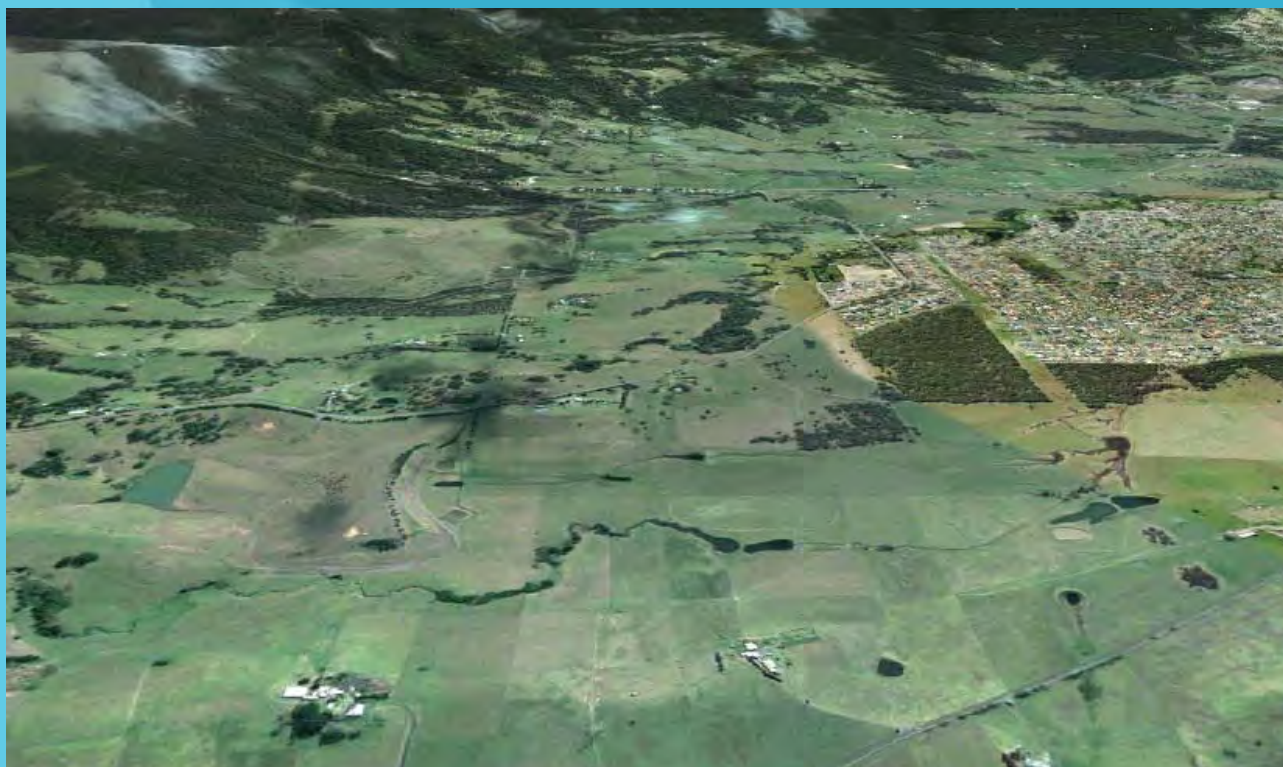


Early Release Lead-in Works for West Horsley

Environmental Assessment



February 2011

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Environmental Assessment prepared by

This Environmental Assessment was prepared by:

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In respect of: Early Release Lead-in Works for West Horsley

Certification

I certify that I have prepared the contents of this Environmental Assessment and to the best of my knowledge the information contained in the Assessment is neither false nor misleading.

Signature:



.....

Name: Jill Berwick

Date: 22.02.11

Executive summary

The Project

The Project examined in this Environmental Assessment (EA) comprises the provision of early lead-in infrastructure in the West Horsley area. Sydney Water is the proponent for the Project which includes:

- construction, operation and maintenance of approximately 1.5 km of 300 mm diameter water pipeline
- construction, operation and maintenance of approximately 2 km of 300 mm diameter wastewater pipeline
- connection to and upgrade of the storage facilities at the existing wastewater pumping station (SPS 1012) at Fairwater Drive, Horsley
- connection to the existing water supply network (from the Illawarra Water Filtration Plant)
- transfer of wastewater flows from the new development to Wollongong Water Recycling Plant (WRP) for treatment and either reuse or ocean discharge
- other assets such as vent shafts and air release valves.

West Horsley is located approximately 15 km southwest of Wollongong, within the Illawarra Region.

Need for the Project

The key driver for the Project is the need to supply water and wastewater services to allow future residential development at West Horsley. West Horsley is one of the first release precincts within the West Dapto Urban Release Area (WDURA) and Adjacent Growth Areas. A development application has been submitted for a subdivision in the West Horsley precinct, with construction likely to commence in 2011/2012. This Project will provide the water and wastewater services for the residential subdivision, and surrounding development.

The Project is needed to allow development within the West Horsley area. If the Project does not proceed, development of the West Horsley area would either be delayed or would not occur because of inadequate water and wastewater servicing.

Environmental Assessment Process

This EA has been prepared under Part 3A of the *Environmental Planning and Assessment Act 1979* to obtain project approval to supply early release lead-in infrastructure to West Horsley. The EA has been prepared in accordance with the Director-General's requirements issued to Sydney Water on 7 December 2010.

Key environmental findings

The construction of the Project may result in minor temporary impacts on the environment and community during construction (such as noise, dust and access disruptions). These impacts can be minimised through industry standard measures and effective communication practices.

Clearing of some vegetation and one hollow bearing tree would be required, however the pipeline routes have been selected and refined to minimise impacts, and avoid all areas of medium and high ecological sensitivity, and an Aboriginal site. Furthermore, areas will be progressively rehabilitated as construction progresses. No impacts to items of Aboriginal heritage or non-Indigenous heritage are anticipated.

Operational environmental impacts will be minor for this Project. Sydney Water has planned to minimise the occurrence of overflows during operation. The system has been designed for no dry weather overflows, and no planned wet weather overflows. The use of leak-tight pipes will minimise the amount of stormwater inflow in wet weather events, and will prohibit tree root infiltration. Ultimately, the wastewater from the system will be treated and either recycled or discharged at Wollongong Water Recycling Plant in accordance with the Environment Protection

Licence #218. There will be some increases in the amount of energy used, discharge of treated wastewater to the marine environment, and generation of biosolids for beneficial reuse.

Stakeholder engagement and consultation

Consultation with local government and relevant Government agencies was undertaken during the preparation of the EA. Sydney Water has developed a Stakeholder Consultation and Communications Strategy to keep key stakeholders involved and informed throughout the Project. The EA will be publicly exhibited for 30 days and available for viewing at the Department of Planning's (DoP) head office in Sydney, the regional DoP office in Wollongong, Wollongong Council, Wollongong and Dapto Libraries, the Nature Conservation Council offices in Sydney and the DoP website. Written submissions are invited from the public, including relevant agencies and local Councils.

Conclusion

In the context of potential impacts arising from the planned urban development in the area, the Project would have a minor impact upon the environment. The Project would result in only localised and minor disturbances to the existing environment, the impact of which would be mitigated through a range of identified environmental management measures. The Project would be carried out in accordance with the Draft Statement of Commitments, which provide strategic environmental performance outcomes.

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Abbreviations

ANZECC	Australian and New Zealand Conservation Council
AS	Australian Standards
DEC	Department of Environment and Conservation (now DECCW)
DECCW	Department of Environment, Climate Change and Water
DGRs	Director-General's Requirements
DoP	Department of Planning
EA	Environmental Assessment
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPI	Environmental Planning Instrument
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
FM Act	<i>Fisheries Management Act 1994</i>
Ha	Hectare
IWWS	Illawarra Wastewater Strategy
Km	Kilometre
KWh	Kilowatts per hour
L	Litres
LEP	Local Environment Plan
LGA	Local Government Area
m	Metre
ML/d	Mega Litre per day
mm	Millimetre
MW	Megawatts
NP&W Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
POEO	<i>Protection of the Environment Operations Act 1997</i>
RTA	Roads and Traffic Authority
SEPP	State Environmental Planning Policy
SPS	Wastewater Pumping Station
SWC	Sydney Water Corporation
TSC Act	<i>Threatened Species Conservation Act 1995</i>
WCC	Wollongong City Council
WDURA	West Dapto Urban Release Area
WFP	Water Filtration Plant
WRP	Water Recycling Plant
WSAA	Water Services Association of Australia

1 Introduction

1.1 Project overview

Sydney Water is seeking Project Approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the construction, operation and maintenance of early lead-in infrastructure in the West Horsley area. The “Early Release Lead-in works” (the Project) comprise a water and wastewater pipeline to connect to existing infrastructure in the suburb of Horsley. The Project is required to provide water and wastewater services for a new residential development.

1.1.1 Background

West Horsley is located within the West Dapto Urban Release Area (WDURA) in the Wollongong Local Government Area. The WDURA has been identified by Wollongong City Council, Shellharbour Council and the NSW Government as a priority greenfield area for significant urban development within the Illawarra region.

In 2006 there were 281,000 people living in the Illawarra Region and the population is expected to increase by 47,000 over the next 25 years (Department of Planning, 2007). WDURA will provide about 16,000 homes to meet 50% of future greenfield residential demand in the Illawarra region.

The WDURA is made up of seven development precincts, three of which have recently been rezoned for development; Kembla Grange, Sheaffes / Wongawilli, and West Horsley. These three first development precincts will cater for 6,900 residential dwellings and approximately 175 hectares of employment land. The remainder of the WDURA development precincts will be rezoned at a later stage based on future demand. Sydney Water has worked with major stakeholders to develop a preferred servicing strategy to provide water-related services (including drinking water and wastewater) to the WDURA. Sydney Water is preparing a separate Environmental Assessment for Concept and Project Approval for the servicing of the overall WDURA and Adjacent Growth Areas proposal.

1.1.2 Outline of the Project

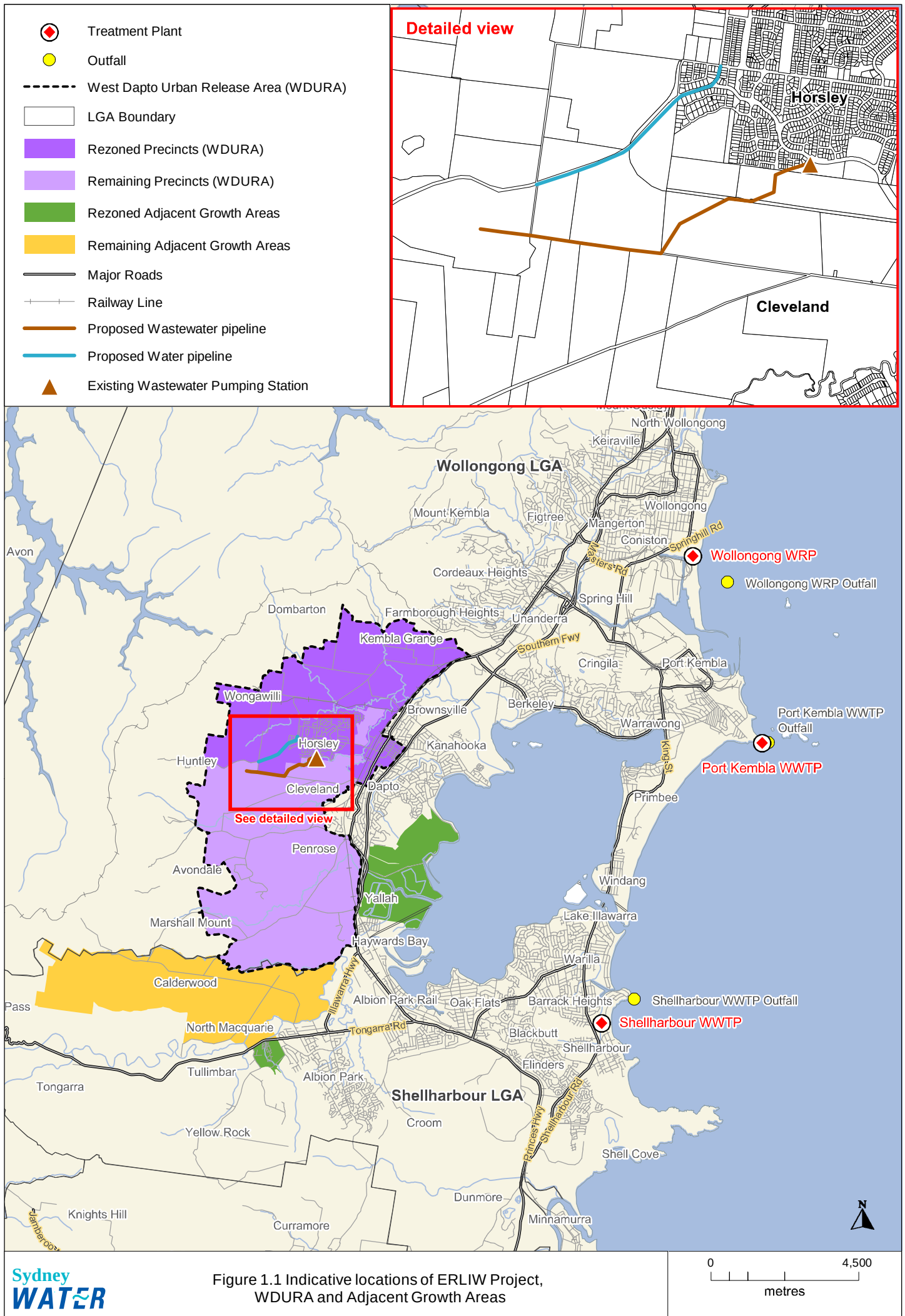
The Early Release Lead-in works for West Horsley will provide a minor extension of the existing system. Sydney Water's proposal has been designed to provide water and wastewater services, initially to the new suburb at West Horsley, but with the capacity to supply surrounding development. The proposal includes:

- construction, operation and maintenance of approximately 1.5 km of water pipeline
- construction, operation and maintenance of approximately 2 km of wastewater pipeline
- connection to and upgrade of the storage facilities at the existing wastewater pumping station (SPS 1012) at Fairwater Drive, Horsley
- connection to the existing water supply network (from the Illawarra Water Filtration Plant) at Shone Avenue and Bong Bong Road, Horsley
- other assets such as vent shafts and air release valves.

Figure 1.1 shows the location of the Project, as well as the WDURA and Adjacent Growth Areas. Full details of the Project are provided in Chapter 3. The Project is limited to lead-in trunk mains (water and wastewater infrastructure) and does not include stormwater systems or reticulation networks (smaller scale pipes). The reticulation networks required to connect properties to this system are also not included, and will be the responsibility of landowners and/or developers.

1.2 Project location

West Horsley is located approximately 15 km southwest of Wollongong, within the Illawarra Region. The Project study area comprises the areas that would be affected by the construction and operation of the water and wastewater services infrastructure.



The Illawarra Region covers the local government areas of Wollongong, Shellharbour, and Kiama. The Region adjoins Sydney, the South Coast and the Southern Highlands, resulting in implications for linking employment, transport and settlement between neighbouring regions.

Development in the north of the Region is characterised by smaller communities overlooking the Pacific Ocean. Kiama and parts of Shellharbour in the south are characterised by urban landscapes and agricultural lands. The main opportunity for urban expansion is located in the middle of the Illawarra Region, around West Dapto, where the coastal plains broaden.

The area is primarily non-urban and includes a mix of residential, rural residential, industrial, commercial and agricultural land uses. There has been a decline over recent years in farming activities in the area in anticipation of the future urban development. There is also a number of existing services already located within the WDURA and Adjacent Growth Areas including drinking water, wastewater, electricity, gas and telecommunications that will require extensions/upgrades/replacement as development occurs.

The overall urban development that is planned for the WDURA and Adjacent Growth Areas will impact existing land uses. The proposed land use will be predominantly residential, but industrial and commercial uses will expand. Some areas of conservation and open space will be retained. Sydney Water's Project will facilitate the changes to land use in accordance with the Department of Planning's strategy.

1.3 The Environmental Assessment Process

On 7 September 2009, the Minister for Planning declared the water and wastewater servicing of the WDURA and Adjacent Growth Areas to be a Major Project under the *Environmental Planning and Assessment Act 1979* (EP&A Act), declaring the works to be of "State and regional environmental planning significance".

The Early Release Lead-in Works Project is situated within the area covered by the Declaration, and as such, is also a project to which Part 3A applies. This Environmental Assessment (EA) report has been prepared under Part 3A of the EP&A Act to support Sydney Water's application for Project Approval for the Project.

1.3.1 Project Application and preliminary information

A Project Application, preliminary environmental information and an overview of the proposed Project were submitted to the Director-General of the Department of Planning on 12 October 2010 for the Early Release Lead-in Works, as required under section 75E of the EP&A Act.

The information provided identified ecology and Aboriginal heritage as key issues for consideration in the EA.

1.3.2 Environmental Assessment Requirements

Under section 75F of the EP&A Act, the EA must be prepared in accordance with the Director-General's Requirements (DGRs) issued by the Director-General of the Department of Planning (DoP). The Director-General of the DoP issued Sydney Water with the requirements for the EA on 7 December 2010. The Director-General's requirements are attached in Appendix A. This EA has been prepared in accordance with the DGRs.

1.3.3 Stakeholder consultation

During the preparation of this EA, key stakeholders nominated by the Department of Planning were consulted. Stakeholders included local community members and key government agencies. Further details on consultation are provided in Section 8.

1.3.4 Exhibition and approval

The EA was finalised following the Director-General's pre-exhibition evaluation of the document's adequacy. The EA will be publicly exhibited for 30 days. Any submissions received by DoP will be forwarded to Sydney Water. The Director-General may require Sydney Water to:

- respond to issues raised in those submissions

- prepare a Preferred Project Report that outlines any proposed changes to the Project
- provide a revised Statement of Commitments.

If any significant changes are proposed to the nature of the Project, the Director-General may require the Preferred Project Report to be made available to the public.

The Director-General will prepare an assessment report for the Minister for Planning's consideration of the proposed Project. The assessment report includes an evaluation of the relevant documents (this EA, Submissions Report and any Preferred Project Report), giving consideration to submissions received during the exhibition period. The Minister for Planning may approve or reject the Project and determine any conditions to apply to the carrying out of the Project.

1.4 Purpose and structure of this report

This EA has been prepared in accordance with the DGRs issued for the project. The EA describes the Project, assesses key environmental issues associated with its construction and operation, and identifies the mitigation and management measures that would be implemented. It also includes a draft Statement of Commitments, which provide the environmental performance standard for this Project.

A summary of the information contained within each chapter and appendix of this report is provided below.

- Chapter 1 – introduces the Project, provides background information on its broad strategic context and describes the EA study area, and includes a description of the Part 3A assessment and approval process under the EP&A Act.
- Chapter 2 – describes how the Project relates to the Illawarra Regional Strategy and NSW Government and Sydney Water plans and strategies.
- Chapter 3 – provides a detailed description of the Project.
- Chapter 4 – describes the process used to select the preferred servicing strategy and details the alternatives considered.
- Chapter 5 – provides an overview of the legislative framework for the Project, and includes an assessment of consistency of the Project against the objects of the EP&A Act.
- Chapter 6 – identifies and discusses the key environmental issues for the Project and the corresponding impact mitigation and management measures that would be implemented to address these issues.
- Chapter 7 – details an environmental risk analysis of the Project and includes consideration of the residual risks.
- Chapter 8 – provides a description of the stakeholder engagement and community consultation process.
- Chapter 9 – provides a justification for the Project, an assessment of the Project's suitability in relation to ESD, and the overall conclusion with respect to environmental impacts.
- Chapter 10 – provides the Draft Statement of Commitments for the Project.
- Chapter 11 – lists the references used in the preparation of this EA.
- Appendix A – Project declaration and Director-General's environmental assessment requirements.
- Appendix B – Flora and fauna impact assessment.

2 Strategic context

2.1 Overview

Development in the West Dapto area began over 20 years ago with the release of the suburb of Horsley. Due to high infrastructure costs and low housing demand further development did not proceed. In 2004 the then Department of Infrastructure, Planning and Natural Resources announced that the Dapto Release Area would proceed. In 2007, Wollongong City Council working with the Department of Planning exhibited a draft Local Environment Plan (LEP) for the West Dapto Urban Release Area (WDURA) to facilitate new residential development in this area.

