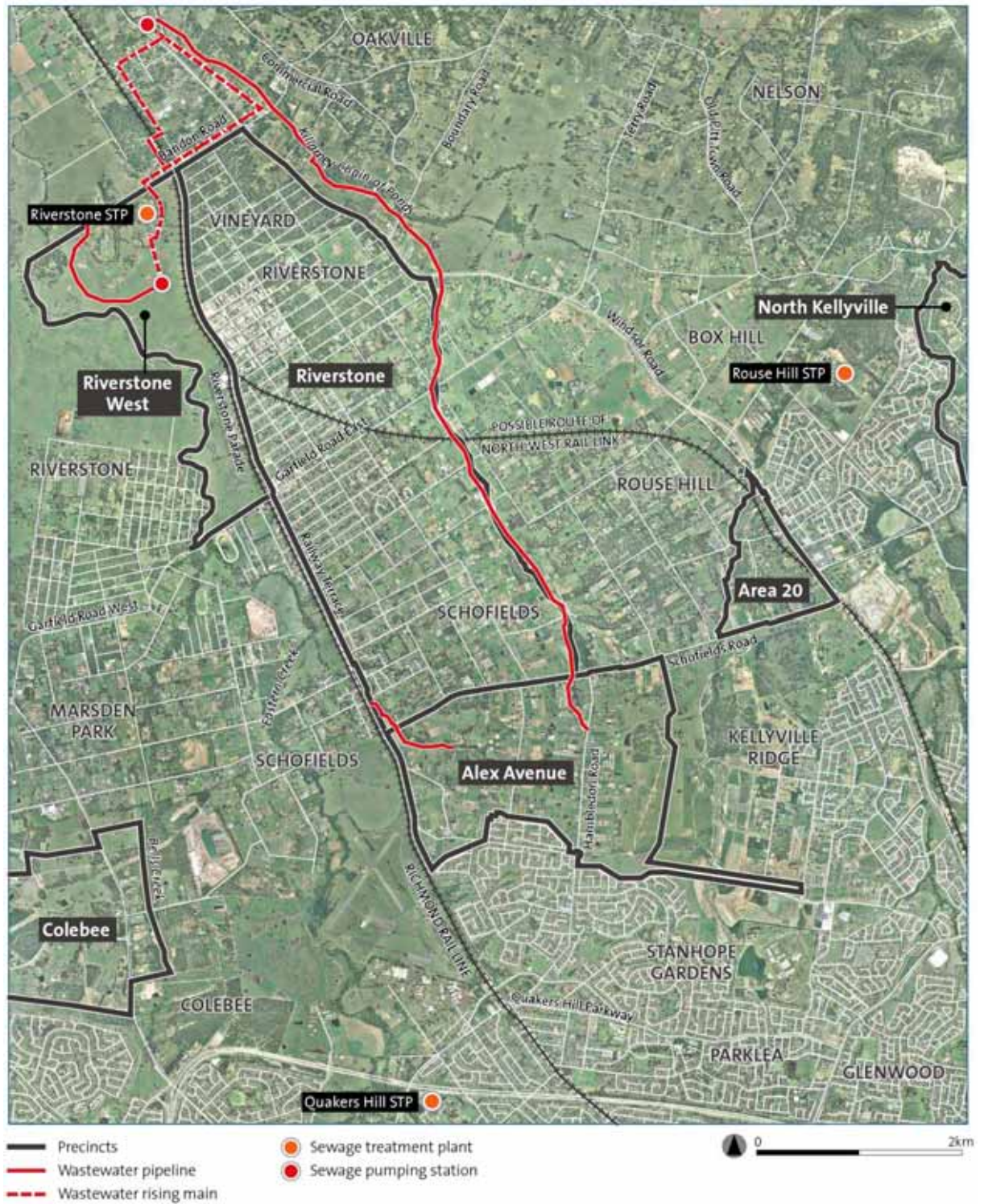
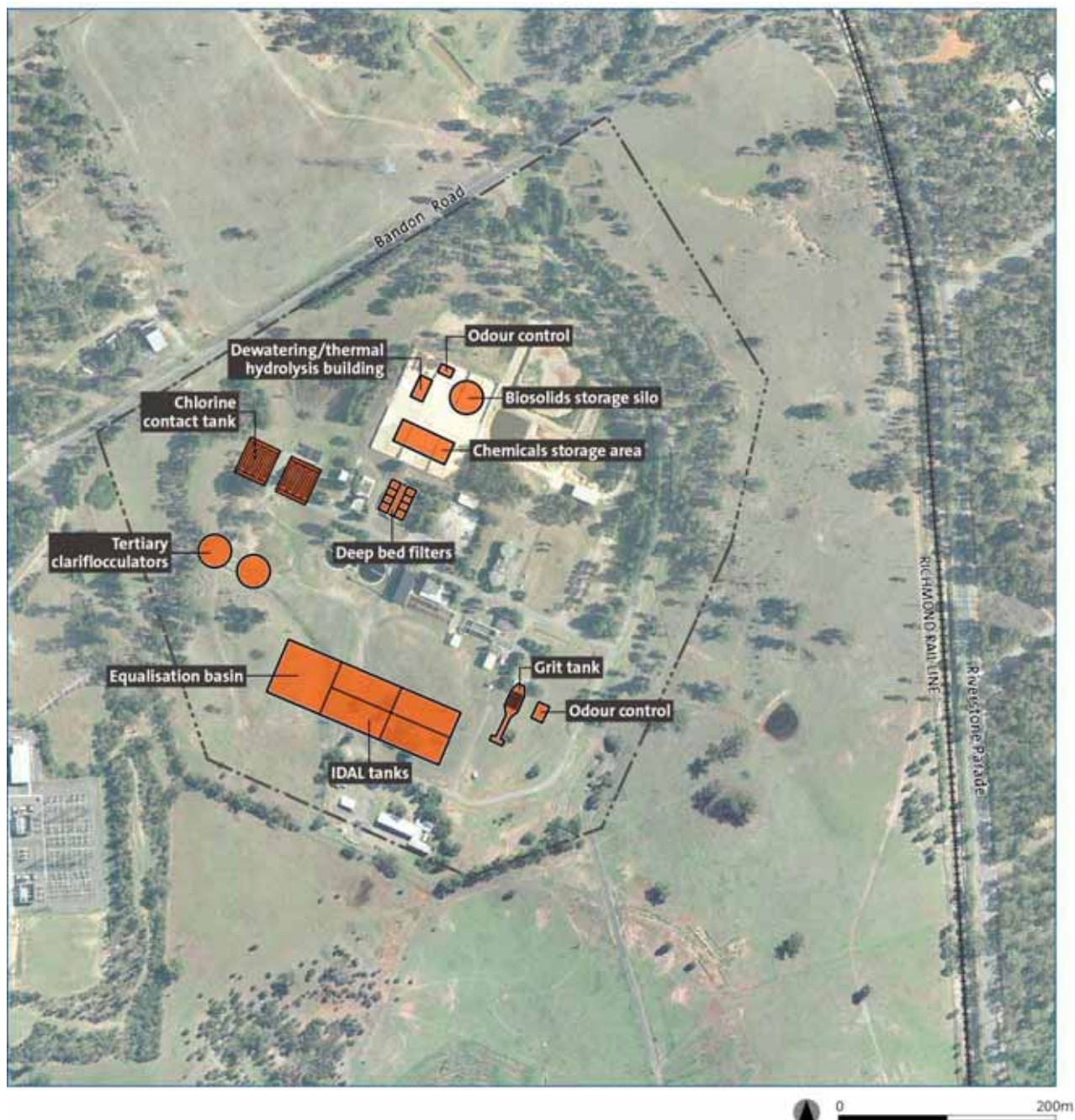