2.2 Strategic context

The WDURA is located 12km south of Wollongong and covers an area of approximately 3,000 hectares. WDURA has been identified as an important component of the Illawarra and Greater Sydney Metropolitan Area housing market.

The West Dapto Release Area was first identified as suitable for urban development when it was placed on the Illawarra Urban Development Program in the early 1980s.

As described in Chapter 1, three first release precincts have been identified and rezoned, including West Horsley. The land in Kembla Grange, Sheaffes/Wongawilli and West Horsley Precincts was rezoned in 2010. A Development Application has been submitted for a subdivision in the West Horsley Precinct with construction likely to commence in 2011/12. The remaining Precincts will be developed and released over time depending on development rates and demand.

2.2.1 Illawarra Regional Strategy 2006-2031

The Illawarra Regional Strategy (Department of Planning, 2007) was prepared as one of the regional strategies for areas of high growth in NSW. The strategy aims to ensure the projected housing and employment needs of the Region over the next 25 years are adequately accommodated and appropriately located. The Strategy also identifies and protects the Region's significant natural assets such as the Illawarra Escarpment, Lake Illawarra and the Minnamurra Estuary. The Strategy aims to ensure that careful planning of new development in the WDURA will recognise and protect natural vegetation corridors between the coast and the escarpment.

The Strategy identifies the WDURA as a priority new release area, proposing to accommodate approximately 20,000 dwellings and meet approximately 60 per cent of future residential demand in the Illawarra Region. More details on the release precincts will be provided in the Environmental Assessment for the WDURA and Adjacent Growth Areas proposal.

2.2.2 West Dapto Release Area Review Planning and Infrastructure Report

In 2008, the Growth Centres Commission (GCC) (now within the Department of Planning) undertook a review of the key aspects of the development of the WDURA (*West Dapto Release Area Review Planning and Infrastructure Report*, GCC 2008). The review concluded that the staged development of WDURA can and should proceed, as it will assist in meeting the housing and employment needs of the Illawarra Region up to 2050.

The objectives to achieve sustainable urban development of the WDURA are to:

- develop vibrant, sustainable and liveable neighbourhoods that provide for community well-being and are supported by essential facilities
- maximize the potential for local employment opportunities
- protect and enhance West Dapto's ecological and cultural features through sustainable urban design and appropriate land management
- achieve cost effective and efficient provision of infrastructure through a collaborative and transparent governance system between Council and the NSW Government

- meet housing supply needs and provide a range of housing products.

The Project is consistent with the objectives of the *West Dapto Release Area Review Planning and Infrastructure Report*. Sydney Water has developed the Integrated Servicing Strategy and preferred project to ensure that cost effective and efficient provision of infrastructure is achieved. Furthermore, the Integrated Servicing Strategy has been developed in consultation with a number of government agencies, including Wollongong City Council and the Department of Planning (refer Section 8).

2.2.3 Lake Illawarra Estuary Management Study and Strategic Plan

Lake Illawarra is a broad, shallow saline lagoon with an area of 33 square kilometres and a maximum depth of 3.7 metres. One quarter of the lake is less than 1.2 metres deep (URS 2004). The Lake Illawarra catchment has an area of 270 square kilometres. Lake Illawarra is a popular natural resource for both local people and visitors to the region. The Lake and foreshore area support numerous recreational activities, and commercial fishing and tourism associated with the Lake are also financially important to the area.

Lake Illawarra and its associated creeks and tributaries have been degraded as a result of changes to their hydrology, geomorphology and ecology. URS (2004) notes that the water quality within the area is considered to be poor, with high levels of pollutants such as nutrients, total suspended solids and faecal coliforms. The poor water quality of Lake Illawarra is considered to be a result of urban and industrial pollution and poor tidal flushing.

The condition of the Lake became so degraded in the 1970s and 1980s, as evidenced by frequent large macroalgae blooms, that the NSW Government decided to form a small focused body to manage the Lake. In 1988, the Lake Illawarra Authority was established under the *Lake Illawarra Authority Act 1987* with the specific task of improving the environment of Lake Illawarra, its foreshores and environs. The overall aim of the Lake Illawarra Authority is to revive and restore the Lake environment by resolving existing problems so that the Lake can be restored to a healthy aquatic ecosystem and an attractive recreational and tourist resource for the region.

In 2006, the Lake Illawarra Authority released an *Estuary Management Study and Plan*, developed in accordance with Part 4 of the NSW Government's Estuary Management Program. It outlines key management issues for the Lake, presents management objectives, and considers management options.

Sydney Water has considered the *Estuary Management Study and Plan* in its assessment of the potential impacts on Lake Illawarra. The assessment includes development of mitigation measures to ensure potential impacts due to wet weather discharges are adequately mitigated (see Section 6), and concludes that impacts to the Lake are unlikely for this Project.

2.2.4 Sydney Water Integrated Servicing Strategy

The NSW Government's *Metropolitan Water Plan* outlines strategies to balance demand for water with a sustainable supply. Based on an adaptive management approach, the Plan outlines a diverse suite of options to meet long-term water needs while minimising the costs to the community and the environment.

Sydney Water is responsible for the provision of water and wastewater services for the Illawarra Region. Consequently, Sydney Water has developed an Integrated Servicing Strategy for the WDURA and Adjacent Growth Areas in accordance with the objectives of the Metropolitan Water Plan, and Sydney Water's Sustainability Planning Manual. The Integrated Servicing Strategy adopts a sustainable approach to the implementation and management of services for water and wastewater both for now and in the future.

The preferred servicing strategy for the WDURA integrates existing infrastructure and includes:

- provision of drinking water services through the extension of the existing Illawarra water system
- provision of wastewater services through the extension of the existing Wollongong and Shellharbour sewerage treatment systems

- non-drinking water supply through the installation of rainwater tanks by homeowners on each residential lot.

The Project is consistent with this strategy in that the proposed water and wastewater pipelines will connect with the existing water and wastewater system. Section 3 provides additional details on the integration of the new and existing systems.

2.2.5 Sydney Water Operating Licence

Sydney Water's Operating Licence enables the Corporation to provide water, wastewater and some stormwater services in the Sydney, Illawarra and Blue Mountains regions. The current Licence is effective from 1 July 2010 to 30 June 2015.

The Operating Licence reflects public expectations of Sydney Water's performance. The Operating Licence also provides key regulatory drivers to ensure that Sydney Water maximises the community's investment in line with its objectives; to protect public health and the environment, and be a successful business.

The Operating Licence sets out requirements relating to:

- drinking water (health and aesthetic requirements)
- infrastructure performance
- customer and consumer rights
- system performance standards (including standards for continuity of service, water pressure and wastewater overflows)
- water conservation targets, demand management and recycling
- environmental management and environmental health indicators
- the Customer Contract.

Sydney Water's Integrated Servicing Strategy and hence this Project are consistent with the requirements of the Operating Licence to provide drinking water and wastewater services within the area.

2.2.6 The Sydney Water Environment Plan

The Environment Plan sets out the objectives, actions and targets required to manage Sydney Water's environmental performance. The Plan identifies the way in which Sydney Water is addressing one of its principal objectives, ie to protect the environment, by operating in compliance with the principles of ecologically sustainable development (ESD).

Relevant Environment Plan objectives are to:

- contribute to the health of waterways and clean beaches through effective effluent management activities
- ensure all activities and operations are in accordance with environmental statutes
- minimise harm to the environment through pollution minimisation and control
- avoid and minimise waste generation and maximise re-use, recovery and recycling
- responsibly manage all Sydney Water's natural and cultural resources and assets
- continue to improve environmental management practices and promote an environmentally responsible culture.

Development of the Integrated Servicing Strategy included incorporating the objectives of the Environment Plan.

3 Project description

3.1 Overview

The Project involves the installation of one water and one wastewater pipeline, and comprises:

- construction, operation and maintenance of approximately 1.5 km of water pipeline
- construction, operation and maintenance of approximately 2 km of wastewater pipeline
- connection to and upgrade of the storage facilities at the existing wastewater pumping station (SPS 1012) at Fairwater Drive, Horsley
- connection to the existing water supply network (from the Illawarra Water Filtration Plant)
- transfer of wastewater flows from the new development to Wollongong Water Recycling Plant (WRP) for treatment and either reuse or ocean discharge
- other assets such as vent shafts and air release valves.

Figure 3.1 shows the indicative location of the proposed infrastructure. The location of the pipelines has been determined based on hydraulic and technical requirements, and environmental constraints and opportunities. Additional detailed design will be undertaken prior to construction to optimise functionality and minimise adverse impacts.

3.2 Components of the project

3.2.1 Water pipeline

The water pipeline will be located in the existing road verge along the southern side of the Bong Bong Road easement, between Hayes Lane and Shone Avenue along Bong Bong Road. This road verge has been previously cleared, although there are some scattered stands of remnant woodland vegetation.

The pipeline will be 300 mm in diameter and approximately 1.5 km in length. The pipeline will connect to the existing drinking water supply network (from the Illawarra Water Filtration Plant) at Shone Avenue, Horsley. The water pipeline will be installed below ground but will include some surface features such as valves or scour chambers. Figure 3.1 shows the alignment of the water pipeline.

Once connected to the existing network, the new water pipeline will supply drinking water to the new suburb and surrounding developments. Water will be sourced from the existing 20 ML water reservoir at Smiths Lane, Wongawilli, which is supplied by the Kembla Grange Water Treatment Facility.

3.2.2 Wastewater infrastructure

The wastewater infrastructure would include a new wastewater pipeline, and an upgrade to the storage capacity at the existing wastewater pumping station in Fairwater Drive, Horsley.

Wastewater pipeline

The wastewater pipeline will be 300 mm in diameter and approximately 2 km in length between the southern boundary of Lot 61 DP 1063539 (currently Illawarra Gun Club) and the existing pumping station at the corner of Fairwater Drive and Riverpark Way. The alignment of the pipeline generally follows Reed Creek, a tributary of Mullet Creek, crossing ephemeral drainage lines at a number of points along the route. The pipeline route has been selected to avoid areas of medium and high conservation significance, and most of the route has been previously cleared or disturbed. The pipeline is initially aligned with Jersey Farm Road before heading north east to be located within an existing cleared electricity easement. The alignment then follows Bridgewater Drive and Riverpark Way before connecting to SPS 1012 at Fairwater Drive, Horsley. Figure 3.1 shows the alignment of the wastewater pipeline and the wastewater pumping station.



Figure 3.1 Project Components

The wastewater pipeline is gravity-fed, whereby the wastewater within the pipe is transported by gravity without the need for pumping. As with the water pipeline, the wastewater pipeline will be installed below ground but will include some surface features such as vent shafts. No overflow points will be included in the new wastewater pipeline.

For this Project, Sydney Water will use a leak tight wastewater system to minimise the amount of inflow and infiltration. These systems are designed to limit inflow and infiltration. Leak tight systems are similar to conventional gravity systems, but use welded polyethylene pipes, fittings and maintenance shafts. Reduced inflow and infiltration in the wastewater system will result in reduced potential for wet weather overflows, reduced treatment costs and improved treatment plant performance.

Wastewater pumping station

The wastewater pipeline connects to the existing wastewater pumping station (SPS 1012), at Fairwater Drive, Horsley. The wastewater pumping station is an underground pumping station, which has been operating for approximately 15-20 years, servicing part of Horsley.

The wastewater pumping station has sufficient pumping capacity to service the ultimate growth of the development, however additional in-ground storage capacity will be required. The storage upgrade is required to ensure that the wastewater pumping station has spare detention time, in accordance with Sydney Water's emergency management plan. Approximately 152m³ of additional storage capacity will be required, making the total storage capacity (existing and upgraded) to approximately 239m³. It is predicted that this upgrade would be required some time after the first 250 houses are developed, anticipated to be around 2015.

From the wastewater pumping station at Horsley, the wastewater would be pumped along the existing wastewater network and ultimately to Wollongong WRP. Wollongong WRP has sufficient capacity to cater for the projected inflows from the development areas being serviced by this Project.

Ancillary components of wastewater pipelines

Ancillary components for the wastewater pipelines would include maintenance structures and vent shafts.

Maintenance structures would be installed to allow wastewater pipes to be inspected and maintained and are usually installed at changes of level, pipeline direction and/or pipe size.

Vent shafts would typically be constructed above ground and would allow air to be admitted to the wastewater system to reduce the likelihood of wastewater turning septic or corrosive and causing offensive odours. Vent shafts would also allow odours to be dispersed from the wastewater system. The numbers and locations of vent shafts would be determined during detailed design. Each vent shaft would be a supported pipe up to 19 m tall and up to 0.3 m in diameter. Section 6.9 Visual amenity includes additional details.

Wollongong Water Recycling Plant

Wollongong WRP serves Wollongong and surrounding suburbs, treating about 43 million litres of wastewater a day, equal to the waste produced by about 200,000 people. The plant recycles about 22 million litres a day, which is almost half the wastewater it treats. The remaining wastewater (which has been treated and disinfected) is discharged to the ocean, approximately 1 km out to sea.

The plant operates under an environmental protection licence (EPL # 218) under the *Protection of the Environment Operations Act 1999* from the NSW Department of Environment, Climate Change and Water (DECCW), and in accordance with the *Australian Guidelines for Water Recycling*.

The system licence specifies that future wet weather overflow performance must not exceed 43 overflows in any ten-year period for the Wollongong Sewerage System. The licence similarly limits Sydney Water's discharges to the marine environment from the WRP in terms of pollutant concentrations, pollutant loads and volume. The leak-tight pipes planned for the Project are designed to ensure Sydney Water continues to achieve the licence conditions.

Wollongong WRP currently treats approximately 43 mega litres (ML) of wastewater per day, with an existing approval to treat approximately 59 ML per day. The proposed development would contribute an additional 0.28 ML per day to the plant. This equates to a 0.65% increase in average dry weather flows to be treated by the plant, which is well within the capacity of the plant to accommodate the additional flows, and still meet requirements of Wollongong sewage treatment system environment protection licence issued by DECCW. As such, the wastewater inflows to the WRP are not discussed any further in this EA.

3.3 Project phases

3.3.1 Pre-construction

Before construction commences, pre-construction activities may include geotechnical surveys, identification of the locations of existing underground services, and other minor surveys and tasks required to finalise the alignment and depths of the new underground infrastructure and optimise the design.

3.3.2 Construction

Timing

Construction of the water and wastewater pipelines is planned for late 2011. The duration of the construction period would be approximately 6-9 months.

The developer will provide the smaller reticulation components of the water services infrastructure in a sequential manner so that development can occur as infrastructure is provided. This would allow infrastructure to be laid in the correct location and depth.

Pipeline construction methodology

The pipelines would be installed underground using open trenching techniques. Trenching is the preferred method of pipe installation as it allows open access to the pipeline during construction.

Open trench excavation

The total construction footprint for the pipeline corridors is expected to be approximately 10 m wide. The trenches would generally be 1.3-1.7 m wide and range in depths from 1.5 m (drinking water pipeline) to 3 to 5 m (wastewater pipeline), depending upon topography.

Construction activities associated with trenching typically include:

- establishing temporary site compounds at appropriate locations along the pipeline route
- establishing erosion and sediment control measures
- implementing traffic management measures
- site preparation, including pavement, footpath and/or road surface removal or vegetation removal
- providing temporary access to properties where trenches impact driveways
- trench excavation, including stockpiling spoil material on the upslope side of trenches
- shoring and dewatering trenches, depending upon trench depths and groundwater levels
- spreading granular material such as sand or gravel along the bottom of the trench prior to pipe laying
- installing and testing of the pipeline
- constructing maintenance holes
- backfilling the trenches with bedding material and excavated soil
- compacting the fill material in the trenches
- restoring areas disturbed by the construction works.

Trenching methods can include both machine trenching and hand trenching. Trenching would generally be carried out using excavators and a small compactor. Rockbreakers may also be required where bedrock is encountered during excavation. Hand trenching may be carried out in environmentally sensitive areas, including areas where there is a need to avoid root damage to large trees and areas where heritage items are located in close proximity to the pipeline route.

In trafficable areas, full spoil removal may be required. In non-trafficable areas the majority of spoil excavated from the trenches would be used to backfill the pipeline route (per Water Services Association of Australia Water and Sewer Codes). Spoil would be classified in accordance with the DECCW guidelines *Waste Classification Guidelines: Part 1 - Classifying waste (DECCW 2009)* and the *Protection of the Environment Operations Act 1997*. Excess spoil would be disposed of at a licensed facility, in accordance with the *Waste Classification Guidelines* (refer Section 6.11).

Connection to existing network and upgrade of the wastewater pumping station

Water and wastewater pipelines would generally be connected to the existing network by pipe welding and joining, then restoration of roads and affected areas. Upgrading the SPS would include constructing additional emergency storage and connecting inflow/outflow pipelines using open trenching techniques.

Construction equipment

The machinery/equipment likely to be used during construction includes:

- excavator
- small compactor
- saw cutters
- welding equipment
- delivery and concrete trucks
- powered hand tools
- small compressor
- small generator
- trucks and pumps (if dewatering required)
- micro-tunnelling or directional drilling rigs
- crane for wastewater pumping station upgrade.

3.3.3 Commissioning

During commissioning, the new infrastructure would be thoroughly tested prior to use. Commissioning would be in accordance with Sydney Water's standard operating procedures. No significant impacts are expected during the commissioning period.

3.3.4 Operation and maintenance

It is expected that the pipelines will commence operation in early to mid 2012. During operation, the new pipelines would be routinely inspected, cleaned and repaired as necessary in accordance with Sydney Water's standard operating procedures.

The upgraded wastewater pumping station would be monitored and operated remotely. The pumping station capacity will be upgraded to maintain four-hour emergency storage capacity in case the pumps or power fails. This emergency storage capacity would ensure that adequate time is available for maintenance crews to restore the operation of the pumping station before a dry weather overflow occurs. The pumps have been designed to create minimal noise and comply with the Industrial Noise Policy (EPA, 2000). No noise complaints have been received from the existing wastewater pumping station. In general, underground pumping stations do not normally result in noise complaints. As the upgrade to the pumping station only involves increasing the storage, and

there will be no change to the pumps, no additional noise is anticipated. Section 6.7 provides additional information on noise for the project.

Although the Project would be designed to minimise energy use, operating water and wastewater systems is inherently energy intensive and the Project will increase the existing operational energy demand. Approximately 283 kilowatts per hour (KWh) is required to transport and treat one mega litre (ML) (1,000,000 litres) of water, and approximately 467 KWh is required to transport and treat 1 ML of wastewater (Sydney Water 2007).

Operation of the water infrastructure would require a minor amount of additional electricity. The pipeline between the new development site and the wastewater pumping station would be gravity-fed, which has a relatively low operational energy demand. Operation of the existing wastewater pumping station uses approximately 12,000 kW of electricity per annum.. Electricity use will increase to 27,400 kW once the Project is operational, representing an additional annual energy usage of 15,400 kW. Sydney Water's total annual energy use approximates 352,000 MW per annum. Relatively, the Project will increase Sydney Water's operational energy demand by approximately 0.004%. Sydney Water is committed to be carbon neutral (for operational energy use) by 2020. This will be attained through a combination of reduced demand, energy efficiency, renewable energy and offset initiatives. Accordingly, the greenhouse gas emissions associated with the Project's energy demand would effectively be neutralised by Sydney Water's broader energy management initiatives.

4 Consideration of alternatives

This chapter describes the alternatives that were considered in developing the Integrated Servicing Strategy for the WDURA and for the Early Release Lead-in Works. Alternatives examined included alternative servicing strategies as well as alternative pipeline routes.

4.1 Developing the Integrated Servicing Strategy

Sydney Water has developed an Integrated Servicing Strategy for the provision of water and wastewater services to the WDURA and the Adjacent Growth Areas up to the year 2050. The Strategy was prepared in order to provide safe, reliable and sustainable water and wastewater services for the WDURA and Adjacent Growth Areas. The preferred strategy was chosen following a sustainability planning process used throughout Sydney Water to ensure preferred options are environmentally, financially, technically and socially sustainable. A sustainable decision is one that weighs up all relevant social, environmental, economic and technical considerations in a manner that is understood and accepted by the key stakeholders. The decision making process in Sydney Water was adapted from Sydney Water's *Sustainability Planning Manual* and the *Sustainability Framework* commissioned by Water Services Association of Australia (WSAA). The process includes steps for engaging external stakeholders (including local councils, community and business groups), setting objectives, developing options and appropriate quantitative and qualitative criteria, assigning weightings to those criteria and using them to evaluate options and carry out sensitivity analysis.

The process of identifying and choosing a preferred servicing strategy was undertaken in two stages. The first stage was to establish a long list of options that could service the expected needs for residential, industrial and commercial uses to the equivalent of approximately 35,000 dwellings. The long list of options was based around different drinking water sources, wastewater management, non-drinking water sources (for example recycling) and other measures (such as grey water). The long list of options was evaluated and ranked against the following criteria:

- maximise drinking water conservation
- minimise wet weather discharges to Lake Illawarra
- minimise cost
- minimise energy consumption
- minimise impacts to the community
- maximise community acceptance
- maximise flexibility to development staging.

The eight highest scoring options were then added to a "short list" for further assessment. Further development was then undertaken on the short-listed options in order to provide enough information for assessment in the second stage. The short-listed options were again assessed and ranked against the above objectives. The assessment and ranking of the short-listed options included consultation with representatives from the Department of Planning, (the then) Department of Water and Energy, (then) Department of Environment and Climate Change, NSW Health, and the local councils (Wollongong and Shellharbour).

After considering all the criteria the preferred integrated servicing strategy chosen for WDURA was:

- to provide drinking water services by extending the existing Illawarra water system
- to provide wastewater services by extending the existing Wollongong and Shellharbour Wastewater Treatment Systems
- non-drinking water supply through installing rainwater tanks by homeowners on each residential lot.

4.2 The preferred pipeline routes

The above Integrated Servicing Strategy developed for WDURA and the Adjacent Growth Areas was used to develop the preferred pipeline routes for this Project. A detailed planning process undertaken in 2010 chose the indicative route alignments. The purpose of the detailed planning process was to determine the optimal configuration of a water supply system and a wastewater network to service all the developable areas in WDURA and the Adjacent Growth Areas. A total of eleven water systems and twenty-six wastewater options were developed and considered. The options were assessed using Multi-criteria Analysis (MCA) with financial, technical, environmental and social criteria. The final water and wastewater servicing options were selected because they were considered to be the most sustainable options.

The preferred pipelines chosen to service this section of West Horsley consist of a:

- 300 mm diameter water pipeline constructed along Bong Bong Road and connecting to the existing water supply network at the corner of Shone Avenue and Bong Bong Road, Horsley
- 300 mm diameter wastewater pipeline connecting to the existing wastewater pumping station at Fairwater Drive, Horsley.

The final alignments as shown in Figure 3.1 were chosen after field surveys and modelling of the wastewater pipeline confirmed that these alignments were technically viable and would have the least environmental impact.

4.3 Alternative pipeline route options

4.3.1 Water pipeline

The pipelines are planned to comply with the Water Supply Code of Australia (WSA 03-2002) set by the Water Services Association of Australia (WSSA). This Code states that “water mains should be located in the road reserve”. There are general space allocations for utility services in the footways of the road reserves. Water pipelines are allocated 2.6 metres from the property line. If the water pipelines are placed outside the allocated area it has the potential to interfere with the provision of other utility services.

Placing water pipelines in the road reserves is preferred because it:

- allows easy access for repairs and maintenance
- minimises disruptions to residents and customers
- provides greater protection from services being disrupted by landowners accidentally digging up the pipelines.

Locating pipes in road reserves also generally creates only minor environmental impacts because the environment has already been disturbed by the road construction activities.

For these reasons the preferred location of the water pipeline is limited to being within the existing road reserve for Bong Bong Road. The pipeline route has been realigned slightly to avoid a habitat tree, but has ultimately remained unchanged, as it will result in minimal environmental impacts.

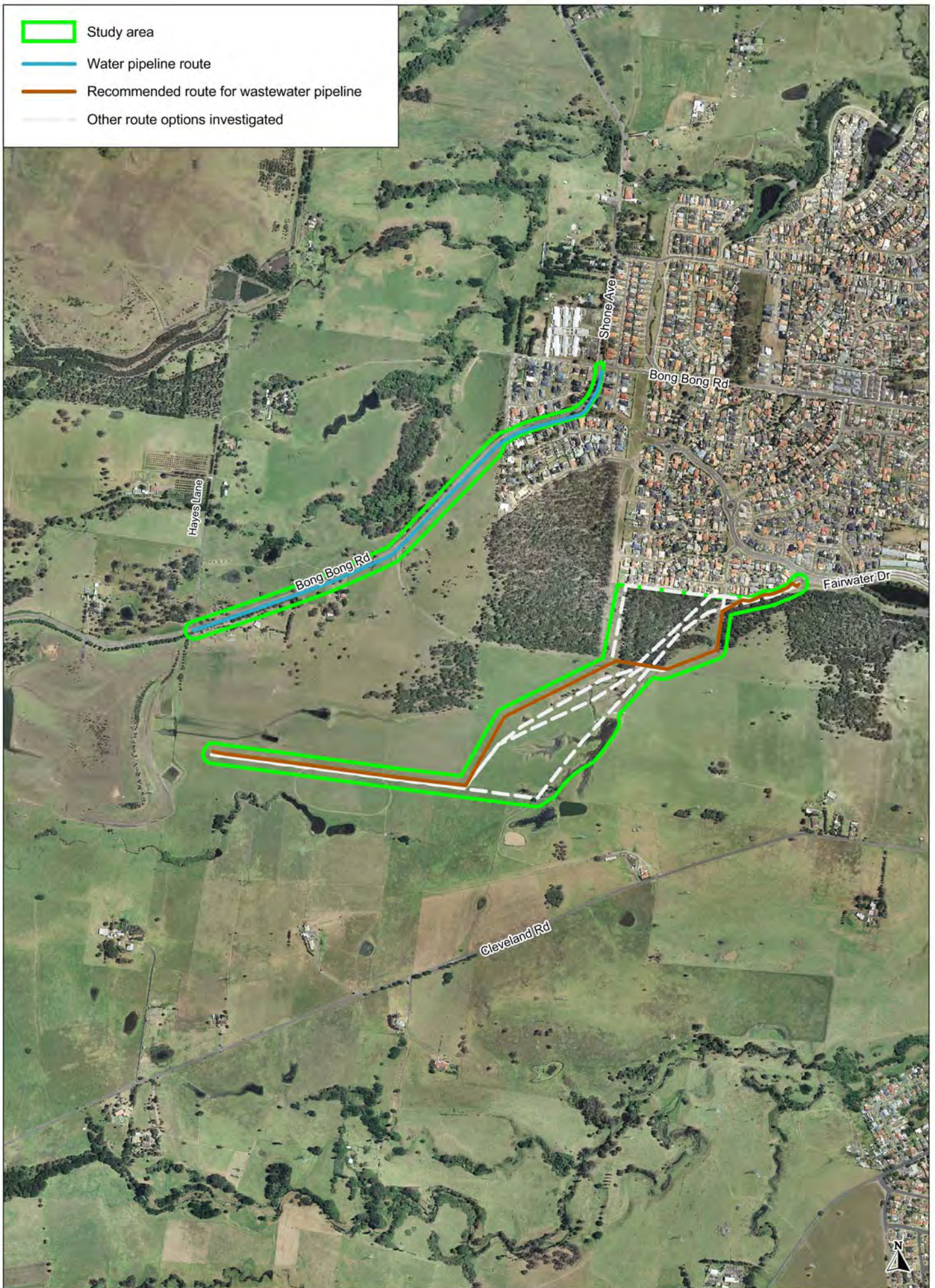
4.3.2 Wastewater pipeline

Wastewater pipelines are constructed in low-lying areas and in the vicinity of waterways. Due to the design requirements of gravity wastewater systems, locating wastewater pipelines away from waterways is not always feasible. A number of alternative pipeline route options were identified for the Project.

Initially four pipelines were proposed but two were eliminated because they could not meet design standards set by the Water Services Association of Australia (WSSA). The ecological consultants assessed these remaining two routes. Following the field survey the consultants proposed a number of other routes that would have less impacts than originally proposed. These routes were then modelled and two more eliminated for technical reasons. The Aboriginal heritage consultants

then assessed the final routes with members of the relevant Aboriginal stakeholder groups. The final route was chosen following their recommendations.

Figure 4.1 shows the different options considered. The preferred route was selected based on the results of the wastewater modelling, ecological and Aboriginal heritage studies. It is considered to have the least potential for environmental impacts and meets all relevant operating design standards. While it is necessary for the pipeline to cross the ephemeral drainage lines in a number of locations, the route has been selected to avoid areas of medium and high ecological constraint, and overall has the best environmental outcomes.



5 Legislative and planning framework

5.1 NSW Legislation

5.1.1 Environmental Planning and Assessment Act 1979

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and associated regulations and environmental planning instruments (EPIs) provide the framework for assessing environmental impacts and determining planning approvals for developments in NSW.

Assessment under Part 3A of the EP&A Act

Part 3A of the EP&A Act establishes an assessment and approval regime for major infrastructure projects. Part 3A applies to development that is declared to be a Part 3A project by either the *State Environmental Planning Policy (Major Development) 2005*, or by Ministerial Order. The Minister for Planning is the approval authority for most Part 3A projects.

On 7 September 2009, the Minister for Planning issued an order that the West Dapto Urban Release Area and Adjacent Growth Areas Proposal should be assessed and determined under Part 3A of the EP&A Act. The order stated that the water and wastewater servicing of the West Dapto Urban Release Area and Adjacent Growth Areas “*is of State and regional environmental planning significance....pursuant to section 75B of the Environmental Planning and Assessment Act 1979....*” and “*to be a Project to which Part 3A of the Environmental Planning and Assessment Act 1979 applies*” (NSW Government Gazette No 146).

Schedule 1 to the order defines the suburbs of the West Dapto Urban Release Area, including West Horsley. The Early Release Lead-in Works Project involve water and wastewater servicing within West Horsley, which is within the area covered by the declaration. Accordingly, this Project is also a project to which Part 3A of the EP&A Act applies.

The Part 3A process of the EP&A Act is outlined in Chapter 1. **Table 5.1** provides a summary of the Director-General's Requirements issued under Part 3A and where they have been addressed in this EA. The additional requirements and considerations for the Project in relation to EPIs made under the EP&A Act are detailed in Section 5.2.

Table 5-1 Summary of the Director-General's Requirements for the EA and where they have been addressed in this report

Item to be addressed	Requirement	Section of the EA
General Requirements	• Executive summary	Executive summary
	• Detailed description of the project	Chapter 3
	• Consideration of relevant statutory provisions	Chapter 5
	• Assessment of the key environmental impacts	Chapter 6
	• Draft Statement of Commitments	Chapter 10
	• Justification for undertaking the project	Chapter 9
	• Certification by the author of the EA	Certification page
Key Issues	• Strategic justification	Chapter 2
	• Flora and Fauna	Section 6.1
	• Aboriginal Heritage	Section 6.2
	• Non-Indigenous Heritage	Section 6.3
	• Water quality, hydrology and soils	Section 6.4
	• Human Health	Section 6.5
	• Dust and Odour	Section 6.6
	• Noise and Vibration	Section 6.7
	• Traffic and Transport	Section 6.8

Item to be addressed	Requirement	Section of the EA
Key issues continued	- Visual Amenity - Hazards and Risk	Section 6.9 Section 6.10
	Environmental Risk Analysis	Chapter 7
Consultation	- Local, State or Commonwealth government authorities and service providers - Specialist interest groups, including local Aboriginal land councils - Local community, including affected landowners	Chapter 8

Legislation that does not apply to approved Part 3A projects

Section 75U of the 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. For this Project, the following separate approvals are not required:

- Fisheries Management Act 1994* – approvals under Section 219 (for obstruction of fish passage).
- National Parks and Wildlife Act 1974* – permits under Section 90 (for destruction of Aboriginal objects or places).
- Water Management Act 2000* – an activity approval under section 91 (for works within 40 m of a first order stream).

The intent of the above-listed legislation, and the need to consult with the relevant agencies is captured by the Part 3A approval process.

Legislation that must be applied consistently to approved Part 3A projects

Under Section 75V(1) of the EP&A Act, the following authorisations cannot be refused if necessary for the carrying out of a project that has been approved under Part 3A of the EP&A Act:

- an environment protection licence (EPL) issued under Chapter 3 of the *Protection of the Environment Operations Act 1997* (POEO Act) (unless it is an existing EPL).
- a consent under Section 138 of the *Roads Act 1993* (Roads Act).

Furthermore, the conditions of any EPL under the POEO Act or consent under the Roads Act must be substantially consistent with the Part 3A approval. The Part 3A approval process requires consultation with the agencies administering these Acts. The Minister will consider comments made by other agencies before granting consent and imposing conditions.

Consistency with the relevant objects

An evaluation of the Project against the relevant objects of the EP&A Act is presented in **Table 5.2** below.

Table 5-2 Consistency of the Project with objects of the EP&A Act

Object of the EP&A Act	Consistency of the Project with the object
(a(ii)) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.	Sydney Water has developed the Project to ensure that natural and artificial resources are managed and conserved in accordance with appropriate guidelines, policies and requirements. In particular, the pipeline routes have been aligned to avoid impacting natural/ecological resources. The Project would promote the improved social and economic welfare of the community by allowing the development of the area.

Object of the EP&A Act	Consistency of the Project with the object
(a(ii)) To encourage the promotion and co-ordination of the orderly and economic use and development of land.	This Project involves providing water and wastewater services to the area, in accordance with various Government strategies (Illawarra Regional Strategy, Metropolitan Water Plan etc) to facilitate urban development. One of the Proposal's objectives is to support the orderly rollout of land release and infrastructure whilst meeting Sydney Water's statutory and regulatory obligations.
(a(iii)) To encourage the protection, provision and co-ordination of communication and utility services.	This Project involves providing water and wastewater (utility) services connected to the existing network. The Project has been developed in consultation with the Department of Planning (Growth Centres) and Wollongong City Council to ensure this objective is achieved.
(a(vi)) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.	The Project has been designed to minimise impacts to the environment and to protect existing natural heritage values including areas of high ecological sensitivity. Furthermore, Sydney Water has identified management measures to protect the environment, including protecting and conserving native animals, plants, and endangered ecological communities.
(a(vii)) To encourage ecologically sustainable development.	The Project has been developed using a sustainability planning process to ensure the preferred option is environmentally, financially, technically and socially sustainable. An evaluation of the Project against the principles of ecologically sustainable development as described in the <i>Environmental Planning and Assessment Regulation 2000</i> is included in Chapter 9.
(b) To promote the sharing of the responsibility for environmental planning between the different levels of government in the State.	Sydney Water has consulted directly with key stakeholders, including the Department of Environment, Climate Change and Water and Wollongong City Council during the preparation of the EA to ensure their concerns are adequately addressed. Section 8 contains a summary of the consultation process undertaken. The Part 3A planning process effectively facilitates shared responsibility between the different levels of government in the State.
(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	The Part 3A process and Sydney Water's consultation initiatives provided opportunities for public involvement and participation in the planning and assessment of the Project.

5.1.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) regulates pollution and includes provisions for issuing environment protection licences (EPL). The POEO Act is administered by DECCW and provides for the control and regulation of water, air and noise pollution, waste transport and disposal, and littering. Under Part 3A of the EP&A Act, an EPL cannot be refused if it is necessary for carrying out an approved project and must be substantially consistent with the Part 3A approval.

It is a mandatory requirement of the POEO Act to obtain an EPL for scheduled development work and scheduled activities. Sydney Water currently holds an EPL for Wollongong WRP and system (EPL #218). If required, a variation to EPL #218 will be sought to include these works.

EPLs may also be sought on a voluntary basis to regulate water pollution from non-scheduled development work and activities. Sydney Water may seek a voluntary EPL for the purpose of regulating the disposal of stormwater from work sites during construction. Any voluntary EPL issued in respect of the Project would have to be substantially consistent with the Part 3A approval.

5.1.3 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) provides for the protection of critical habitat and threatened species, populations, ecological communities and their habitats in NSW (with the exception of fish and marine plants). The TSC Act is administered by DECCW.

It is an offence to damage critical habitat and/or cause harm to a threatened species, population or endangered ecological community, except if the action constituting the offence was:

- authorised by a licence issued under the TSC Act or NPW Act
- carried out in accordance with an approval or consent granted under Part 3A of the EP&A Act.

Section 6 contains an assessment of the potential impacts of the Project on threatened species, habitat, populations and ecological communities and concludes that no threatened species, habitat, populations and ecological communities would be impacted by the Project.

5.1.4 Roads Act 1993

The *Roads Act 1993* (*Roads Act*) is administered by the NSW Roads and Traffic Authority, local Council or the Department of Lands.

Under section 138 of the Roads Act, a person must not:

- a) erect a structure or carry out a work in, on or over a public road, or
 - b) dig up or disturb the surface of a public road, or
 - c) remove or interfere with a structure, work or tree on a public road, or
 - d) pump water into a public road from any land adjoining the road, or
 - e) connect a road (whether public or private) to a classified road,
- otherwise than with the consent of the appropriate roads authority.

The Project involves the construction of the wastewater pipeline within the road reserve of Bong Bong Road. However, because the Project is being assessed under Part 3A of the EP&A Act, consent is not required. Sydney Water will seek consent from Wollongong Council's Regulation and Enforcement Division prior to construction in line with Council's *Consent to Work within Council's Existing Road Reserve* requirements.

5.1.5 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) is administered by the Department of Industry and Investment (DII) and was developed to protect and manage the fisheries of the State for the benefit of present and future generations. The Act applies to all waters within the limits of the State, except where Commonwealth legislation applies.

Of relevance to the Project, Part 7A of the FM Act provides for the conservation and protection of threatened species and critical habitat. Threatened species are listed in Schedules 4, 4A, and 5 to the Act. The current list of recommended and declared critical habitat is provided on the DPI's website.

The flora and fauna assessment undertaken as part of this EA concluded that no threatened fish species or critical habitat declared under the FM Act would be adversely affected by the Project.

5.1.6 Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) provides for the conservation and protection of NSW natural and built heritage. The Heritage Act is administered by the NSW Heritage Office. Under the Heritage Act, certain works on relics or items on the State Heritage Register require a permit from the Heritage Council. However, such permits are not required for projects approved under Part 3A of the EP&A Act. Notwithstanding, and in line with Sydney Water's Environment Plan 2010-2015, Sydney Water has assessed any potential impacts on natural and built heritage items and where

necessary proposed mitigation measures to ensure potential impacts are adequately mitigated (see Section 6.3).

5.1.7 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NP&W Act) provides for the establishment, care, control and management of national parks, historic sites, nature reserves, State conservation areas, Aboriginal areas and state game reserves, and is administered by DECCW. The NP&W Act also provides for the protection, preservation and management of Aboriginal relics and the protection of native flora and fauna in NSW. Under the NP&W Act, permits are required for the destruction of any known Aboriginal archaeological sites (section 90). However, such permits are not required for projects approved under Part 3A of the EP&A Act.

Potential impacts to Aboriginal places and objects, and historic sites are considered in Section 6.2 of this EA. Potential impacts to native flora and fauna and National Parks are considered in Section 6.1 of this EA. No significant impacts are anticipated to matters protected under the NP&W Act.

5.1.8 Coastal Protection Act 1979

The *Coastal Protection Act 1979* provides for the protection of the coastal environment of the State for the benefit of both present and future generations. One of the key objectives of the Act is to protect, enhance, maintain and restore the environment of the coastal region, its associated ecosystems, ecological processes and biological diversity, and its water quality. To this end section 38 of the Act requires a public authority to obtain the concurrence of the Minister for Environment, Climate Change and Water prior to carrying out any development in the coastal zone. However, the Project does not include works within the coastal zone, and therefore the requirements of this Act do not apply.