Figure 4-15 Riverstone STP



5 Statement of Commitments

This chapter provides details of the revised Statement of Commitments for the Project. Amendments to the draft Statement of Commitments are shown in bold text. The revised changes to the Statement of Commitments have been made in response to submissions in Chapter 3, a technical review of the Project and proposed changes to the Project presented in Chapter 4.

5.1 Revised Statement of Commitments

The Statement of Commitments for the Project has been revised in response to submissions and a technical review of the Project. **Table 5-1** and **Table 5-2** list the revised (final) Statement of Commitments for the Project.

Table 5-1 Statement of commitments - Key Issues

Water Quality, Hydrology and Aquatic Ecology		Project Phase
1	A monitoring program to assess the impacts of the Project on river health (eg. water quality, flow, fish migration, macrophytes, macroinvertebrate communities and ecotoxicity testing) would be undertaken in conjunction with NSW State Government agencies. This would complement the Integrated Water Monitoring Framework for the Hawkesbury-Nepean River. Details of the monitoring program would be determined in consultation with relevant government authorities/stakeholders (including the DECC, DWE & DPI).	Pre-Construction, Construction and Operation
2	Groundwater encountered during construction would be pumped out of the work area and would be treated prior to discharge. If necessary a number of boreholes with pumping apparatus would be established around the construction area to inhibit groundwater flow.	Construction
3	Erosion and sedimentation control would be managed using measures developed in accordance with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom 2004). An Erosions and Sediment Control Sub-plan would be prepared prior to construction.	Construction
4	All creek crossings by pipelines would be underbored except where underboring would cause more impacts than trenching. Appropriate sedimentation and erosion controls would be developed and implemented for underboring sites.	Construction
5	The storage of large quantities of fuels on or around the site would generally be avoided and vehicles and equipment would be refuelled off site. Where on-site refuelling is unavoidable, mini-tankers would be used. Mini-tankers	Construction

	would be required to follow standard procedures and have a spill kit to minimise the risk and impact of spills.	
6	Any fuels and chemicals required to be stored on site would be stored in accordance with relevant standards in bunded or contained areas and a spill kit would be provided at all locations where fuels are used.	Construction and Operation
7	For the Rouse Hill and Riverstone wastewater systems, the design and operational criteria for wet weather overflows would meet the requirements of the current respective Environmental Protection Licences, namely 12 and 14 overflow events every 10 years, respectively.	Design and Operation
8	The wastewater system would be designed and operated with the objective of having no dry weather overflows.	Design and Operation
9	The upgraded and amplified Riverstone STP would meet the existing conditions for bypasses during large wet weather events as detailed in the Environmental Protection Licence for the Riverstone system.	Design and Operation
10	Outlets for discharge of water would be constructed so as to minimise potential destabilisation and scouring. This would involve the construction of appropriate headwalls, dissipaters and bank stabilisation techniques.	Design and Operation
11	During the detailed design phase further consultation would be undertaken with relevant Councils and other agencies for input to the design aspects such as the integration of Water Sensitive Urban Design (WSUD) principles and the future amenity of the area.	Design
12	Discharge of water from the Cudgegong Road Reservoir Site reservoirs would comply with Sydney Water's discharge protocol standard operating procedure (SOP) (Sydney Water 2006). The purpose of this protocol is to provide guidelines for Sydney Water, which: ▶ meet Sydney Water's obligation to provide water which satisfies public health requirements ▶ permit essential activities to take place, in a cost effective manner ▶ demonstrate leadership in water conservation by minimising the wastage of water, and supporting the principles of Ecologically Sustainable Development (ESD) ▶ minimise the impact on the environment and receiving waters ▶ satisfy the requirements of the regulator for the environment, DECC.	Operation

Terrestrial Flora and Fauna		Project Phase
13	To be consistent with the relevant Priority Actions all works would adhere to best-practice management to minimise impacts.	Design and Construction
14	The following mitigation measures would be implemented as part of the Project to ensure that the impacts on flora and fauna are minimised: • The pipeline route would avoid the majority of hollow-bearing trees. • The extent of the direct pipeline construction impact would be limited to a maximum width of 10 m. • At creek crossings, where pipelines would be underbored, bore shaft launch and exit pads would be located on adjacent cleared land. • A range of standard mitigation measures such as weed control, exclusion fencing, minimisation of soil disturbance and site staff education would be implemented.	Design and Construction
15	To minimise the impacts on the threatened species <i>Epacris purpurascens</i> var. <i>purpurascens</i> or <i>Grevillea juniperina</i> ssp. <i>Juniperina</i> the following mitigation measures would be implemented: • No works would be undertaken within 5 m of the threatened flora species. • Exclusion fencing would be erected around threatened flora species and maintained in place until such time as construction works are completed. • Manual digging would be undertaken in the vicinity of the threatened species.	Construction
16	The extensive weed infestations recorded in the Project area would be managed and controlled to avoid the spread of weeds during construction to improve the region's biodiversity.	Construction
17	General mitigation measures would be implemented to minimise the impact on all native vegetation and vegetation communities, such as temporary fencing to mark designated work areas, locating construction facilities in already cleared lands and restoring all impacted areas to pre-works condition where possible.	Construction
18	The pipeline routes and disturbed ground would be revegetated with local native species following completion of construction.	Construction
19	Standard mitigation measures would be implemented to minimise the impacts on fauna species including retaining hollow bearing trees, clearly marking trees near the construction site that are to be retained, minimising open	Design, Pre-Construction and

	trenches and checking all trees for sheltering animals prior to removal.	Construction
20	A protocol/procedure would be developed for the clearing of trees to minimise the impact on sheltering animals. The protocol/procedure would include details such as time of removal (seasonal and day), checking trees for sheltering animals, the presence of an appropriate specialist on-site during the removal of any trees and animal rescue practices.	Pre-Construction and Construction
21	To mitigate the impacts on the threatened fauna at the Cudgegong Reservoir site, a strategy would be developed including: - timing of construction to ensure clearing is not undertaken in breeding, roosting and torpor times for the microchiropteran bats; - translocation of individual Cumberland Plain Land Snails.	Construction
22	Offsets for the loss of any non-certified lower long term management viability (LMV) vegetation in the North West Growth Centre and Ecologically Endangered Communities outside the North West Growth Centre would be developed with consultation between Sydney Water, the Growth Centres Commission and DECC, and where appropriate local councils, and private landholders.	Design and Pre-Construction
23	Sydney Water would provide an offset for the loss of 2.58 hectares of existing vegetation in the non-certified areas of the Project.	Design and Pre-Construction
24	The protection applied to the offset would meet the definition of protection in the Biodiversity Certification Order.	Design, Construction and Operation
25	When required, future repairs to pipelines would be subject to further environmental assessment by Sydney Water and would be carried out in accordance with an approved Construction Environmental Management Plan.	Operation
26	All recommendations in the flora and fauna assessments undertaken for the EA that are applicable to the Project would be applied.	Design, Pre-Construction and Construction
27	Prior to commencement of construction at the Cudgegong Road Reservoir Site a detailed Flora and Fauna Management Strategy would be prepared. This strategy would incorporate the mitigation measures specified in the Species Impact Statement prepared for the site.	Pre-Construction
28	A Flora and Fauna Management Sub-plan would be prepared as part of the Construction Management Plan prior to commencement of construction. This Sub-plan would	Pre-Construction

	outline details such as a replanting strategy and threatened species management measures. Approval would be sought from the DECC for these management plans. The replanting strategy would outline the indigenous plants that could be used and aim to achieve the reestablishment of the natural structure of the original vegetation.	
Indigenous Heritage		Project Phase
29	Prior to the commencement of construction works, collection of artefacts, in conjunction with Aboriginal stakeholders, would be undertaken where items of low Aboriginal heritage significance would be impacted upon. For sites or PADs of moderate to high heritage significance excavations would be undertaken. In undertaking the test excavations a "landscape" or 'regional' approach would be implemented.	Pre-Construction
30	All test excavations would involve the identification, assessment, recording and salvage of any archaeological remains that are found. Further consultation with Aboriginal stakeholders would be undertaken as appropriate.	Pre-Construction
31	Mitigation measures would be implemented to ensure that impacts on known sites/PADs are avoided. Specifically these measures would include: - marking sites/PADs as 'work exclusion zones' on concept and working drawings - enclosing sites/PADs with temporary protective barriers during the entirety of the construction period to direct construction work away from these areas and prevent inadvertent damage by construction activities including work vehicles and construction staff - Sydney Water personnel and contractors involved in construction would be made aware of the locations of all relevant sites/PADs.	Pre-Construction
32	In areas of significance disturbance would be minimised as much as possible by the use of appropriate boring techniques, in combination with traditional trenching techniques, for the installation of pipelines. Consideration would be given to pipeline realignment where practical. The use of boring techniques would involve the construction of launch pads and shafts, from which the boring equipment operates to install the pipeline, but would not involve construction of long lengths of trench. The most suitable strategy would be chosen following design finalisation, further investigations and appropriate consultation with Aboriginal stakeholders.	Design and Construction
33	In the event that previously undiscovered Aboriginal objects (or potential Aboriginal objects) are discovered during construction, all works in the vicinity of the find would cease and the Sydney Water Project Environmental Representative	Construction