5.2 NSW environmental planning instruments

The EP&A Act allows for the making of environmental planning instruments (EPIs) at local, regional and State levels. EPIs have statutory force under the EP&A Act and include State Environmental Planning Policies (SEPPs), Regional Environmental Plans (now deemed SEPPs) and Local Environmental Plans (LEPs). EPIs collectively establish the permissibility of development proposals and controls (either by development standards or otherwise) for development.

The EPIs of relevance to the Project are discussed below.

5.2.1 State environmental planning policies

A number of SEPPs are either directly applicable to the Project or contain objectives and provisions that are relevant to the assessment of environmental issues and development of impact mitigation measures. The SEPPs of relevance to the proposal are discussed in **Table 5.3** below.

Table 5-3 Relevant SEPPs and their Application to the Project

State Environmental Planning Policy	Application to Project
State Environmental Planning Policy (Infrastructure) 2007	State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP) applies to all areas and components of the Proposal. Under Clauses 106 and 125 of the Infrastructure SEPP, proposed water and wastewater related services are generally permissible without consent. Certain aspects of the works, particularly related to investigations and testing, would be considered exempt under the provision of the Infrastructure SEPP. Sydney Water is seeking to exclude these elements from the Major Project Application.
State Environmental Planning Policy 14 – Coastal Wetlands	State Environmental Planning Policy 14 – Coastal Wetlands (Coastal Wetlands SEPP) aims to ensure that coastal wetlands are preserved and protected in the environmental and economic interest of the State. Its objectives include: - protecting valuable wetlands - ensuring that a wide range of benefits of wetlands continue

State Environmental Planning Policy	Application to Project
	- enabling cumulative effects of existing and proposed developments to be assessed - encouraging developers to find alternatives to disturbing wetlands. This SEPP provides guidance for consent authorities in terms of issues to consider if there is potential for a listed wetland to be affected by a proposal. Lake Illawarra is listed under SEPP 14 as a coastal wetland. However, Part 6 of the SEPP provides that consent is not required if the project has been declared under Part 3A of the EP&A Act. Notwithstanding, Sydney Water has assessed potential impacts of the project on Lake Illawarra and has concluded that the Project is unlikely to result in impacts to this coastal wetland (see Section 6).
State Environmental Planning Policy 71 – Coastal Protection	State Environmental Planning Policy 71 – Coastal Protection (Coastal Protection SEPP) has been made to ensure development in the NSW coastal zone is appropriate and suitably located, that there is a consistent and strategic approach to coastal planning and management, and there is a clear development assessment framework for the coastal zone. The Project is located outside the area of the Coastal zone, and therefore this SEPP does not apply.
State Environmental Planning Policy Rural Lands 2008	State Environmental Planning Policy Rural Lands 2008 (Rural Lands SEPP) aims to facilitate the orderly and economic use and development of rural lands for rural and related purposes. It was introduced in order to provide a state-wide framework in managing agriculture and the proposed planning of rural lands to provide opportunities for rural lifestyle, settlement and housing in rural communities. Section 4 of the SEPP states that the SEPP does not apply to land within the Wollongong Local Government Area.
SEPP 44 – Koala Habitat Protection	SEPP 44 aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas in order to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline. SEPP 44 applies to local government areas (LGAs) listed in Schedule 1, and includes Wollongong LGA. Schedule 2 of the SEPP lists the feed tree species, which influence whether an area may have potential koala habitat. The flora and fauna studies undertaken for the project found that while portions of the study area are considered to qualify as Potential Koala Habitat (due to the presence of <i>Eucalyptus tereticornis</i> at greater than 15% of the upper and lower canopy component), the paucity of local records and lack of evidence of Koala during recent studies, suggests that the site does not contain Core Koala Habitat. Section 6.1 and Appendix B provide the results of the flora and fauna study.
SEPP 33 – Hazardous and Offensive Development	SEPP 33 defines potential hazardous and offensive developments and specifies the requirements for the assessment of hazards and the granting of development consents. SEPP 33 normally only applies to developments requiring development consent under Part 4 of the EP&A Act. As the Project is to be undertaken under Part 3A of the EP&A Act, the requirements of the SEPP do not apply. However, Sydney Water has undertaken a potential hazards assessment, generally in accordance with the SEPP 33 guidelines to examine the potential hazards relating to the Project. The assessment undertaken in Section 6 is consistent with this policy and with the guideline <i>Applying SEPP 33: Hazardous and Offensive Development Application Guidelines</i> (DUAP, 1994).

5.2.2 Regional environmental plans

The *Illawarra Regional Environmental Plan No 1* (Illawarra REP 1) is the only applicable REP to the Project. As of 1 July 2009, all existing regional environmental plans (REPs) are deemed State environmental planning policies (SEPPs) to simplify the State's planning system.

The Illawarra REP 1 provides a framework for coordinated action to ensure best use of land resources, improving quality of life, protecting regional needs and interests and establishing a stable and attractive climate for public and private investment in the Illawarra Region.

The proposed development is consistent with the aims, objectives, and provisions of the Illawarra REP 1, in that it would enable water and wastewater services to be provided to the West Horsley

area in an ecologically sustainable manner (refer Chapter 9), consistent with the broader planning objectives of the Illawarra region.

5.2.3 Local environmental plans

The Project is located within the Wollongong Government Area. The LEP's that apply to the area include:

- *Wollongong Local Environmental Plan (West Dapto) 2010*
- *Wollongong Local Environmental Plan 2009*

One of the functions of LEPs is to establish land use zonings and to define the objectives and development restrictions for each land use zone. The LEP zonings applicable to the proposal are summarised in **Table 5.4**.

Table 5-4 Summary of land use zonings of proposed work sites

Local Environmental Plan	Land zonings	Permissibility of Project
West Dapto 2010	RU2 Rural Landscape R2 Low Density Residential E2 Environmental Conservation E3 Environmental Management	Prohibited in all zones. However, pipelines are required to facilitate the objectives of the RU2 and R2 zones, and are generally in accordance with the objectives of the E2 and E3 zones.
Wollongong 2009	E3 Environmental Management	Pipelines are not specified as permissible development, however are generally in accordance with the objectives of the E3 zone, which are to <i>"provide for a limited range of development that does not have an adverse effect on areas with special ecological, scientific, cultural or aesthetic values"</i> .

While the construction and operation of the project is not specified as permissible within the land use zones described in the table above, the LEPs state that the provisions of any SEPP prevail over the plans. SEPP (Infrastructure) 2007 includes provisions for water and wastewater infrastructure without consent.

5.3 Commonwealth legislative and planning framework

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires approval from the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities for any action likely to have a significant impact on a matter of national environmental significance. Matters of national environmental significance are:

- World Heritage properties
- National Heritage places
- wetlands of international importance
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- nuclear actions.

Commonwealth land is also protected under the EPBC Act. No Matters of Environmental Significance or Commonwealth land will be affected by the project. Accordingly, a referral to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities is not required.

6 Key environmental issues

6.1 Ecology

6.1.1 Overview

A flora and fauna assessment has been undertaken for the Project, in accordance with the *Draft 3A Guidelines for Threatened Species Assessment* (DEC, 2005b) and DECCW's *Draft Threatened Biodiversity Survey and Assessment Guidelines* (DEC, 2004). The guidelines identify factors that must be considered when undertaking assessments for developments under Part 3A of the EP&A Act. Specifically, the guidelines relate to surveying and assessing impacts on threatened species, populations or ecological communities or their habitats.

The pipeline routes have been designed to minimise impacts on native vegetation and habitats, based on initial fieldwork and identifying ecological constraints. The pipelines will be located entirely within heavily disturbed and previously cleared land. Apart from one hollow-bearing tree that may need to be removed, the proposal will not involve the removal of substantial trees, intact native vegetation or other important habitats.

6.1.2 Assessment

The assessment undertaken included a data audit, literature review and field surveys (including targeted surveys), as detailed in Appendix B.

Field surveys

Field investigations were carried out between 8 October 2010 and 3 December 2010. The study area comprised approximately 30 ha of land, generally based on a 25 m buffer around each proposed pipeline. A number of options were investigated for the wastewater pipeline to determine the route of least environmental impact through areas of higher value habitats.

The subject site is approximately 3.5 ha and comprises the 10 m wide zone along the final water and wastewater routes. Land may be directly disturbed by construction activities within this 10 m zone (for example for equipment layout), although the actual excavation for the pipelines should not be more than 2-3 m wide.

The study area has been subject to substantial levels of disturbance, including clearing for grazing, dam construction and residential infrastructure including housing, roads and major electricity easements. The vast majority of the study area (and subject site) occurs within cleared land currently used for grazing or road easements. The remnant native vegetation in the general area has also been substantially disturbed, but larger patches generally constitute one or two endangered ecological communities listed under the TSC Act.

6.1.3 Existing environment

Six vegetation communities or associations were identified within the study area as identified in Table 6.1 below. Figure 6.1 shows the location of the vegetation communities within the study area.

Table 6-1 Vegetation communities present within the study area

Vegetation community	Description and location	Conservation status
Coastal Grassy Red Gum Forest	This community generally occurs in the study area as small remnant patches on the northern fringes. All examples of this community have been disturbed by clearing, grazing and weed invasion. The residential section of the Bong Bong Road easement previously constituted this community (as mapped by NPWS (2002)), however has been subject to severe disturbance from clearing, roadside landscaping (planting), and weed invasion such that it only resembles the community from scattered remnant and	Community is consistent with the final determination of <i>Illawarra Lowlands Grassy Woodland</i> , which is listed as an Endangered Ecological Community (EEC) under the TSC Act.

Vegetation community	Description and location	Conservation status
	regrowth trees that are characteristic of the original community.	
Lowland Woollybutt-Melaleuca Forest	This vegetation community occurs in the southeast portion of the study area, excluding the main riparian sections. Most of the community shows evidence of recent grazing and weed invasion, with a very open shrub layer. The canopy is relatively young with no old growth components present, suggesting widespread previous clearing. The northwest occurrence of this community in the study area starts to resemble the Coastal Grassy Red Gum Forest, which replaces the Lowland Woollybutt- Melaleuca Forest community at slightly higher elevations.	Association is consistent with the final determination of <i>Illawarra Lowlands Grassy Woodland</i> , which is listed as an EEC under the TSC Act.
Swamp Oak Forest	This vegetation community is restricted to the forested riparian areas in the southeast portion of the study area, and is characterised by stands of <i>Casuarina glauca</i> (Swamp Oak). Previous disturbance is evident, as is weed invasion in the understorey. Previous vegetation mapping of the study area appears to have included this community with the Lowland Woollybutt-Melaleuca Forest community and associated Illawarra Lowlands Grassy Woodland EEC, however <i>C. glauca</i> is not characteristic of the above EEC.	Consistent with the final determination of <i>Swamp Oak Floodplain Forest</i> , which is listed as an EEC under the TSC Act.
Artificial Wetlands	Artificial wetland communities have been formed by the creation of farm dams in the southeast of the study area. Native aquatic vegetation is dominated by <i>Triglochin procerum</i> (Water Ribbons), <i>Typha orientalis</i> (Cumbungi), <i>Baumea</i> sp. (Twigrush) <i>Ludwigia peploides</i> ssp. <i>montevidensis</i> (Water Primrose), <i>Azolla pinnata</i> (Ferny Azolla) and <i>Juncus</i> sp. (Rush). Aquatic weeds are dominated by <i>Nasturtium microphyllum</i> (Brown Watercress) and the wetlands are largely surrounded by exotic pasture grasses.	As this wetland community is artificial, it is not considered to constitute the Freshwater Wetlands on Coastal Floodplains EEC listed under the TSC Act.
Pasture and Roadside	This community occurs throughout the majority of the study area. Historically it has been cleared for grazing. It comprises dense groundcover of exotic and native grasses and herbs with a few trees scattered across the area. Most of the roadside vegetation in the study area is similar to nearby pasture, but recently has been subject to less grazing disturbances and contains a greater proportion of introduced species. Very occasional paddock trees are present, including <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>Eucalyptus eugenioides</i> (Narrow-leaved Stringybark), <i>Angophora floribunda</i> (Rough-barked Apple) and <i>Casuarina glauca</i> (Swamp Oak). Typical groundcovers include <i>Axonopus fissifolius</i> (Narrow-leafed Carpet Grass), <i>Juncus continuous</i> , <i>Poa labillardieri</i> var. <i>labillardieri</i> (Tussock Grass), <i>Chloris gayana</i> (Rhodes Grass), <i>Dichondra repens</i> (Kidney Weed), <i>Briza minor</i> (Shivery Grass), <i>Pratia purpurascens</i> (Whiteroot), <i>Senecio madagascariensis</i> (Fireweed) and <i>Pennisetum clandestinum</i> (Kikuyu Grass).	None
Planted native and exotic species	The northern portion of the Illawarra Gun Club land is cleared with a primarily exotic groundcover of grasses and a diverse range of planted native and exotic trees and shrubs. These include <i>Lophostemon confertus</i> (Brush Box), <i>Grevillea robusta</i> (Silky Oak), <i>Jacaranda mimosifolia</i> (Jacaranda), <i>Erythrina X sykesii</i> (Coral Tree), <i>Agapanthus praecox</i> (Common Agapanthus), <i>Hakea dactyloides</i> (Finger Hakea), <i>Pittosporum undulatum</i> (Sweet Pittosporum) and a number of <i>Casuarina</i> , <i>Eucalyptus</i> , <i>Callistemon</i> , <i>Melaleuca</i> , <i>Pinus</i> and <i>Ficus</i> species.	None

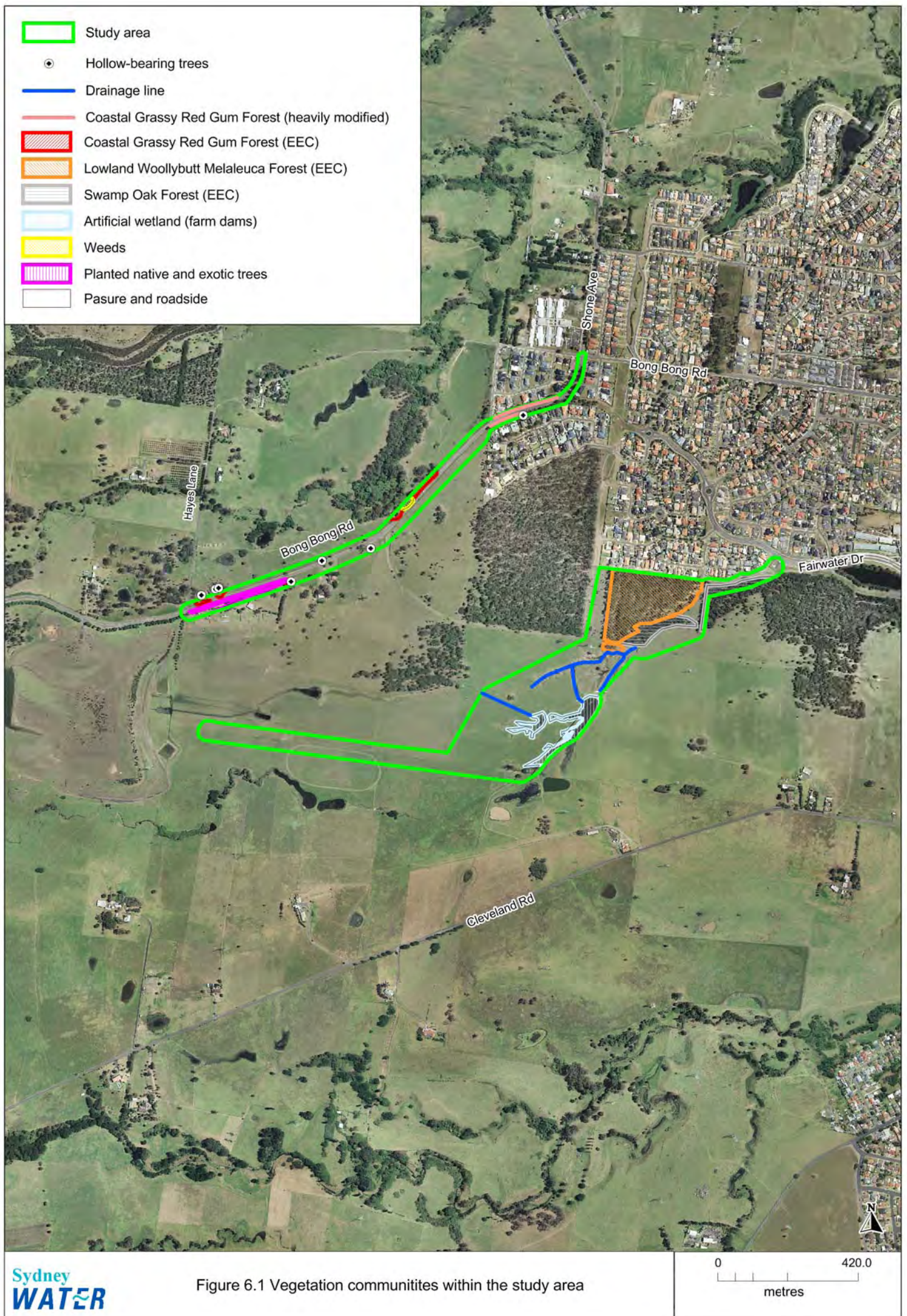


Figure 6.1 Vegetation communities within the study area

Threatened flora

No naturally occurring threatened plants were identified in the study area. Targeted surveys were undertaken for the *Pterostylis gibbosa* (Illawarra Greenhood), *Chorizema parviflorum*, *Lespedeza juncea* ssp. *exalata* and *Pimelea spicata*, however none were found. The lack of detection during targeted surveys and the disturbed condition of habitats present suggest that threatened flora species are not likely to occur naturally in the study area.

An unidentified *Syzygium* species was recorded as part of landscape plantings along the Bong Bong Road easement in the north east of the study area. This is likely to be *Syzygium paniculatum* (Magenta Lilly Pilly), which is commonly propagated and used for landscaping, but is also listed as a threatened species under both the TSC Act and EPBC Act. However, the species occurs naturally only in coastal rainforest communities; there are no records in the locality and the study area does not provide potential habitat for the species. So while potentially a threatened species, this commonly planted species does not occur naturally in the study area and will not be assessed further in this report.

Fauna habitat

Four hollow-bearing trees were recorded in the northern parts of the study area, although only one of these trees may need to be removed for the Project (Figure 6.1). No hollow-bearing trees were recorded in the southern parts of the study area. Other notable fauna habitats included the farm dams in the south east, which have created artificial wetland habitats, and associated ephemeral drainage lines. The pipeline alignment avoids the majority of hollow-bearing trees.

Potential Koala Habitat is defined in SEPP 44 as areas where the tree species listed under Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. An area of land to which the policy applies must be at least one hectare in area (and may include adjoining land in the same ownership).

Eucalyptus tereticornis comprised at least 15% of the total number of trees in the upper or lower strata of the tree component in the Coastal Grassy Red Gum Forest and probably the Lowland Woollybutt-Melaleuca Forest communities; therefore the site qualifies as Potential Koala Habitat.

There have been a total of five recorded koala sightings within 10 km of the site since 2000, the closest being over 8 km away. Surveys of adjacent and similar habitats undertaken by ELA (2009) included scat searches for Koala, call play back and spotlighting. The Koala was not detected via any of these methods, suggesting that the site does not support a resident Koala population and does not qualify as Core Koala Habitat. Furthermore, the Project will only remove a small number of mostly young trees within a residential context and will not adversely affect Koala habitat. A Plan of Management for Koala Habitat is not required.

Fauna surveys

- Bird Surveys – A total of 49 bird species were recorded within or close to the study area. No threatened species were recorded. All bird species recorded are considered common woodland and farmland species within the Illawarra Region. The Cattle Egret, which is listed as migratory under the EPBC Act, was recorded in the south of the study area.
- Frog Surveys – No threatened species were recorded during frog surveys for the Green and Golden Bell Frog. Six frog species were recorded (Common Eastern Froglet, Striped Marsh Frog, Peron's Tree Frog, Western Dwarf Tree Frog and Leaf Green Tree Frog), all of which are considered relatively common in the Illawarra Region.
- Opportunistic Observations and Secondary Evidence – No evidence of threatened or otherwise significant fauna species was detected opportunistically. Other fauna recorded opportunistically included four native lizard species (Jacky Lizard, Water Skink, Dark-flecked Garden Sunskink, Blue-tongued Lizard), all of which are common in the region, and six introduced mammals (Cow, Dog, Horse, Cat, Rabbit, Fox).