	(PER) would be informed to determine the subsequent course of action. The PER would, if required, notify the DECC to obtain advice on how to proceed. The NSW Police and NSW Coroners Office would also be contacted should skeletal remains be identified. Works would not recommence until any DECC or other requirements have been met.	
34	The pipelines would require maintenance during the operation of the Project. Should potential impacts on Aboriginal heritage arise, standard operating procedures would be implemented to ensure the maintenance activities would have no impact.	Operation
35	All recommendations in the Aboriginal heritage assessments, including those provided by representatives of the Aboriginal community, that are applicable to the Project would be applied.	Design, Pre-Construction, Construction and Operation
Non-Indigenous Heritage		Project Phase
36	Construction activities would be managed to avoid structural damage to heritage items as a result of vibration, including implementation of the following measures: - Where possible, safe working distances between heritage structures and vibratory plant/activities would be maintained in accordance with German Standard DIN 4150 Part 3 1986. - Where vibratory plant or activities are to be undertaken within 50 m of a heritage item, an assessment of potential vibration impacts would be undertaken prior to construction to determine the vibration levels likely to be experienced at the heritage structures during construction. - Where the potential vibration levels experienced at the heritage structures are likely to exceed 3 mm per second, smaller sized or non-vibratory machinery would be selected so that vibration levels do not exceed 3 mm per second. - Where significant vibration potentially would impact a heritage item, vibration monitoring would be carried out during construction to identify if safe vibration limits (3 mm per second) are being maintained. - All construction personnel would be inducted on the potential to find previously unrecorded non-Indigenous heritage items during the construction works. - If an item (or suspected item) of non-Indigenous heritage is discovered during works, all work in the vicinity of the find would cease and the Project Environmental Representative (PER) would be notified to determine the appropriate course of action.	Construction

37	To minimise impact on the section of Old Windsor Road at Kellyville, which is listed on the Register of the National Estate, the drinking water pipeline would be underbored where it crosses Old Windsor Road at Bella Vista.	Design and Construction
38	The pipelines would require maintenance during the operation of the Project. Standard operating procedures would be implemented to ensure the maintenance activities would have no impact on the items of non-Indigenous heritage.	Operation
Soils and Groundwater - Operations		Project Phase
39	Any areas identified as affected by soil salinity would be appropriately managed during construction, and potential impacts mitigated.	Construction
40	Recycled water total dissolved solids (TDS) levels would be monitored and managed at a level to minimise the risk of significant salinity impacts from irrigation.	Operation
41	A groundwater monitoring program for the Project would be developed in conjunction with other relevant stakeholders such as the DWE, and implemented by Sydney Water.	Operation
42	Recycled water users would be informed of the specific environmental and human health risks associated with irrigating with recycled water.	Operation
43	Sydney Water would ensure that: - infrastructure, especially the pipelines, would not impact on natural surface and sub-soil drainage, and where appropriate would improve drainage - the existing and potential salinity of soils and groundwater would be considered to ensure the appropriate materials and other features are incorporated to mitigate against the corrosive impacts of high salinity.	Design
44	Further detailed geotechnical investigations would be carried out during the detailed design stage. Areas where electro-magnetic survey results indicated high salinity (greater than 100 dS/m) would be investigated further, prior to land development, to confirm salinity levels and associated risks.	Design
45	Soil samples would be collected and analysed to confirm the findings of the Phase 1 contamination assessment as part of the detailed geotechnical investigations prior to construction.	Design
46	During detailed design, Sydney Water would ensure that the existing and potential salinity of soils and groundwater would be considered to ensure that appropriate materials and other features are used to mitigate against the corrosive impacts	Design

	of high salinity.	
Human Health		Project Phase
47	Recycled water would be provided to meet the standard of urban non-potable reuse as defined by the <i>Natural Resource Management Ministerial Council, Environmental Protection and Heritage Council, Australian Health Ministers Conference - National Guidelines for Water Recycling: Managing Health and Environmental Risks (2006)</i> .	Operation
48	Prior to operation of the Project a Recycled Water Quality Management Plan (RWQMP) would be prepared based upon the risk management framework approach outlined by the <i>National Guidelines for Water Recycling – Managing Health and Environmental Risks (2006)</i> and using actual tertiary treated wastewater data from the STPs. Sydney Water, in consultation with the Department of Health, has initiated the development of a RWQMP for several recycled water services, including the Rouse Hill RWP. The Quakers Hill RWP would also be addressed as it becomes operational. Detailed information on each of the recycled water systems would be included; in particular, how risks to human health would be reduced and the results of validation.	Operation
49	Sydney Water would apply the following risk management practices to limit exposures to recycled water: ▶ installation regulations and codes of practice that include systematic processes to reduce the probability of cross-connections ▶ materials codes and regulations that easily discriminate drinking and recycled water plumbing ▶ regulations that limit the legal installation and modification of plumbing systems to licensed individuals ▶ education on recycled water use and the need to avoid creating cross-connections ▶ opportunities to apply pressure differentials in certain situations to ensure that if cross-connections occur, they are from higher to lower quality water ▶ installation of backflow prevention systems to reduce the extent of hydraulic influence from any cross-connections that do occur ▶ operational checking and connection auditing.	Design and Operation
Traffic, Transport and Access		Project Phase
50	Disturbances to traffic and access would be minimised whenever and wherever practical.	Construction

51	Impacts on traffic, transport and access as a result of construction of the Project would be managed with standard mitigation and management controls. These controls would be prepared in consultation with relevant stakeholders, including Councils, RTA and RailCorp. Impact mitigation and management measures would be implemented to address road closures, access to properties, closure (permanent or temporary) and diversions of pedestrian pathways, provisions for temporary access and re-instatement.	Pre-Construction and Construction
52	Further assessment would be undertaken before construction commences at the Riverstone STP so that appropriate traffic management controls can be developed and incorporated into the Construction Environmental Management Plan.	Pre-Construction
53	Road closures would be developed and implemented in consultation with the relevant roads authorities (Council and/or RTA).	Pre-Construction and Construction
54	Where pipelines cross roads, they would be constructed by one of the following approaches: - open trenching and temporary partial road closures during normal construction hours (generally for roads with low traffic volumes) - open trenching and temporary partial road closures outside normal construction hours (generally for roads with moderate traffic volumes) - underboring techniques, such as thrust boring or microtunnelling (generally for roads with high traffic volumes), which would avoid the need for road closures. Underboring techniques would be used where pipelines cross major intersections to avoid traffic diversions and delays in these areas. Appropriate construction methodologies for road crossings would be developed and implemented in consultation with the relevant Council and/or RTA.	Design, Pre-Construction and Construction
55	Councils, property owners and local community members would be informed of any potential loss of access and appropriate measures to either provide alternative pedestrian access ways or reinstate access at the end of each work day would be negotiated. Any access ways affected by construction would be reinstated to their original condition. Measures to manage closures and diversions of pedestrian pathways would be carried out in consultation	Construction

	with the relevant local Council(s).	
56	Appropriate temporary access requirements would be negotiated with property owners for the construction period. Any areas affected by the temporary construction access requirements would be reinstated to their original condition.	Construction
57	Proposed future road widening of Schofields Road would be taken into account during the detailed design of the revised drinking water pipeline route. The pipeline route would be located appropriately so as not to interfere with future road widening works.	Design
58	RailCorp has a staged consultation and approval framework for such works and Sydney Water would meet RailCorp's requirements. Actions that would be undertaken by Sydney Water would include providing RailCorp with engineering and construction information on the rail line undercrossings (including concept and detailed designs) for their review and approval. This consultation and design finalisation process would take into consideration any future upgrades or expansion of the rail network, including the future Richmond rail line duplication works between Quakers Hill and Vineyard.	Design
59	Ongoing consultation with the Transport and Infrastructure Development Corporation (TIDC) would be undertaken regarding the construction and location of Project components relative to the proposed North West Rail Link, including where TIDC is proposing to cross Windsor and Rouse Road, to determine the preferred location and design of pipelines in consideration of the costs of any future relocation requirements.	Construction
60	Where maintenance or emergency activities require a road closure or the temporary loss of access to a property, Sydney Water's standard operational procedures in managing these activities would be implemented.	Operation
Waste Generation and Management		Project Phase
61	Detailed measures to manage, reduce, reuse, recycle and for disposal of construction waste would be developed and applied to the Project.	Construction
62	Wherever possible, suitable excavated spoil would be reused on site for backfilling, landscaping and other uses. If suitable spoil was unable to be reused on-site, opportunities for off-site reuse would be investigated. If reuse opportunities were unable to be identified or the spoil was unsuitable for reuse due to its geotechnical or contamination characteristics, spoil would be classified according to <i>Environmental Guidelines: Assessment, Classification and</i>	Construction