6.1.4 Construction impacts and mitigation measures

The proposal to provide two underground pipelines through approximately 3.5 km of heavily disturbed land will have relatively minor impacts on the existing environment. The following direct impacts on flora and fauna are anticipated from the Project:

- modifying approximately 3.4 ha of cleared roadside, electricity easement or pasture
- the likely removal of one lower quality hollow bearing tree, situated in a residential context
- excavating soil for trenching of pipes and compacting by construction vehicles
- temporarily disturbing soil and possibly water flow at three sections of ephemeral drainage line located within cleared areas.

The Project has the potential to result in indirect impacts on flora and fauna, including weed invasion, erosion and sedimentation of minor creeklines. However, all of these processes are already present due to the range of disturbances throughout the site.

No intact areas of native vegetation or important habitats will be removed or permanently degraded by the Project. While one threatened plant species *Syzygium paniculatum* (Magenta Lilly Pilly) is likely to be removed from a roadside area, the few individuals affected have been planted for landscaping purposes and are not occurring in their natural habitat. No other threatened species were recorded or are likely to regularly occur in the subject site. Adjacent endangered ecological communities will not be further degraded by the Project.

Mitigation measures to minimise impacts on flora and fauna include:

- Selection of the pipeline route recommended by Ecological Australia, which avoids areas of higher ecological sensitivity as much as possible.
- Avoid areas of EEC, where possible. However, where the pipelines would have an impact on areas of EECs (approximately 100m), the pipelines would be bored under the vegetation to avoid clearing or modifying the EECs. No EECs would therefore be impacted by the Project.
- Retaining hollow bearing trees and other large trees in situ where possible. In the event that a hollow-bearing tree needs to be removed, a qualified ecologist should be present to check for native fauna. Hollows found to be occupied by fauna should not be removed until fauna have vacated the hollow. A hollow-bearing tree removal procedure may be required, and may involve measures that ensure fauna have vacated, sectional removal of the tree hollows and soft-drop techniques to avoid direct impacts on fauna.
- The pipeline routes and construction methods should minimise disturbance to native vegetation and other habitats as much as possible, particularly when close to endangered ecological communities and drainage lines. Use of temporary fencing to mark designated work area, locating construction facilities in already cleared lands and restoring impacted areas to pre-works condition may be undertaken.
- The extent of the direct pipeline construction impact would be limited to a maximum width of 10 m.
- A range of standard mitigation measures such as weed control, hygiene protocols, exclusion fencing, minimising soil disturbance and educating site staff may be implemented. Where necessary, appropriate erosion and sediment controls would be used during and following the construction period, and would remain in place until disturbed soil has been stabilised.
- Pipelines and cleared areas would be rehabilitated to pre-existing condition following the completion of the works.

In relation to the 'maintain or improve' principles, the project has identified ecological constraints early in the process and the proposal has been modified to avoid impacts to high level constraints as much as possible by restricting the pipelines to areas of high disturbance. The direct and

indirect impacts to native vegetation are further mitigated by the use of best practice methods to avoid erosion, sedimentation and weed spread. Given the minimal impacts of the proposal (the potential removal of one hollow bearing tree), the provision of offsets to compensate for the removal of native vegetation is not considered necessary.

6.1.5 Operational impacts and mitigation measures

The pipeline routes and disturbed ground would be revegetated with local native species following completion of construction. The operation of the Project would have little or no direct impacts on terrestrial flora or fauna.

The aspects of operation that have the potential to impact terrestrial flora and fauna are:

- maintaining pipelines (routine)
- repairs to pipelines
- wastewater overflows and leakage from wastewater pumping stations.

The potential impacts associated with routine maintenance would be very minor, short-term and limited to minor disturbance of vegetation by workers and equipment in the vicinity of maintenance holes.

Pipeline repairs are likely to be required infrequently and would involve minor excavation to gain access.

Overflows and leakages from the wastewater system have the potential to impact on native vegetation and fauna habitats by increasing soil nutrients and encouraging weed growth. As discussed in Section 3, leak tight pipes have been selected to minimise leaks, and the system has been designed for no planned overflow points to new areas. In the event that an unplanned and uncontrolled overflow occurred, the low frequency and volume of the overflows would not result in any significant impact on terrestrial flora and fauna.

6.2 Aboriginal heritage

6.2.1 Assessment methodology

Overview

The West Dapto area has been the subject of numerous archaeological investigations over the last decade. Biosis Research also undertook an Aboriginal heritage assessment comprising field surveys and assessments of cultural heritage significance as part of this EA. The aim of the assessment was to gain a better understanding of the history of Aboriginal occupation within the Project area and to identify any additional items and locations of Aboriginal heritage significance that may be present. The following sections summarise the outcomes of the study.

The following guidelines were used to identify the issues that required consideration when assessing the potential impact on Aboriginal cultural heritage and what was required for this EA:

- *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, 2005a)
- *Interim Community Consultation Requirements for Applicants* (DEC, 2004)
- *Aboriginal Cultural Heritage Community Consultation Requirements for Proponents* (DECCW, 2010).

Field surveys

Aboriginal heritage assessments were conducted for the proposed pipelines in October and November 2010. The Aboriginal heritage assessments commenced with searches of DECCW's *Aboriginal Heritage Information Management System* (AHIMS) database to identify previously recorded objects and places of Aboriginal heritage significance within the Project area. Reports from previous archaeological studies were also consulted.

During the field surveys, Aboriginal heritage sites previously recorded on the AHIMS database were visited in the field to confirm their location relative to the proposed works.

While it is expected that construction activities for the new pipelines would be contained within a 10 m corridor, wider corridors (up to 25 m) were surveyed to gain a more complete knowledge of Aboriginal cultural heritage sensitivity in the vicinity of the proposed works.

Registered Aboriginal stakeholders were invited to attend the field surveys for the Project. Nine groups participated in the field surveys, which were undertaken between 1 and 15 November.

6.2.2 Consultation

Consultation acknowledges the right of Aboriginal people to be involved through direct participation in matters that may directly impact on their heritage. The involvement of Aboriginal communities early in the impact assessment and planning process increases the opportunity to have an influence on the outcomes of the process. Successful identification, assessment and management of Aboriginal cultural heritage values are achieved through sustained consultation with interested communities throughout the planning process. (refer to section 8.2.2 for further details)

The Project area falls within the boundaries of the Illawarra Local Aboriginal Land Council. No Native Title groups were identified either within, or close to, the Project study area. Public notifications were placed in *The Illawarra Mercury* on 02/09/10 and 09/09/10 and the *Wollongong Advertiser* on 08/09/10. Eleven Aboriginal stakeholder groups registered an interest in the project. All groups were invited to participate in the field survey, consultation meetings and development of management and mitigation measures for this project. At the completion of the field surveys, details of the Early Release Lead-in Works were sent to all registered stakeholders on 21 January 2010. Details sent included figures showing the proposed routes, as well as areas of sensitivity and known Aboriginal sites, as well as a request for comments. Follow up phone conversations were then made to all stakeholders. All stakeholders advised they had received the letter via mail or email. Two comments were received thanking Biosis for the update and stating that they were generally agreeable with the works.

Consultation activities are ongoing and are discussed in Chapter 8 of this report.

6.2.3 Significance assessment

Heritage sites, objects and places hold value for communities in many different ways. The nature of those heritage values must be considered when determining mitigation measures. The primary guide to management of heritage places in Australia is the *Australia ICOMOS Charter for Places of Cultural Significance* (The Burra Charter) (1999). In accordance with the Burra Charter, Aboriginal cultural heritage resources are assessed in terms of the following three significance criteria:

1. cultural values or significance to the Aboriginal community
2. public significance or educational values
3. scientific significance or archaeological values.

The Aboriginal heritage assessments identified heritage objects and sites within the Project area and provide information to allow the values of those objects and sites to be determined. Only members of the contemporary Aboriginal community are able to make an assessment of cultural values. Archaeological potential refers to the likelihood that Indigenous cultural materials may be present within an area, occurring as surface and/or subsurface artefact deposits. The criteria used to determine the archaeological potential within the Project area landforms includes:

1. Patterns of Indigenous land use and occupation of the region, to identify those landscape areas where material was likely to have been deposited;
2. Distribution of known sites of the area and broader coastal plain, to identify the landforms known to contain archaeological materials (and patterning of those materials);
3. Geomorphic evolution of the landscape, to identify those natural processes that may have affected the archaeological resource;

4. Terrain integrity of the area, considering the impact of post-contact land use history on the potential of archaeological site survival; and
5. Likely detection of archaeological materials, considering the nature of the resource (surface/subsurface materials) and ground surface visibility constraints.

Social/cultural potential may be completely independent of archaeological potential and refers to areas that form intangible expressions of Indigenous culture. The following sections provide a summary of the results of the field surveys and the assessment of significance.

6.2.4 Existing environment

The Project has been assessed as being primarily within areas of moderate Aboriginal archaeological sensitivity, with some areas of low and high sensitivity, as detailed in **Table 6.2**. However, it should be noted, that detection of surface archaeological material is often influenced by ground surface visibility patterns, and the nature of the archaeological resource. Throughout the Project area, ground surface visibility is generally low as a result of dense grass cover, with the majority of areas assessed as having less than two per cent effective visibility. The low visibility means the assessment is conservatively classified as medium or high sensitivity.

Table 6-2 Aboriginal archaeological sensitivity within the Project area

Area of Archaeological Sensitivity	Description	Project components
Low likelihood for intact Aboriginal archaeological remains	Areas that have been identified as having specific locations where there has been a high degree of disturbance since the arrival of non-Aboriginal people, where the impact has been to the extent where no intact deposits are believed to be present. Areas may also include moderate and steep slopes or plains away from water sources. Artefacts found in this area are likely to be isolated, representative of 'background scatter', or in a highly disturbed context	Includes the pipelines and infrastructure within Horsley, particularly along Bong Bong Road and Bridgewater Drive
Moderate likelihood for intact Aboriginal archaeological remains	Areas where minor post contact disturbance has occurred; the area is located along creeks and waterways where short term campsites may have been present. Artefact scatters are likely to vary in density, but are concentrated in small areas.	Includes the wastewater pipeline within the vicinity of the drainage lines surrounding Horsley
High likelihood for intact Aboriginal archaeological remains	Areas associated with major creek lines, raised flat landforms such as ridges and hills, where disturbance has been minimal to the specific area and it is believed that an intact sensitive landscape exists. Artefacts that remain within these areas are likely to be high density	Includes the wastewater pipeline within close proximity to Reed Creek and undisturbed areas of bushland south of Horsley

The above areas of sensitivity are based on a predictive desktop model, which informed targeted field surveys. During the field surveys, no Potential Aboriginal Deposits (PADs) were identified within the Project area. One site (stone artefact) was identified within an initial wastewater pipeline alignment, as discussed below. The alignment was subsequently realigned to avoid impacting the site. Furthermore, the fieldwork undertaken for the preferred wastewater route (presented in Figure 3.1) did not identify any new Aboriginal sites or areas of PAD.

While the modelling shows the sensitivity of the area to be primarily moderate (with some low and high areas of sensitivity), given the fieldwork undertaken to date, and the degraded nature of these areas, it is considered unlikely that Aboriginal sites of high archaeological significance will occur within the proposed zones of impact. Overall the chosen pipeline routes are expected to have minimal impacts on Aboriginal heritage values.

Water pipeline

No Aboriginal sites were found within the road reserve for the water pipeline, either as a result of previous studies or during the field survey carried out for this EA. However, a number of Aboriginal archaeological sites and areas of archaeological sensitivity where sites may occur have been identified within the vicinity of the water pipeline.

Wastewater pipeline

No Aboriginal sites were found within the corridor of the wastewater pipeline as a result of previous studies. However, during the field survey carried out for this EA, an isolated stone artefact was found within the 25 m corridor of one of the options for the wastewater pipeline. Sydney Water has selected an alternate pipeline route to avoid impacting this site, and where possible, areas of potential high archaeological sensitivity.

The item identified has been registered as “Riverpark Way AFT-1” and consists of an isolated chalcedony stone flake, located within the vicinity of a drainage channel. The site is located less than 100m from the drainage lines of Reed Creek. The artefact was located in a disturbed context where ground surface visibility was high. Based on these factors, the site is considered to have low research potential. It is also unlikely that intact sub-surface deposits will be present at the site. Further details are included in Table 6.3 below.

Table 6-3 Assessment of Riverpark Way AFT-1

Site Name and Number	Description/ Representativeness	Rarity	Research Potential	Aesthetic	Values
Riverpark Way AFT-1 (52-2-3815)	This site contains a single fine grained siliceous flake, in an open area of moderate-high disturbance. The site contains a single flaked stone artefact, making it representative of a common class of sites.	Stone artefact sites of a single artefact are not a rare occurrence. This site provides little value under the rarity criterion.	The site occurs in a context with moderate-high disturbance, where earthworks have been undertaken beneath a series of high voltage powerlines. It is considered that there would be low potential for intact archaeological deposits. The site therefore has a low research potential.	The site is located on the West Dapto flood plain and is considered to have low aesthetic value.	Aboriginal Stakeholder Cultural Values – High Archaeological or scientific – Low

6.2.5 Construction impacts and mitigation measures

No known sites have been identified within the proposed pipeline corridors. There are several identified known sites that lie within the vicinity of the Project area, however the works would not impact these sites. To ensure these sites are not impacted, industry standard mitigation measures would be used, where necessary, such as marking relevant sites as ‘work exclusion zones’, and use of temporary protective barriers to direct construction work away from these areas. Such measures would prevent inadvertent damage by construction activities, including work vehicle and construction staff movement.

Sydney Water is committed to minimising disturbance as much as possible in areas of significance. Pipeline realignment has been undertaken to date to avoid known sites.

In regards to protecting potential sites in areas of medium and high sensitivity, staff and contractors on site would be made aware of the locations of known sites and the areas of sensitivity. Inductions would be undertaken prior to the commencement of works to brief staff and contractors on what to look for during construction.

In the event that previously unrecorded Aboriginal objects are discovered during construction, the objects would be recorded by a qualified archaeologist and reported to the AHIMS registrar as soon as practicable. All works in the vicinity of the find would cease and the Sydney Water Project Environmental Representative (PER) would be informed. In the event that human remains are discovered, the following procedure would be followed:

- a. do not further harm the remains
- b. immediately cease all work at the particular location
- c. secure the area so as to avoid further harm to the remains
- d. notify the local police, the Department of Planning, and DECCW's Environment Line on 131 555 as soon as practicable and provide any details of the remains and their location, and
- e. do not recommence any work at the particular location unless authorised in writing by relevant approval authorities.

6.2.6 Operational impacts and mitigation measures

The pipelines would require maintenance during the operation of the Project. No impacts to Aboriginal heritage are predicted. However, should potential impacts on Aboriginal heritage arise, standard operating procedures would be implemented to ensure the maintenance activities would have no impact.

6.3 Non-Indigenous heritage

6.3.1 Existing environment

A search of the following instruments and heritage registers has been undertaken to identify the presence of any heritage items in the vicinity of the Project:

- World Heritage List
- Commonwealth Heritage List
- National Heritage List
- Register of the National Estate (RNE)
- NSW State Heritage Register
- NSW State Heritage Inventory
- Sydney Water Section 170 Heritage Register and other Section 170 registers for relevant government agencies (eg RTA)
- Wollongong Local Environmental Plan (1990 & 2009) heritage schedule
- Wollongong Local Environmental Plan (West Dapto) 2010
- National Trust of Australia (NSW Branch)

The purpose of the search was to identify heritage items that may require protection from project works. The search was limited to within 25 m either side of the proposed pipelines. Previous heritage assessments undertaken for work in the area were also reviewed.

There is one item of non-Indigenous heritage value located within the vicinity of the proposed water pipeline at Bong Bong Road, Horsley (**Table 6.4**). The item, the former tramway alignment is

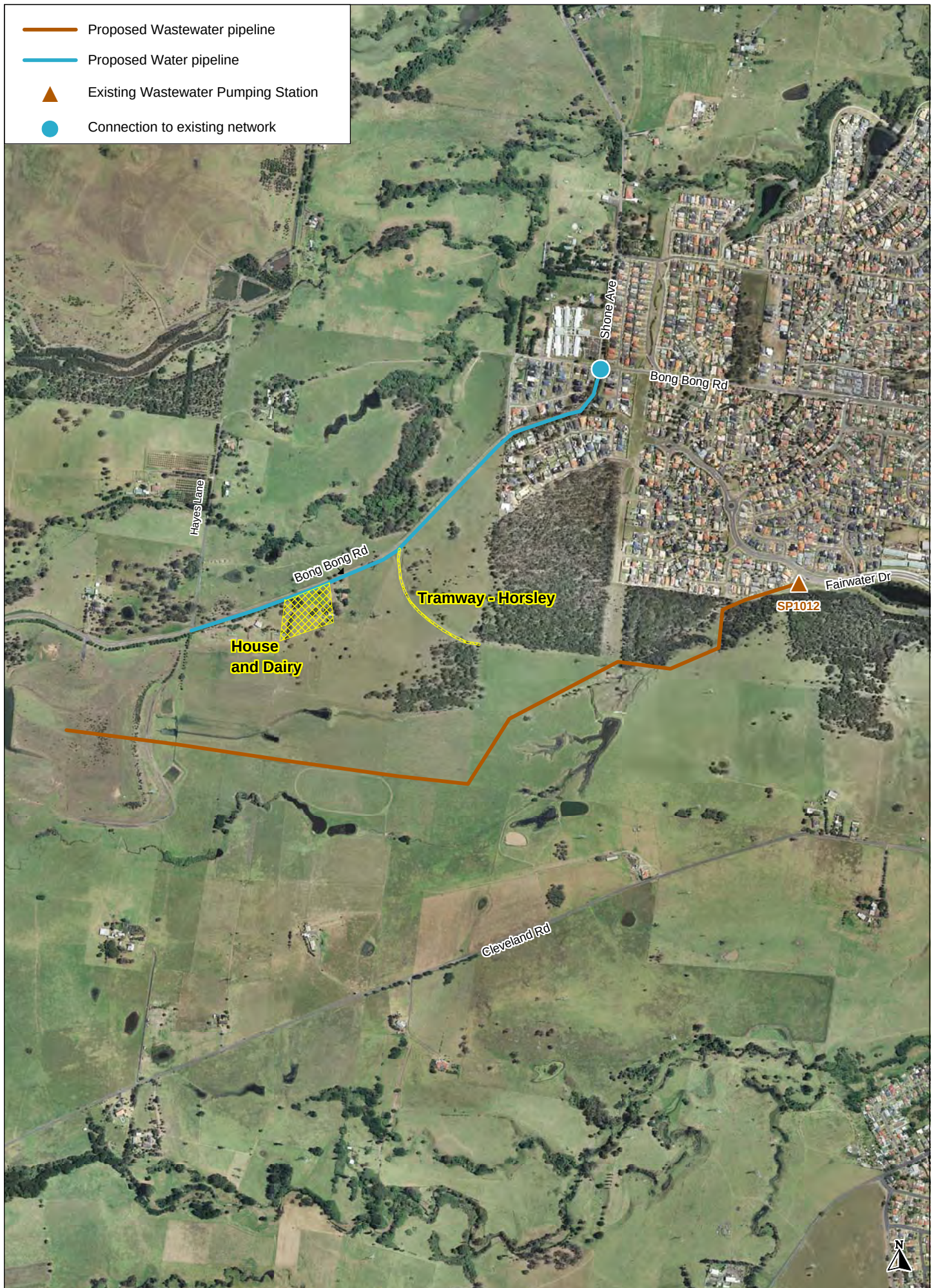
located within the 25 m corridor of the pipeline. Three other items (a timber stock ramp, house and dairy, and a stockyard) were identified during initial desktop studies as located within the 25 m corridor of the pipelines, and as having potential heritage value. These items were recorded by previous studies, undertaken by HLA (2006) and AMBS (2010). Subsequent field surveys undertaken as part of a non-indigenous heritage assessment (by AECOM on behalf of Sydney Water) have confirmed that the timber stock ramp and stockyard are not of heritage significance, and that the house and dairy is located over 40 m from the pipeline route. No heritage items were located within the vicinity of the wastewater pipeline. **Figure 6.1** shows the location of the heritage items within the vicinity of the project water pipeline.