	<i>Management of Liquid and Non-liquid Wastes</i> (DEC 1999) and disposed of at an appropriately licensed facility.	
63	Assessments of the North Kellyville, First Ponds Creek and Level Crossing Wastewater Carriers for soil contamination would be conducted later, during the detailed design for these components of the Project.	Design and Pre-Construction
64	Appropriate studies and assessments would be undertaken to further identify and manage potentially contaminated soils during construction. Sampling of soils at depths relative to the construction zone would be undertaken during geotechnical testing prior to construction. Soils would be analysed for a broad range of potential contaminants to confirm the findings of the desk-top study, provide an indication of potential waste classification against DECC's <i>Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes</i> (DEC 1999) for off-site disposal purposes and determine any other mitigation measures that would be required. Consideration would be given to where soil characteristics might exacerbate soil contamination impacts.	Pre-Construction
65	All wastes generated by the construction and operation of the Project would be classified and disposed in accordance with the <i>Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes</i> (DEC 1999).	Construction and Operation
66	Organic wastes produced through vegetation clearing would be minimised where possible and opportunities for mulching and composting would be investigated.	Construction
67	Cutting heads and drilling equipment used for boring beneath sensitive environmental areas, creeks or roads could be lubricated using bentonite slurry. The slurry would be reused in the drilling process, although small quantities of this liquid waste may be produced and would require disposal. Liquid and non-liquid waste would be classified and managed in accordance with DECC's <i>Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes</i> (DEC 1999). Wastewater from the dewatering of excavated areas would be discharged and disposed of in accordance with the POEO Act.	Construction
68	Detailed measures to manage, reduce, reuse, recycle and dispose of construction waste would be contained in the Construction Environmental Management Plan.	Pre-Construction and Construction
69	Biosolids generated by Riverstone STP would continue to meet the Grade B stabilisation criteria (Sydney Water 2004) and would be 100 per cent beneficially reused as part of the	Operation

	Bio-Soil Program operated by Sydney Water.	
70	There would be an increase in other general wastes generated by Riverstone STP (eg. waste from workers amenities, general maintenance waste, grit and screenings), however, the quantities would be relatively small and would be managed according to Sydney Water's standard operating procedures and policies.	Operation
Air Quality		Project Phase
71	The potential impacts from construction activities on dust generation would be managed through typical dust suppression measures contained in the Construction Environmental Management Plan.	Construction
72	Any complaints relating to odour from vent stacks or SPSs would be dealt with promptly and the problem rectified.	Operation
73	Odour management would continue to be undertaken in accordance with Sydney Water's existing procedures. Odour complaints would be registered and investigated. Engineering, operational or other odour reduction measures would be implemented where verified odour complaints are received about odours from the sewerage system.	Operation
74	Vegetation would be planted along the eastern boundary of the Riverstone STP, within land owned by Sydney Water. This vegetation would provide a buffer between the STP and other land.	Operation
Noise and Vibration		Project Phase
75	Mitigation measures would be developed prior to construction to specify how noise and vibration impacts on the community would be minimised. This would be achieved through the implementation of noise control measures, such as those outlined in Australian Standard 2436-1981 " <i>Guide to Noise Control on Construction, Maintenance and Demolition Sites</i> ". Typical mitigation measures would include: use of acoustic barriers, location of plant, specified working hours, monitoring and modification of construction techniques.	Construction
76	Where vibration from construction activities may impact on residents, the activities would be managed in accordance with the British Standard BS 6472 (1984 to 1992), the International Standard ISO 2631:2-1989 and the Australian Standard AS 2670.2-1990.	Construction
77	Where vibration from construction activities may impact on nearby structures, the activities would be managed in accordance with British Standard 7385:Part 1-1993	Construction

	<i>Evaluation and Measurement for Vibration on Buildings.</i>	
78	For historic buildings, which have a higher sensitivity to vibration, the guidelines within the German Standard DIN 4150:Part 3-1986 would be adhered to.	Construction
79	Additional noise attenuation would be provided on noise generating infrastructure at the Cudgegong Road Reservoir Site to reduce noise levels at residential receivers to acceptable levels.	Design
80	During the final selection of mechanical plant and equipment, appropriate noise control treatments would be chosen, including: ▶ installation of commercially available silencers ▶ installation of acoustic screens and barriers between plant and sensitive neighbouring premises ▶ installation of partially enclosed or fully enclosed acoustic enclosures around mechanical plant and pumping stations.	Design
81	The Construction Noise Management Plan, as provided in Appendix G to the EA, would be further developed for the Project prior to construction and would include detail provided in the DECC's submission. The plan would be included as a Sub-plan to the Construction Environmental Management Plan.	Pre-Construction
82	Periodic maintenance and inspections would typically not result in significant noise generation and would be managed through Sydney Water's standard management procedures.	Operation
Hazards and Risks		Project Phase
83	Any fuel or chemicals used during construction would be stored to meet relevant standards in bunded or contained areas.	Construction
84	The storage of fuels on or around the site would generally be avoided and vehicles and equipment would be refuelled off site. Where on site refuelling is unavoidable, mini-tankers would be used. Mini-tankers would be required to follow standard procedures to minimise the risk of explosion or fire.	Construction
85	All class 8 storage areas would be maintained within bunded facilities that conform with relevant standards and codes, primarily <i>AS1940: The Storage and Handling of Combustible and Flammable Liquids and dangerous Goods Storage Codes</i> . Separate bunded areas would be constructed for each type of chemical and would drain to a sump, not to stormwater drains.	Design and Operation