Table 6-4 Non-Indigenous Heritage items in the vicinity of the Project

Item	Location	Heritage listing	Listed significance	Impact
Tramway alignment (former) of local heritage significance	Lot 601 Bong Bong Road, Horsley	Heritage schedule of the Wollongong LEP (West Dapto) 2010	Local	No impact proposed alignment is located within the road reserve, outside the area of the tramway alignment.
Stockyard - including holding yards and a loading ramp. The stockyard is located in an empty paddock close to the road alignment. The stockyard has been constructed from bush timber and more recent dressed timber.	Bong Bong Road, Dapto	None	None	No impact – stockyard was assessed as not of heritage value during field surveys.
House and Dairy - Accessed via Bong Bong Road; neighbours the Illawara Gun Club. Comprises two houses, a windmill, mounted water tank, stockyard and remnant outbuildings associated with the operation of a former dairy. Main house is a c.1940s-1950s single storey brick and fibro structure. Hipped corrugated iron gabled roof. Windows are fixed and timber framed. Two brick chimneys. A small brick outhouse from the same period located at the rear of the house. Several buildings survive from their former use as a functioning dairy. Five main intact buildings of mid-19th century origin.	Bong Bong Road, Dapto	None	Local	No impact – located over 40 m from the proposed pipeline route.
Timber stock ramp	Near Bong Bong Road	None	None	No impact– stock ramp was assessed as not of heritage value during field surveys.

6.3.2 Construction impacts and mitigation measures

The proposed route avoids the heritage items identified in Table 6.4. As such, the Project would not directly disturb or require demolishing any non-Indigenous heritage items or places.



Sydney WATER

Figure 6.2 Non-indigenous heritage items within the vicinity of the project components

0 420.0
metres

6.3.3 Operation impacts and mitigation measures

The pipelines would require maintenance during the operation of the Project. There is no anticipated potential to impact non-indigenous heritage during the operational phase.

6.4 Water quality, hydrology and soils

The construction of the water and wastewater pipeline for the early release lead-in works has the potential to impact water quality and hydrology as a result of:

- increased erosion and sedimentation from cleared construction areas
- discharge of contaminated or dirty water from construction sites.

The operation of the wastewater services has the potential to impact water quality and hydrology as a result of overflows. Ordinarily, overflows from new wastewater pipelines and pumping stations would have the potential to cause localised impacts on nearby creek systems. For this Project, however, the system has been designed for no dry weather overflows, and no planned wet weather overflows.

Wastewater from the new development will be transferred to Wollongong WRP for treatment and discharge. The operation and impacts of the Wollongong WRP were assessed in by the *Environmental Impact Statement (EIS) for the Illawarra Wastewater Strategy* (SWC, 1999) and subsequently approved. Wollongong WRP has sufficient spare capacity to accept the wastewater generated by the new development at West Horsley (refer to section 3.2.2 for details). Therefore the impact of treating and discharging the wastewater from the new development has already been addressed by the EIS and will not be considered in this assessment.

6.4.1 Existing environment

The proposed wastewater pipeline is located in the Reed Creek catchment. Reed Creek is a tributary of Mullet Creek. Mullet Creek flows into the northern end of Lake Illawarra at Koong-Burry Bay.

The proposed development area is approximately two kilometres upstream of the confluence of Mullet and Reed Creeks. The area immediately surrounding the proposed wastewater works is cleared grassland with limited grazing. Further upstream of the site is a rehabilitated mine emplacement area and a rehabilitated mine site. Reed Creek and the proposed wastewater pipeline pass through a small area of highly disturbed native vegetation in the vicinity of Bridgewater Drive.

In the vicinity of the proposed wastewater pipeline Reed Creek can generally be described as a shallow, intermittent creek with fairly poor water quality. Water quality sampling undertaken in the area by Wollongong Council found that a number of water quality parameters exceed ANZECC guidelines. These include faecal coliforms, nitrogen (including ammonia), and metals (copper, zinc, chromium and arsenic). Physical parameters such as Total Suspended Solids (TSS), conductivity, and pH were also found to be very poor.

The Fairy Meadow Soil Landscape dominates the area and the geology is Quaternary sediments. The topography is gently undulating alluvial plains. Fertility of all soil materials is low to moderate, and nutrient status is low. Minor sheet erosion, gully erosion and stream bank erosion occur throughout the area. The erodability of the soil materials is low, however in some areas, the soils are susceptible to mass movement.

Council maps indicate that the area is generally outside flood prone land, and the layout for nearly all the infrastructure has been designed to avoid a 1 in 100 year flood event. Approximately 250 metres of the proposed wastewater pipeline adjacent to Reed Creek would be located within flood prone land. This section of the pipeline will be underground and should not have an impact on or be affected by flooding.

The Project area is not within the coastal zone and as such, the *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (DoP 2010), does not apply to this Project.

Current data indicates that groundwater would be expected to exist at depths greater than 3 m below ground level. During the land capability study for the West Dapto Local Environment Study (LES) groundwater was not encountered during hand auguring activities, which extended to a maximum depth of 1.6 m below ground level (HLA, 2005). A preliminary review of the licences for bores in the area held by the Office of Water indicates the standing water level for most bores is greater than three metres. The groundwater flows in a generally easterly direction towards nearby fluvial systems, subsequently draining to Lake Illawarra (HLA, 2005). Groundwater quality is generally reasonable, with some moderate levels of salinity identified in older bores

Salinity is not considered an issue for this project. During the land capability study undertaken for the West Dapto LES in 2004 the (then) Department of Planning Infrastructure and Natural Resources (DIPNR) advised that no salinity issues had been identified in the WDURA similar to those that occur in other parts of the State (HLA, 2005). Soil samples taken for the LES identified two areas with high salinity areas. One of these areas was to the south of the study area near Avondale Road and the other to the north of Horsley. However, sample sites taken in closer proximity to this project returned low or moderate readings. Based on DIPNR's advised and the presence of only low-moderate salinity levels, it is anticipated that salinity will not be an issue for this project.

Wollongong Council 2010 Acid Sulphate Soils (ASS) maps indicate no project components would be situated in an area at risk from ASS. ASS is not considered an issue for this project.

6.4.2 Construction impacts and mitigation measures

Construction work involves the excavation of trenches to lay the pipelines. Construction activities associated with the project have some limited potential to cause water quality, hydrology and soils impacts (discussed below).

Groundwater

There is the potential for trenching and boring for the proposed pipelines to impact on groundwater. Furthermore, shallow groundwater may be encountered after rainfall and adjacent to creek and drainage lines during pipeline construction. Provided appropriate mitigation measures are implemented, impacts on shallow groundwater are not expected.

Groundwater encountered during construction would be pumped out of the work area and treated prior to discharge. Should groundwater inflow rates into the construction area exceed pumping rates, it may be necessary to consider locating a number of boreholes with pumping apparatus around the construction area to inhibit groundwater flow.

Erosion and sedimentation

Disturbance, excavation and stockpiling of soils would occur during construction of the Project. If not properly managed, disturbed soils can be eroded by runoff from the construction sites into the surrounding environments causing impacts such as sedimentation and eutrophication. The risks of these impacts occurring are largely dependent upon three risk factors:

- the extent of soil disturbance
- the location of the construction site relative to environmental and catchment features (eg. creeks)
- soil characteristics.

Table 6.4 identifies the risk of erosion and sedimentation impacts from the construction of each of the different Project components, based on the three risk factors identified above. The wastewater pipeline has the highest erosion and sedimentation risks during construction as it is located in the lowest part of the catchment adjacent to creeks through soils with a high erosive potential. The water pipeline and upgrade to the storage capacity of the wastewater pumping station have been assessed as having low risk of erosion and sedimentation during construction. Creek crossings by pipelines also have the potential to impact upon water quality and cause sedimentation and erosion impacts.

The risks assessed in Table 6.5 can be reduced to acceptable levels by developing and implementing appropriate and standard erosion and sedimentation mitigation measures as detailed in *Managing Urban Stormwater: Soils and Construction* (Landcom 2004). Progressive trenching would reduce the risks of soil erosion. This limits amount of trenching undertaken in one day to the length of pipeline to be laid on that day. At the end of each day the trench is backfilled filled avoiding possible sedimentation from stockpiled spoil.

Where the pipeline crosses Reed Creek the flow is ephemeral. It may be possible to construct the pipeline crossing when there is no water in the creek. If this were not possible then a creek diversion using sandbags would be required. In this situation the impact would be minimised by constructing only half the pipeline at one time. This would require diverting only half the creek at any one time. The overall impact of constructing the pipeline across Reed Creek should have minimal impact as the area is already very disturbed and existing water quality is poor.

Table 6-5 Erosion and sedimentation risks for construction of project components (without mitigation measures)

Component	Soil disturbance during construction	Proximity to environmental and catchment features	Soil characteristics	Overall risk
Water pipeline	Minor - Typical disturbed construction area = 30 m long x 10 m wide (Note: once pipelines are installed disturbed areas are progressively rehabilitated)	Located in cleared road reserve. Little or no remaining remnant native vegetation	Soils on higher slopes have low – moderate erosive potential.	Low
Wastewater pipeline	Minor - Typical disturbed construction area = 30 m long x 10 m wide (Note: once pipelines are installed disturbed areas are progressively rehabilitated)	Located in the lowest part of the catchment adjacent to Reed Creek and drainage lines. Has been designed to avoid important remnant native vegetation	Soils in the lower part of the landscape around creeks have a very high erosive potential and in some areas are prone to sodicity (which may further increase erosion)	Medium - high
Upgrade to SPS 1012	Existing SPS -disturbance to expand storage would be minimal.	Located in vicinity of Reed Creek. Will not require vegetation removal	Soils in the lower part of the landscape around creeks have a very high erosive potential and in some areas are prone to sodicity (which may further increase erosion)	Low

Other impacts

There is a low risk of soil, groundwater and surface water contamination during the construction phase from the spillage of chemicals such as lubricants, fuels, grease and other materials required for construction. During construction, fuel (diesel and petrol) and oils would be used by construction vehicles and equipment. At each construction area, small volumes of fuels (generally about 200 L) would be stored and used to refuel generators, saw cutters and other similar types of construction equipment. In addition, there may be small quantities of chemicals used during construction (generally in containers of less than 20 L). Any fuels or chemicals would be stored to meet relevant standards in bunded or contained areas and a spill kit would be provided at all locations where fuels are used. 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.

Appropriate soil and water management strategies would be developed during the pre-construction phase for the works to prevent soil and water pollution.

6.4.3 Operation impacts and mitigation measures

Overflows from the wastewater transport system

Sydney Water's wastewater system transports and treats wastewater through a network of pipes, wastewater pumping stations and wastewater treatment plants. In dry weather, overflows of wastewater can occur for a variety of reasons, such as when there is a blockage in a wastewater pipe caused by tree roots or other material, or if a pump fails at a pumping station.

In wet weather, stormwater flows into the wastewater system and may exceed the system's capacity resulting in overflows from the pipe network. These events are recognised within the EPL # 218 set by DECCW, which requires the Wollongong system to not exceed 43 overflow events every 10 years.

For this Project, Sydney Water has planned to minimise the occurrence of overflows. The system has been designed for no dry weather overflows, and no planned wet weather overflows. The use of leak-tight pipes will minimise the amount of stormwater inflow in wet weather events, and will prohibit tree root infiltration.

As such, water quality and hydrology impacts on Reed Creek from wastewater discharges would be minimal.

6.5 Human health

6.5.1 Existing environment

Human health needs to be considered as part of the Project as water related services are essential to public health. Providing safe drinking water and wastewater services is required to ensure that exposure to microbial hazards is minimised.

6.5.2 Construction impacts and mitigation measures

Construction of the Project would have no direct impact on human health. As such, no construction impact mitigation measures are required in relation to human health.

6.5.3 Operational impacts and mitigation measures

The proposed wastewater services will connect to, and be operated in accordance with the Wollongong Environment Protection Licence (EPL No 218) administered by DECCW. The first two objectives of this licence require Sydney Water to:

- protect the environment and public health from sewage treatment plant effluent and sewer overflows
- properly and efficiently manage the wastewater system to minimise harm to the environment and public health.

The proposed water services will be sourced from the Wongawili Reservoir and treated at the Kembla Grange Water Filtration Plant. Sydney Water treats drinking water to meet the *Australian Drinking Water Guidelines*. The *Australian Drinking Water Guidelines* are set by the National Health and Medical Research Council (NHMRC). Sydney Water's compliance with these guidelines is regulated by NSWHealth who work in close association with Sydney Water to ensure that water is safe to drink and public health is protected. Providing drinking and wastewater services is managed through Sydney Water's Integrated Management System and Standard Operating Procedures. These are used throughout Sydney Water's operations to ensure the reduction in pathogen and toxicant levels to mitigate the risk of impacts on human health.

6.6 Dust and odour

6.6.1 Existing environment

Air Quality

Wollongong City Council's *State of the Environment Report* (2008) indicates that air quality across Wollongong is highly variable but in recent years standards have rarely been exceeded at its regional monitoring stations. The main sources of air pollution in the region are industrial activities, particularly from the Port Kembla area, high levels of motor vehicle usage, hazard reduction burning, general domestic pollution and 'natural' particulates such as pollen and dust.

Odour

Odours may reduce the amenity of an area and may cause significant public annoyance. *The Technical Framework: Assessment and management of odour from stationary sources in NSW* (DECC 2006) suggests that nuisance impacts are unlikely to occur when the odour level at a receptor is less than two Odour Units for 99% of the time. Odours in the Project area can be considered typical of those encountered in a rural/residential environment located on the edge of an industrial area. The *West Dapto Release Area Draft Local Environmental Study* (MG Planning 2006) notes that the pollutants affecting the WDURA are predominately produced outside the area and transported in via the prevailing winds.

Sydney Water currently has limited odour-producing infrastructure in the Project area. The main source of odour from Sydney Water's operations is from wastewater infrastructure, eg odour treatment units and vent shafts. To date, no odour complaints have been received regarding the existing wastewater infrastructure in the area. This indicates that odours from the existing wastewater systems are not a nuisance to the environment.

6.6.2 Construction impacts and mitigation measures

Air quality – dust

Excavation of trenches, construction traffic and wind erosion of cleared areas and stockpiles may impact air quality through dust generation. Constructing the pipelines would involve only minimal surface disturbance at any one time as the excavation works and rehabilitation would happen progressively. Upgrading the wastewater pumping station storage capacity would require larger areas to be levelled and cleared. However, areas disturbed would be relatively small in comparison to other large infrastructure developments.

Appropriate dust management measures would be implemented throughout the duration of the construction activities. These measures could include watering exposed soils when necessary, covering trucks removing waste materials, progressive restoration of disturbed areas and maintaining stockpiles at a height of less than 1.5 metres. These standard measures should ensure that the impacts from dust are minimal.

Odour

No odour impacts are expected during construction of the pipelines. There is the potential for very short term, minor odour impacts to occur during upgrade of the storage capacity of the wastewater pumping station in 2015. Industry standard practices, such as the use of temporary odour control units can be made available to minimise impacts if necessary. The potential for increased odours will be considered during the detailed design process prior to the construction in 2015. At this time Sydney Water will review the operation of the pumping station and consider the need for interim solutions to odour impacts.

6.6.3 Operation impacts and mitigation measures

Air quality – dust

The operation of the Project infrastructure would not generate dust or air particulates.

Odour

Although odours do not represent a health risk to either the public or the biophysical environment, odour can reduce the amenity of an area and be a considerable nuisance. The wastewater pipeline and pumping station have the potential to generate local odour impacts, if they are not properly designed and operated. Odours generally occur when the wastewater becomes anaerobic (ie lacking oxygen) due to poor venting or stagnant conditions in the pipelines (ie low or no flows). The wastewater pipeline will use leak tight pipes and have sufficient grade to maintain self-cleansing velocities. This is to prevent settling of solids within the pipeline therefore reducing odour potential within the wastewater network.

The nearest residents are located approximately 20 metres from the existing wastewater pumping station. To date no complaints have been received regarding this facility. The pumping station has been designed to cater for increased flows. The additional flows into the pumping station will reduce detention time in the pumping station wet well and rising main. This will further reduce the risk of odours being generated. As a result, odour levels are not expected to be greater than the current operations and therefore not likely to cause a nuisance to the nearby residents.

Emergency storage shall be provided to allow Sydney Water sufficient time to respond to failures at the pump station and to mitigate the potential for overflow to occur. The emergency storage is designed to be an integrated part of the wastewater pumping station. There is a potential for increased odour during a prolonged failure scenario however such incidences are expected to be infrequent. Odour control measures include that the emergency storage be self-cleaning and that any odours are vented appropriately.

Furthermore, vent stacks of varying height and diameter will be designed into the wastewater pipelines to allow the controlled release of odours and the inflow of fresh air into the system. Vent stacks are designed to allow the release of odours before they reach nuisance levels (ie. greater than two Odour Units). There is expected to be a negligible impact on surrounding land uses, provided these vents are adequately designed and located. There is an existing vent stack at wastewater pumping station located approximately 20 metres from the nearest residents. It is anticipated there will be no change to odour impacts from this stack. It is expected that approximately five vent stacks will need to be built along the new wastewater pipeline. The existing residents are likely to be located between 40-150 metres away from the nearest vent stack. Given that this is more than twice the distance from the existing vent stack, it is considered most unlikely that any odour impact would be experienced.

Odour management would be undertaken in accordance with Sydney Water's existing operating procedures. Any odour complaints would be registered and investigated. Engineering, operational or other odour reduction measures may be implemented where verified odour complaints are received about odours from the Project's wastewater components.

Sydney Water plans, designs and constructs its wastewater systems to meet the requirements and standards set by the Water Services Association of Australia (WSSA). This includes:

- vent shaft design and location
- ensuring self-cleansing velocities
- minimising detention times in pumping stations.

Meeting these parameters will generally ensure that odours do not become a nuisance. The fact that Sydney Water has not received any odour complaints in the area would indicate that the system is operating to expectations. All new infrastructure will be designed and constructed to meet the same parameters. It is expected that both existing and proposed components will continue to operate to meet these parameters and that odours impacts will not occur. For these reasons the consideration of odours has been limited to a qualitative assessment.

6.7 Noise and vibration

6.7.1 Construction impacts and mitigation measures

In assessing the potential noise impacts for this Project, Sydney Water has used a qualitative assessment. In accordance with the *Interim Construction Noise Guidelines* (ICNG), the relatively short-term nature of the impacts of noise and vibration on nearby residences justifies this approach. The ICNG define works that are not likely to affect an individual or sensitive land use for more than 3 weeks in total as 'short-term'. As the pipeline would be constructed in a progressive manner, and is located primarily outside urban areas, impacts to receivers would be 'short-term' and as such, the qualitative assessment approach is justified.

Equipment Types

The proposed construction works would involve the use of equipment such as:

- excavator
- rockbreakers
- small compactor
- saw cutters
- welding equipment
- delivery and concrete trucks
- powered hand tools
- small compressor
- small generator
- trucks and pumps (if dewatering required)
- micro-tunnelling or directional drilling rigs
- crane for wastewater pumping station upgrade.

Sensitive Receivers

It is expected that the noise levels generated by construction of the pipelines will cause some disturbance to a number of residences in the area. The closest residents are located approximately 20 m from the proposed pipeline alignment. There is also a school located about 200 m from the wastewater pipeline. The proximity of these properties to the proposed work and low ambient noise levels in the immediate surrounding areas means that some short-term disturbances could occur. This is because the noise impacts associated with pipeline construction are transitory, with work areas being located next to individual properties for less than one week. Hence it is anticipated that any impacts would be minor. Given the distance to the school, adverse noise impacts are not expected.

Receivers would experience construction noise and vibration associated with the following activities:

- vehicle and staff movements
- generator operation
- delivery and removing materials
- using equipment for excavation
- installing pipes
- general construction activities.

Impacts on the acoustic environment during construction would be short-term and localised, normally occurring during daytime hours.

Review of the *Environmental Criteria for Road Traffic Noise* was undertaken for the Project. The road traffic associated with construction activities has the potential to cause noise impacts to nearby residences. However, due to the negligible increase in traffic due to construction vehicle movements the impact of increased noise levels is considered insignificant.