86	All chemical unloading areas would be capable of collecting and containing spills. All drains in the unloading area would be directed to a sump and not to stormwater.	Design and Operation
87	The following studies would be completed during final design and prior to operation to assess the effectiveness of design features and safeguards in relation to the Preliminary Hazard Analysis assumptions and recommendations: ▶ Fire Safety Study ▶ Hazard and Operability Study ▶ Emergency Response Planning ▶ Final Hazard Analysis ▶ Safety Management System assessment ▶ Hazard Audit.	Design and Pre-Construction
88	There is potential for contaminated firewater to flow off site at the STPs, resulting in environmental damage. To minimise the risk of this occurrence, the site first flush retention system would have capacity to contain a minimum of 10 times the capacity of the largest tank. This would ensure the firewater is retained on site in accordance with the applicable Australian Standards.	Design
89	Other recommendations of the PHA that would be implemented include: ▶ spill kits would be installed adjacent to the acid alkali storage and use areas to provide rapid response in the event of a spill during storage and handling ▶ an emergency response plan would be developed for the sites, which should be developed in accordance with the requirements of "HIPAP No.1, Emergency Planning Guidelines" ▶ the emergency response plan would include procedures for response to spills and a schedule for emergency response drills and training ▶ review of OH&S regulations would be undertaken to ensure sites are compliant with section 6A of the regulation.	Operation

Table 5-2 Statement of Commitments - Other Issues

Energy and Greenhouse Gas Emissions		Project Phase
90	All vehicles, machinery and water-related infrastructure would be adequately maintained and operated to ensure efficient operation to minimise energy use and greenhouse gas emissions.	Construction and operation
Visual Amenity		Project Phase
91	Areas disturbed by pipeline construction would be progressively rehabilitated, further reducing any visual impacts. Machinery would be used and stored so as to minimise disturbances to residents.	Construction
92	Hoardings or temporary screening would be erected to decrease visual impact of construction compounds. Good housekeeping practices would be employed on site to minimise visual impacts.	Construction
93	Screening or vegetation along the fence line would be used to obscure construction works at the STPs and reservoir site and further reduce the visual impact of construction.	Construction
94	At the STP, pumping stations and Cudgegong Road Reservoir Site existing vegetation would be maintained where possible and where appropriate additional plantings would be undertaken along site boundaries to obscure views of infrastructure from sensitive receivers. Site facilities (including fencing) would be designed to minimise visual impact.	Operation
95	Visual impact of the reservoirs would be minimised through painting the structures dark “bush green” which has been chosen as the colour most compatible with the surrounding environment.	Operation
96	Overshadowing from elevated reservoirs on surrounding properties would be addressed during the design phase when the location and structural features of the reservoirs would be considered to minimise this impact.	Design
97	A vegetation management plan and landscape plan would be prepared for each of the STP, pumping station and reservoir sites which would provide for the following: ▶ protection of existing vegetation during construction, including temporary fencing, minimising vehicle movements and preventing stockpiling under tree canopies ▶ erosion control plans, where required ▶ reuse of topsoil	Design, Construction and Operation

	recommendations for additional screen planting, including use of native and where possible endemic plant species.	
Social Impacts		Project Phase
98	During construction, communities would be informed prior to the start of any works in their area and would be notified at regular intervals throughout the construction process.	Construction
99	Sydney Water would ensure that: - the community and stakeholders, including Blacktown City Council, have a high level of awareness of all processes and activities associated with the Project - timely and accurate information is provided and easily accessible - there is a high level of responsiveness to issues and concerns raised by the community.	Construction
100	Communication processes outlined in the EA would be developed and implemented throughout the delivery of the Project. These would include: - opportunities for the community to provide input on mitigation measures for construction or operations - methods to inform the community of the progress and performance of the Project and issues of interest to the community - notification of construction activities to potentially affected local residents, councils and businesses - processes to receive and manage complaints in accordance with the Sydney Water customer contract - consultation with affected property owners - provision of information regarding the specific environmental and human health risks associated with irrigating with recycled water - induction and training of construction personnel in communication requirements - protocols to notify stakeholders of relevant activities and any incidents should they occur.	Design, Pre-Construction, Construction and Operation

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