Review of the *Assessing Vibration: A Technical Guideline* was undertaken for the Project. Vibration impacts may result from truck movements or excavating in close proximity to existing residences. There is the potential for vibration impacts to exceed the DECCW criteria for human comfort, however this is considered unlikely, and vibration is not expected to cause structural damage. Furthermore, as with construction noise, vibration impacts would be transitory as the pipeline progresses and impacts to any individual receiver would be minor.

Mitigation Measures

Potential noise and vibration impacts on the community can be minimised through the implementation of industry standard noise control measures, such as those outlined in the *Interim Construction Noise Guideline* (DECC, 2009) and the Australian Standard 2436-2010 “*Guide to noise and vibration control on construction, demolition and maintenance sites*”. Typical mitigation measures include:

- adopt normal working hours for construction activity
 - o Monday to Friday 7 am to 6 pm
 - o Saturday 8 am to 1 pm
 - o no work on Sundays or public holidays
- operate plant in a quiet and efficient manner
 - o examine, and implement where feasible and reasonable, alternative work practices which generate less noise
 - o examine, and implement where feasible and reasonable, the use of silenced equipment and noise shielding around stationary plant
 - o ensure plant is regularly maintained, and repair or replace machinery that becomes noisy
 - o arrange work site to minimise the use of movement alarms on vehicles and mobile plant
- community notification
 - o contact potentially noise affected neighbours at the earliest possible time before any site work begins
 - o inform potentially noise affected neighbours about the nature of the construction stages and the duration of the works.

As discussed in Section 8, communication processes would be developed and implemented throughout the delivery of the Project. Typically these include:

- 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 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.

6.7.2 Operation impacts and mitigation measures

The main component of the Project that may generate operational noise and/or vibration impacts is the existing wastewater pumping station on Fairwater Road. The main source of potential noise is the pumps that are located underground. As the Project does not propose increasing the size of the existing pumps, it is expected that there will be no change to existing noise levels, and correspondingly, no cumulative impact with existing development. Currently the impact is considered negligible as the pumps emit low audible level of noise and Sydney Water has not received any complaints for this facility.

The periodic maintenance and inspection of the pumping station and the pipeline should not generate any significant noise. These routine activities would be managed through Sydney Water's standard management procedures.

Overall it is anticipated that the operation of the proposed infrastructure will not cause a significant change to the existing acoustic environment.

6.8 Traffic and transport

6.8.1 Existing environment

The north-south linkages provided by the F6 Southern Freeway and the Princes Highway dominate the major road network feeding into the Project area. Other main roads in the vicinity of the Project are Fowlers Road, Bong Bong Road and Cleveland Road. The water pipeline would be constructed within the road reserve of Bong Bong Road between Hayes Lane and Shone Avenue. Bong Bong Road is not an RTA classified road. Access to the wastewater pipeline and wastewater pumping station would be via Bong Bong Road, Sierra Drive, then Fairwater Drive (pumping station) and Riverpark Way. Wollongong City Council is the relevant road authority of these roads.

Wollongong City Council is currently undertaking major road works in the area in accordance with the West Dapto Access Strategy. The Strategy notes that there is currently only one major access road in and out of Horsley and West Dapto. Traffic congestion is experienced on Bong Bong Road due to the level crossing adjacent to Dapto Railway Station. The Strategy involves providing an alternate access route by constructing a road link between Fairwater Drive and Cleveland Road connecting to the Princess Highway. Shone Avenue will also be upgraded. These works are currently underway and will be completed before the proposed works are commenced. Sydney Water will maintain ongoing consultation with Wollongong City Council regarding traffic matters.

6.8.2 Construction impacts and mitigation measures

Construction of the Project may result in the following impacts on traffic, transportation and access:

- temporary increases in road traffic during the construction period due to the movements of construction vehicles
- temporary lane closure during the installation of the water pipeline in the road reserve of Bong Bong Road
- temporary disruption to property access to construct the water and wastewater pipelines, particularly near the connection to the existing wastewater pumping station at Bridgewater Drive, Riverpark Way and Fairwater Drive.

The above-listed potential impacts are described in detail in the following sections. In summary, impacts on traffic, transportation and access as a result of construction of the Project would be minor and can be readily managed with standard mitigation and management controls. These controls would be prepared in consultation with relevant stakeholders. No full road closures are anticipated with the proposed works.

Temporary increases in road traffic during construction

During construction, an increase in traffic along the affected roads (described above) would be generated by:

- construction site establishment activities, including establishing the site office and storage areas
- moving work crews to and from the construction sites
- delivering construction materials and removing waste materials such as excess spoil.

For the pipeline construction, the increase in traffic movements would be relatively minor as:

- the pipe laying crews generally consist of about 10 people
- the construction site moves as the pipeline installation progresses (that is, construction activities are not centred on one location for the entire construction period)
- deliveries occur on an as needs basis
- the daily volumes of spoil requiring removal are small.

Construction of the Project may result in the following number of traffic types and movements:

Water pipeline

- up to 10 truck movements per day for spoil/fill material
- 2 truck movements per day for delivery of pipe/fittings
- up to 10 concrete truck movements per day (if required)
- daily staff movements (typically cars) of about 40 movements per day

Wastewater pipeline

- up to 16 truck movements per day for spoil/fill material
- up to 4 truck movements per day for delivery of pipe/fittings/chambers
- up to 10 concrete truck movements per day (if required)
- daily staff movements (typically cars) of about 40 movements per day.

Wollongong City Council conservatively estimates up to 2100 vehicles per day would use Shone Avenue (based on previous traffic counts and by applying a growth factor). Given the existing capacities of the affected roads and the existing average daily traffic volumes, the minor increase of approximately 132 traffic movements per day associated with pipeline construction is not expected to affect the capacity or waiting times on any roads.

There would also be some additional traffic generated by the upgrade of SPS 1012 (estimated to be around 2015). Aside from the initial earthworks, which would require some heavy vehicles movements, the upgrade to the wastewater pumping station would be relatively minor. The workforce and materials required for construction should not generate significant traffic volumes that would have an impact on the capacity of surrounding roads. Nevertheless, the capacity of the roads in the area would be sufficient to cater for the likely temporary increase in construction traffic.

Temporary lane closures during pipeline installation

It is proposed to construct the water pipeline within the existing road reserve of Bong Bong Road between Hayes Lane and with connection to the existing system at Shone Avenue, Horsley. Although Bong Bong Road is a wide single lane road with a substantial road reserve along each side, temporary lane closures may be required.

Lane closures would typically involve the closure of one lane (or part of one lane) of traffic adjacent to the pipeline construction to accommodate equipment, removal of spoil and delivery of bulk materials. This may result in traffic delays. Generally these temporary partial closures would only occur when trenching works are in progress. Partial road closures would be developed and implemented in consultation with Wollongong City Council as well as measures to minimise delays, such as using traffic control personnel. It is not anticipated that any full road closures would be required for the proposed works.

Access points and tracks to the construction sites will be located to minimise impacts to the local residents, ground cover and vegetation.

Temporary access to public and private property

Temporary access to construction areas may be required through privately or publicly owned land. This is especially the case when constructing the wastewater pipeline, which is located adjacent to drainage lines in areas with limited road access. Appropriate temporary access arrangements 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. Access to all private property will be maintained.

6.8.3 Operation impacts and mitigation measures

During the operation of the Project, the pipelines and pumping station would require routine inspections and maintenance. The volume of traffic associated with these activities would be negligible in comparison to existing traffic movements and road capacities and would not affect the functioning of any regional or local roads. Sydney Water would develop access arrangements at the completion of construction, once the final alignments are determined.

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.

6.9 Visual amenity

6.9.1 Existing environment

The pipeline routes pass through areas with both urban and rural visual components, including some moderately populated residential areas. The pipelines would be in the existing road reserves (water) and along cleared land and an existing electricity easement (wastewater). The visual environment along these routes ranges from small-scale closed landscapes with isolated pockets of vegetation, to cleared flat open pasture. There is some existing dense vegetation within the vicinity of the wastewater pipeline. Residents are located within the vicinity of the pipelines in the northern ends of the water and wastewater pipeline alignments.

6.9.2 Construction impacts and mitigation measures

Construction equipment for the water pipeline would be visible to adjacent properties and road users along Bong Bong Road. Visibility of the construction sites associated with the wastewater pipeline would vary depending on the distance, screening vegetation and fences, however would mainly be evident to residents and road users along Bridgewater Drive and Riverpark Way.

Due to the rate of pipeline construction, the visual impact of construction activities would be short and as such, the anticipated visual impacts would be minimal. It should be noted that 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 compounds would need to be established along pipeline routes. Each compound is not expected to occupy a large area and would only be required during the construction phase. It is anticipated that these compounds would be located on cleared land owned by the developer. The anticipated visual impact from construction compounds would therefore be minimal and temporary. Hoardings or temporary screening may be erected to further decrease the visual impact. Good housekeeping practices would be employed on-site to minimise visual impacts.

6.9.3 Operation impacts and mitigation measures

It is proposed to install the water and wastewater pipelines underground. This means they should have no visual impact during operation.

Some surface infrastructure associated with the pipelines such as vent shafts, manholes, and screw valves would be required. These would be designed to minimise their visual impact. It is anticipated that approximately 5 vent shafts would be located along the wastewater pipeline (and

no vent shafts along the water pipeline). The numbers and locations of vent shafts would be determined during detailed design, and based on criteria from the Sewerage Code of Australia (WSAA). Each vent shaft would be a supported pipe up to 19 m tall and up to 0.3 m in diameter. The nearest vent shaft to residents (along Bridgewater Drive) is estimated to be approximately 40-150m from the nearest residence. Depending on the final location of the vent shaft, and the vegetation present in the nearby bushland, the vent shaft may or may not be visible to these receivers. Furthermore, the vent shafts are green in colour to blend with the surrounding environment, and minimise visual impacts. Ongoing operation of the pipelines would not result in significant visual impacts to existing receivers. **Plate 6.1** shows the existing wastewater pumping station and a typical vent shaft.

The majority of infrastructure associated with the existing wastewater pumping station is located below ground. However there is a small above ground kiosk housing electrical equipment, and a vent located above ground. At the completion of the upgrade, the visual impact of the operating wastewater pumping station will remain unchanged, as the additional storage will be underground.



Plate 6.1 – SPS 1012 from Fairwater Drive

6.10 Hazardous materials

6.10.1 Existing environment

Fuel and chemicals are stored and used at Wollongong WRP. The storage of chemicals and fuels conforms to relevant standards and codes, primarily AS1940-2004 *The Storage and Handling of Flammable and Combustible Liquids* and *Dangerous Goods Storage Codes*. The transportation and unloading of chemicals conforms to the *Road and Rail Transport (Dangerous Goods) (Road) Regulation 1998*.

Wollongong WRP holds a WorkCover Dangerous Goods License that permits storage of dangerous goods in approved quantities. Chemical storage is a 'scheduled activity' under the POEO Act and is also licensed in the current EPL (# 218) for Wollongong WRP.

Many of the chemicals used in wastewater treatment are Class 8 Dangerous Goods (for example, ferric chloride) and are categorised as corrosive. Due to their low to negligible levels of toxicity, flammability or explosiveness, these substances pose little risk to the surrounding urban development. However, they do have a potential to cause damage to the environment and infrastructure. It is expected that the quantities of chemicals stored at Wollongong WRP will not change as a result of this Project.

The DECCW Contaminated Lands Register was searched for the entire study area. No sites were identified during this search. The western section of each pipeline runs along the southern boundary of the Illawarra Gun Club. Contamination at this site is unknown and it did not show up on the DECCW Contaminated Land Register or following enquiries to Wollongong City Council.

6.10.2 Construction impacts and mitigation measures

During construction, fuel (diesel and petrol) and oil would be used by construction vehicles and equipment. Small volumes of fuel (generally about 200 L) would be stored and used to refuel generators, saw cutters and other similar types of construction equipment. There may be small quantities of chemicals used during construction (generally in containers of less than 20 L). Any fuel or chemicals would be stored to meet relevant standards in bunded or contained areas. It is anticipated that these compounds would be located on cleared land owned by the developer.

The implementation of industry standard mitigation measures can reduce the risk of hazardous events associated with construction work. Typically, these include:

- storing fuels and chemicals in accordance with Australian Standards (AS) 1940
- appropriate soil and water management strategies would be developed during the pre-construction phase for the works to prevent soil and water pollution.
- appropriate spoil management measures will be implemented for the project, and in particularly while working in or adjacent to the Illawarra Gun Club site, such as classification and disposal of spoil in accordance with the DECCW *Waste Classification Guidelines* (DECC, 2009).
- inspecting machinery, plant and equipment for signs of fuel or oil leakage. Leaks identified are then repaired immediately or the equipment removed.
- keeping a spill kit onsite at all times.
- locating bunded material away from sensitive environments such as residents and creek lines.

6.10.3 Operation impacts and mitigation measures

No additional chemical storages will be necessary, therefore the licensed storage capacity (WorkCover Dangerous Goods Licence and EPL no. 218) will not be exceeded. Wollongong WRP will continue to operate in accordance with the Dangerous Goods and Environment Protection licences for the storage of chemicals, and the codes and practices regulating transport and delivery. These requirements serve to minimise the risk of chemicals entering the environment.

6.11 Waste

Sydney Water has developed a *Waste Minimisation Policy* (Sydney Water, 1997) that applies to discarded, rejected, unwanted, surplus or abandoned substances. The key objectives of the policy are to minimise waste and maximise reuse, recovery and recycling of waste products.

These objectives are to be achieved by:

- minimising wasteful practices
- using appropriate technology
- implementing management practices, procedures and planning appropriate for waste minimization
- using products that are environmentally acceptable, commercially available and competitive in price and performance

The policy excludes gas, energy, water, wastewater, beneficially used biosolids (soil fertiliser) and reused water. These wastes are either covered by other regulatory frameworks or Sydney Water currently has strategies in place to address them.

6.11.1 Construction impacts and mitigation measures

The largest volume of waste generated by the construction works would be excess spoil from excavating for pipelines and the additional storage at the wastewater pumping station. The volume of spoil generated by the construction works is detailed in **Table 6.6** below. It should be noted that due to the staged nature of the construction works, spoil would be generated over a period of approximately 6-9 months, so any impacts relating to spoil management and disposal would be spread over that period.

Table 6-6 Estimated volume of spoil generated during construction works

Project component	Construction method	Spoil volume (cubic metres – loose)	Total truckloads*
Pipelines	Trenching	14,700	668
Wastewater pumping station	Excavation for storage areas	160	8

* Assumptions - each truck carries about 22 m³ spoil (loose). This is a worst case scenario as most of the spoil would be re-used on site, where possible

Spoil is classified according to the DECCW *Waste Classification Guidelines* (DECC, 2009). Wherever possible, suitable spoil is reused on site for backfilling, landscaping and other uses. If spoil is unable to be reused on-site, opportunities for off-site reuse would be investigated. In the event that the spoil is unsuitable for reuse (for example due to its geotechnical or contamination characteristics), spoil would be classified according to the Guidelines and disposed of at an appropriately licensed facility.

The pipeline routes are unlikely to encounter contaminated soils in the Project area. A search of the DECCW contaminated land record found no records of notices for contaminated land.

6.11.2 Operation impacts and mitigation measures

Minor volumes of waste would be generated by maintenance activities associated with the water and wastewater systems. Sydney Water's standard operating procedures and policies would be used as a basis for the management and disposal of this waste.

The impacts of discharging tertiary treated effluent from Wollongong WRP were assessed in the *Illawarra Wastewater Strategy EIS* (SWC, 1999). Discharge of the treated effluent is undertaken in accordance with the Environment Protection Licence, issued by DECCW.

There would be a very minor increase in the volume of biosolids produced at Wollongong WRP due to the additional wastewater flows associated with the Project. Biosolids generated by Wollongong WRP would continue to be 100 per cent beneficially reused in horticulture or agriculture, as part of the Bio-Soil Program operated by Sydney Water. There would be no change in the volume of any other operational wastes produced at Wollongong WRP.

7 Environmental risk analysis

7.1 Residual environmental risk

Sydney Water undertook an Environmental Risk Assessment for the WDURA and Adjacent Growth Areas proposal. A multidisciplinary approach was taken, drawing on key internal stakeholders and Sydney Water environmental management staff involved in the Proposal.

The risk analysis process followed several steps. These were:

- identification of components of the surrounding environment that may be impacted by the Proposal
- broad definition of those components of the Proposal that would be interacting with the environment, specifically pipelines, pumping stations, reservoirs and treatment plants
- identification of activities during construction and operation that may affect the environment
- identification of potential environmental impacts as a result of the proposed activities.

A qualitative ranking of consequence and likelihood was undertaken, and the risk considered in light of proposed control measures. The outcomes of the risk analysis were then used to categorise the identified risks in three categories as shown in Table X below.

Table 7-1 Assessment categories

Category	Assessment level
1 – Key Assessment Issues	Issues that fall into this category are: • likely to be important for decision making • large and/or potentially controversial • involve sensitive environments in specific areas • have a high level of uncertainty about the outcomes. These issues will need a full analysis (potentially including comprehensive baseline assessment) to determine the extent of impact and necessary management measures.
2 – Other issues requiring further analysis	Issues that fall into this category are those with some level of uncertainty about outcomes. Further analysis is required to determine the extent of impact and appropriate management measures.
3 – Other issues requiring limited analysis	Issues that fall into this category have highly predictable impacts and are easily and reliably managed within acceptable levels. These issues will not need a full analysis but may involve limited analysis to select relevant standard management measures.

Assessment of the key issues has now been undertaken in accordance with the Director-General's Requirements, and where required, potential management measures identified.

The Residual Environmental Risk Analysis is assessed on the basis of two factors:

- the significance of environmental effects of the Project; and
- the ability to confidently manage those effects to minimise harm to the environment

These two factors in effect provide the residual risk of the project.

The significance of environmental effects is given a numerical value between 1 and 5 depending on the receiving environment, the level of understanding of the type and extent of impacts, and community response to the environmental consequences of the project. This enables both the actual and perceived impacts to be considered. The manageability of environmental effects is

similarly given a numerical value between 1 and 5 depending on the complexity of mitigation measures, the known level of performance of the safeguards proposed and the opportunity for adaptive management. The numerical value allocated for each issue is based upon the following considerations.

Significance of effects

- | | |
|-------------|--|
| 5. Extreme | Undisturbed receiving environment; type or extent of impacts unknown; substantial community concern. |
| 4. High | Sensitive receiving environment; type or extent of impacts not well understood; high level of community concern. |
| 3. Moderate | Resilient receiving environment; type and extent of impacts understood; community interest. |
| 2. Minor | Disturbed receiving environment; type and extent of impacts well understood; some local community interest. |
| 1. Low | Degraded receiving environment; type and extent of impacts fully understood; uncontroversial project. |

Manageability of effects

- | | |
|---------------------|---|
| 5. Complex | Complicated array of mitigation measures required; safeguards or technology are unproven; adaptive management inappropriate. |
| 4. Substantial | Significant mix of mitigation measures required; limited evidence of effectiveness of safeguards; adaptive management feasible. |
| 3. Straight forward | Straightforward range of mitigation measures required; past performance of safeguards is understood; adaptive management easily applied. |
| 2. Standard | Simple suite of mitigation measures required; substantial track record of effectiveness of safeguards; adaptive management unlikely to be required. |
| 1. Minimal | Little or no mitigation measures required; safeguards are standard practice; adaptive management not required. |

The numbers are added together to provide a result, which provides a ranking of potential residual effects of the project when the safeguards identified in this EA are implemented.

Table 7-2 Environmental risk matrix

Significance of Effects	Manageability of Effects				
	5 Complex	4 Substantial	3 Straightforward	2 Standard	1 Minimal
1 Low	6 (Medium)	5 (Low/Medium)	4 (Low/Medium)	3 (Low)	2 (Low)
2 Minor	7 (High/Medium)	6 (Medium)	5 (Low/Medium)	4 (Low/Medium)	3 (Low)
3 Moderate	8 (High/Medium)	7 (High/Medium)	6 (Medium)	5 (Low/Medium)	4 (Low/Medium)
4 High	9 (High)	8 (High/Medium)	7 (High/Medium)	6 (Medium)	5 (Low/Medium)
5 Extreme	10 (High)	9 (High)	8 (High/Medium)	7 (High/Medium)	6 (Medium)

7.1.1 Analysis

The residual environmental risk for issues related to the Project is shown in **Table 7.2**. This analysis indicates the environmental risk profile for the project based on the assessment of environmental effects, the identification of appropriate safeguards, and the Statement of Commitments included in this EA. The original significance ranking for each issue is also shown.

Table 7-3 Residual environmental risk profile

Aspect	Issue	Original Significance Ranking	Significance assessment based on findings	Manageability of Effects	Residual Risk
Ecology	Impacts on terrestrial flora and fauna during construction (including threatened species)	1	2	1	3 (Low)
	Impacts on terrestrial flora and fauna during operation (including threatened species)	3	1	1	2 (Low)
	Impacts on aquatic flora and fauna during construction (including threatened species)	3	2	1	3 (Low)
	Impacts on aquatic flora and fauna during operation (including threatened species) as a result of discharges to waterways	2	1	1	2 (Low)
	Spread of noxious weeds during construction and operation	3	2	1	3 (Low)
Heritage	Construction impacts on Aboriginal heritage	1	2	1	3 (Low)
	Operational impacts on Aboriginal heritage	3	1	1	2 (Low)
	Construction impacts on non-Aboriginal heritage	3	2	1	3 (Low)
	Operational impacts on non-Aboriginal heritage	3	1	1	2 (Low)
Air quality	Dust and fume emissions during construction	3	2	1	3 (Low)
	Odour emissions during operation	2	1	1	2 (Low)
	Generation of greenhouse gases (construction and operation)	3	1	1	2 (Low)
Resource consumption	Consumption of energy and resources (construction and operation)	3	2	1	3 (Low)
Waste	Waste generation (construction and operation)	3	1	1	2 (Low)
Topography, geology and soils	Soil erosion during construction and operation	3	1	1	2 (Low)
	Acid sulfate soil management during construction	2	1	1	2 (Low)
Hydrology and drainage	Groundwater management during construction	3	1	1	2 (Low)
	Temporary creek diversion during construction	2	2	1	3 (Low)

Aspect	Issue	Original Significance Ranking	Significance assessment based on findings	Manageability of Effects	Residual Risk
	Increased operational flows to creeks	2	1	1	2 (Low)
Water quality	Sedimentation into waterways during construction	3	1	1	2 (Low)
	Increased wastewater flows to waterways in wet weather	2	1	1	2 (Low)
	Groundwater discharge into waterways during construction	3	1	1	2 (Low)
Visual	Construction impacts on visual amenity	3	2	1	3 (Low)
	Operational impacts on visual amenity	2	2	1	3 (Low)
Noise and vibration	Construction noise and vibration	3	2	1	3 (Low)
	Operational noise and vibration	3	1	1	2 (Low)
Traffic and access	Construction traffic impacts	3	2	1	3 (Low)
	Operational traffic impacts (road and rail)	3	1	1	2 (Low)
Land use and services	Changes in land use during operation	2	1	1	2 (Low)
	Impact on existing or proposed infrastructure (water supply channel, electricity, telecommunication, gas)	3	1	1	2 (Low)
Storage of hazardous materials	Spill of hazardous materials during construction and operation	3	2	1	3 (Low)
Human health impacts	Human health impacts during operation	2	1	1	2 (Low)
	Human health impacts during construction	2	1	1	2 (Low)
Bushfire	Bushfire risk during construction and operation	2	1	1	2 (Low)

No additional environmental impacts have been identified for the Project. The environmental risk analysis indicates that the Project presents an overall low or low risk in relation to each of the identified environmental issues, provided that the recommended mitigation and management measures are implemented.

8 Stakeholder engagement and consultation

8.1 Consultation prior to Environmental Assessment preparation

8.1.1 Development of servicing strategies

Sydney Water consulted with the following key stakeholders during the development of its Integrated Servicing Strategy for the WDURA and Adjacent Growth Areas:

- Wollongong City Council
- Shellharbour City Council
- Department of Planning (Growth Centres Commission)
- Lake Illawarra Authority
- Southern Rivers Catchment Management Authority
- Department of Health
- Department of Environment, Climate Change and Water
- Integral Energy.

Stakeholders were involved in a series of workshops during December 2007 to April 2008 about the Integrated Servicing Strategy. These workshops and associated outcomes were an integral part of Sydney Water's Integrated Servicing Strategy development, option identification, options short-listing and preferred option selection. A broad range of issues, opportunities and constraints were identified in the workshops. Stakeholders were asked to weigh option evaluation criteria. The criteria adopted from this process are listed below:

- minimise discharge to waterways and ocean
- minimise cost
- maximise water conservation
- maximise community/Stakeholder acceptability
- minimise energy consumption
- flexibility to accommodate changes in growth.

In general terms, the workshop participants were supportive of the preferred servicing option that includes the use of rainwater tanks for non-drinking water, and extending the existing systems for drinking water and wastewater services. It is considered that the community generally has a preference for rainwater tanks over dual reticulation recycled water systems and the local councils have confirmed that they are supportive of rainwater tanks.

8.2 Consultation during Environmental Assessment preparation

8.2.1 Agency consultation

Consultation with the following agencies has been undertaken during the EA process:

- Department of Planning
- Wollongong City Council
- Shellharbour Council
- Department of Environment, Climate Change and Water
- Lake Illawarra Authority

- Southern Rivers Catchment Management Authority
- Roads and Traffic Authority
- Department of Health
- Department of Industry and Investment
- NSW Office of Water.

A number of agencies requested that they be kept informed of the progress of the Project, however no additional issues were raised by these agencies that are not covered in the Director-General's requirements. Wollongong City Council emphasised the need to liaise with their Infrastructure Planning Division and the Regulation and Enforcement Division in relation to traffic impacts. Initially the potential for cumulative traffic impacts was identified. However after further consultation, it was confirmed that the road upgrade works in the area (undertaken by Wollongong City Council) are scheduled to be complete prior to construction works commencing for this Project. In any case, Sydney Water will maintain consultation with Wollongong City Council regarding the management of potential traffic impacts.

8.2.2 Aboriginal consultation

Consultation has been undertaken during the EA process generally in accordance with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, 2005a), the *Interim Community Consultation Requirements for Applicants* (DEC, 2004) and the *Aboriginal Cultural Heritage Community Consultation Requirements for Proponents* (DECCW, 2010). Interested parties were notified of the Project by letter and public notices as per DECCW's requirements above. The public notices were placed in the following newspapers:

- The Illawarra Mercury (2/9/10 and 9/9/10)
- Wollongong Advertiser (8/9/10).

The following groups were consulted:

- Illawarra Local Aboriginal Land Council
- Wodi Wodi Elders Council
- Korewal Elouera Jerrungarugh Tribal Elders Aboriginal Council
- Wadi Wadi Coomaditchie Aboriginal Corporation
- Northern Illawarra Aboriginal Corporation (Woronora Plateau Gundungurra and Wulungulu Elders Group)
- Comaditchie United Aboriginal Corporation
- Peter Falk Consultancy
- Illawarra Aboriginal Corporation
- Kullila Welfare and Housing Corporation
- National Koorie Site Management
- Tocomwall
- La Pouse Botany Bay Aboriginal Corporation.

Representatives from the above groups also participated in field survey work for the Project during November 2010. Consultation will continue with the Aboriginal stakeholders in compliance with DECCW's requirements. No archaeological or cultural heritage issues have been raised to date. A summary of the findings of the Aboriginal Heritage Assessment is included in Section 6.2.

8.2.3 Community consultation

As an integral part of the environmental assessment process, Sydney Water developed a Community and Stakeholder Relations Plan. This Plan details the consultation approach for the

Project. This aims to ensure stakeholders and the wider community are appropriately consulted and informed about the Project.

During the environmental assessment process, the local community has been informed about the Project through the following mechanisms:

- Sydney Water's website www.sydneywater.com.au contains an information page under 'Major projects' on the WDURA and Adjacent Growth Areas, as well as this EA for the Early Release Lead-in works Project. The webpage provides details and key milestones about the Project, a map of the proposed infrastructure, information on community consultation, information on the Part 3A process and estimated timeframes for construction. The webpage also contains project contact information.
- Letters and notice of entries for environmental surveys for the EA were distributed to potentially affected properties located within 25 metres of any proposed infrastructure. A factsheet was also sent with these letters, providing more information about the project, a map of the proposed development areas and contact details for project personnel. This newsletter was also made available on Sydney Water's website.
- Directly impacted property owners (where proposed infrastructure is located on or near their property) in the Horsley and West Horsley areas were sent letters inviting them to the information session, as well as offering face to face meetings to discuss the project. Maps of the proposed infrastructure were also sent to these property owners.

Stakeholders and the community have also been able to contact the Project team throughout the project by:

- emailing areapanning@sydneywater.com.au
- calling 02 8849 4106
- writing to Sydney Water.

8.2.4 Information session

An information session will be held prior to the formal public exhibition period. This will be held on Saturday 26 February 2011 from 10am to 2pm, at the Dapto Ribbonwood Centre. A letter will be sent to the local community, key stakeholders, and community groups inviting them to attend. Advertisements will also be placed in the Wollongong Advertiser and Illawarra Mercury inviting stakeholders and the community to the information session. Information available at the session will include:

- copies of the EA
- detailed maps of the proposal and location of infrastructure
- factsheets containing key project information
- question and answer sheets
- details on how to make a submission.

Project representatives will be available to discuss the proposal, and answer any questions or concerns. A summary of additional issues that may be raised during the information session will be addressed in the Submissions Report.

8.3 Public exhibition period

Public exhibition of the EA is undertaken in accordance with the Part 3A approval process. The EA has been initially assessed by the Department of Planning, and placed on public exhibition for 30 days (from 2 March until 31 March 2011). Written submissions are invited from the public, including relevant agencies and the local council. The EA is available for viewing at the following locations:

- DoP head office in Sydney
- DoP regional office, Wollongong

- Wollongong City Council
- Wollongong Library
- Dapto Library
- Nature Conservation Council, Sydney
- DoP website.

Following the exhibition period, the DoP will consider the EA and any submissions made during the display period. Sydney Water will then prepare a Submissions Report that addresses any issues or concerns raised by stakeholders and the community during the public exhibition period.

The Minister for Planning then considers the Environmental Assessment and Submissions Report. If the Minister for Planning approves the application, the Director-General will issue a range of Conditions of Approval relating to the management of environmental, construction and operational impacts of the Project.

During the exhibition period, Sydney Water will continue to provide updated information on the website regarding the Project and the EA process. The Project contact number will also continue to be staffed by Project team members.

8.4 Future consultation

8.4.1 Prior to and during construction

If the Project is approved, Sydney Water will continue to inform stakeholders and the community about the progress of the Project. Sydney Water will maintain the webpage and a Project contact number so the community can contact the Project team who can respond to localised concerns or impacts.

Sydney Water would ensure that:

- 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 would be developed and implemented throughout the delivery of the Project. Typically these include:

- 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 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.

8.4.2 Future assessment stages

This EA report relates solely to the Early Release Lead-in Works for West Horsley. Another EA is being prepared to support Sydney Water's Concept Plan for the entire Proposal area (the WDURA and Adjacent Growth Areas) as well as Project Approval to service the early release Precincts.

Sydney Water has a separate Community and Stakeholder Relations Plan for the WDURA and Adjacent Growth Areas Project, and will continue to consult with all relevant stakeholders during that EA process.

9 Justification and conclusion

9.1 Background

This Environmental Assessment has been prepared in accordance with the requirements of Part 3A of the EP&A Act. It includes:

- background information on the Project, including the need for the Project, its strategic context and the alternatives considered
- a description of the Project, including the locations, construction methodologies and operational characteristics of the proposed infrastructure
- an assessment of the potential environmental impacts of the Project, with a focus on key environmental issues as identified by the Director-Generals requirements
- the proposed impact mitigation and management measures that would be implemented in conjunction with the Project
- a Draft Statement of Commitments, providing strategic environmental outcomes for the Project.

The following sections present a summary of the benefits and impacts of the Project and a justification of the Project.

9.2 Justification

The Project is required to allow development within the West Horsley area. If the Project does not proceed, development of the West Horsley area (one of the First Release Precincts in the WDURA) would either be delayed or would not occur because of inadequate water and wastewater servicing.

9.2.1 Summary of impacts

Construction impacts

The construction of the Project may result in both minor and temporary impacts on the environment and community during construction (such as noise, dust and access disruptions). These impacts can be minimised through industry standard management measures and effective communication practices.

Clearing of some vegetation and one hollow bearing tree would be required, however the pipeline routes have been selected and refined to minimise impacts, and avoid all areas of medium and high ecological sensitivity. Furthermore, areas will be progressively rehabilitated as construction progresses. No impacts to items of Aboriginal heritage or non-Indigenous heritage are anticipated.

Overall, the impacts of construction on the environment and community would be minor and would be managed using standard industry practices.

Operational impacts

The Project will increase flows to Wollongong WRP from 43 to 43.28 ML per day. As a result, there will be minor increases in the:

- amount of energy used by the water and wastewater networks
- discharge of treated wastewater to the marine environment
- generation of biosolids to be sent to beneficial reuse.

Sydney Water's commitment to be carbon neutral by 2020 means that the Project's greenhouse emissions would be reduced and eventually neutralised through a combination of reduced demand, energy efficiency, renewable energy and offsets. The discharge of treated wastewater to the marine environment and generation of biosolids will continue to be in accordance with the

Illawarra Wastewater Strategy EIS (SWC, 1999) and Environment Protection Licence No 218 for Wollongong WRP and System.

No other operational impacts are anticipated as a result of this Project.

9.2.2 Summary of benefits

The objectives of the Project have been derived from Sydney Water's Integrated Servicing Strategy for the WDURA, and through consultation with relevant external stakeholders. The Project will meet these objectives and provide or contribute to the following benefits:

- ensure a secure water supply
- protect public health
- protect catchment and river health
- provide affordable and efficient water and wastewater services
- provide resource and energy efficient water and wastewater services
- meet the housing and employment needs of the Illawarra Region up to 2050
- support the orderly rollout of land release and infrastructure
- meet Sydney Water's statutory and regulatory obligations, including:
 - o meeting Government development timeframes
 - o compliance with the *Sydney Water Act* and Operating Licence
 - o compliance with the *Protection of the Environment Operations Act* Environmental Protection Licence
 - o compliance with *Australian Drinking Water Quality Guidelines*
 - o compliance with applicable regulations, codes, legislation.

9.2.3 Consistency with ESD Principles

Clause 6 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* outlines the requirements of an environmental assessment, including:

'The reasons justifying the carrying out of the development or activity in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development'

The Regulation lists the principles of ecologically sustainable development as:

- (a) **The precautionary principle**, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- (b) **Intergenerational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
- (c) **Conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.
- (d) **Improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services.

The EPBC Act also identifies the following principle for consideration, namely:

Decision making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.

The following provides an assessment of the Project against the above principles, and takes into account the findings of this environmental assessment.

Principle of ESD	Evaluation of the Proposal against the principle
The precautionary principle	The assessment of the potential impacts of the Project is considered to be consistent with the precautionary principle. This EA has considered the Project in terms of potential impacts to the environment, and in particular, the extent to which potential impacts may pose a significant risk to the environment. Specialist assessments have been undertaken in areas where potential impacts were uncertain or unable to be quantified otherwise. The Project is consistent with a precautionary approach in that an assessment of risk of environmental harm has been undertaken, alternatives have been identified, and associated environmental management measures are proposed.
Intergenerational equity	The principle of 'intergenerational equity' requires that decisions made by the present generation would not result in a degradation of the environment for future generations. The Project involves activities that have the potential for some environmental and social disturbance during the construction period. However, the potential for environmental and social disturbance as a result of the construction of the Project should be balanced against the long term social, environmental and economic benefits. The Project has been designed as far as practicable to ensure that the community would not be significantly disadvantaged over the long term, and that overall environmental and urban quality would be maintained. The Statement of Commitments for the Project, together with the long term social, environmental and economic benefits of developing water related infrastructure, would ensure that the health, diversity and productivity of the local and regional environment is maintained for future generations.
Conservation of biological diversity and ecological integrity	The Project area has been significantly modified as a result of urban and rural development. Studies conducted in conjunction with this environmental assessment have identified that there may be a potential for some clearing of a degraded area of endangered ecological community. However, mitigation measures have been developed to ensure the protection of biological diversity and ecological integrity by selecting pipeline alignments with the least environmental impact.
Improved valuation, pricing and incentive mechanisms	This environmental assessment has identified the environmental and other consequences of the Project and identified mitigation measures where appropriate to manage adverse impacts. Sydney Water bears the cost of protecting the environmental attributes of the area, into the Project and operating costs, for example by extending the pipeline route to avoid areas of medium and high ecological sensitivity. Furthermore, Sydney Water adopts tools that integrate environmental resource use into planning and decision-making processes to ensure preferred project options are environmentally sustainable.
Decision making process	The Project has been developed in consultation with various government agencies and stakeholders, and has been refined to minimise environmental and social impacts. An assessment of the short and long term, construction and operation impacts of the proposed project have been described, including taking into account the principles of ESD. The proposed project requires approval under Part 3A of the EP&A Act 1979, meaning that the decision making process is administered by the Department of Planning, with input from other government agencies, as well as the community.

9.3 Conclusion

Sydney Water has the responsibility to provide water and wastewater services for the WDURA and Adjacent Growth Areas, a major growth and development area identified as part of the *Illawarra Regional Strategy* and other planning documents such as the *Metropolitan Water Plan*. Supply of water and wastewater services to the development site in West Horsley is essential for the release of the suburb for residential and other development. Sydney Water is responsible for the provision of water and wastewater services in the area and is therefore required to plan for and design the

essential infrastructure. In developing the preferred servicing strategy to provide safe, reliable and sustainable water and wastewater services for the WDURA, Sydney Water has utilised a sustainability planning process to ensure the preferred option is environmentally, financially, technically and socially sustainable.

The Project may have some short-term minor environmental impacts during construction, such as the clearing of vegetation, generation of noise, dust and traffic, and the potential disturbance of some heritage items. No significant impacts are predicted for the operation of the Project. Management measures would be implemented as an integral part of the Project to protect existing environmental values and minimise potential adverse impacts as far as practical.

In the context of potential impacts arising from the planned urban development in the area, the Project would have a minor impact upon the environment. The Project would result in only localised and minor disturbances to the existing environment, the impact of which would be mitigated through a range of identified environmental management measures. The Project would be carried out in accordance with the Draft Statement of Commitments, which provide strategic environmental performance outcomes.

10 Draft statement of commitments

10.1 Overview

This chapter provides the draft Statement of Commitments for the Project. Details of the environmental mitigation, management and monitoring for the Project are discussed in the relevant sections in Chapter 6. The commitments may be revised in response to stakeholder and community input during the display of the Environmental Assessment. Following Project Approval, Sydney Water (and parties acting on its behalf) will deliver and operate the Project in accordance with these commitments.

10.2 Draft commitments

Table 10.1 below identifies the draft Commitments for each key issue raised during the environmental assessment process.

Table 10-1 Statement of commitments

Flora and fauna		Project phase
1	Pipeline routes will be selected to avoid areas of higher ecological sensitivity as much as possible	Prior to construction
2	Areas of EEC would be avoided, where possible. Where appropriate, pipelines would be bored under the vegetation to avoid clearing or modifying the EECs	Construction
3	Hollow bearing trees and other large trees would be retained in situ where possible. In the event that a hollow-bearing tree needs to be removed, a qualified ecologist should be present to check for native fauna. Hollows found to be occupied by fauna should not be removed until fauna have vacated the hollow. A hollow-bearing tree removal procedure may be required, and may involve measures that ensure fauna have vacated, sectional removal of the tree hollows and soft-drop techniques to avoid direct impacts on fauna	Prior to construction
4	Construction activities will be carried out in a manner that minimises environmental impacts. This may include using: • Temporary fencing to mark designated work area, locating construction facilities in already cleared lands • Using progressive trenching techniques • Limiting pipeline construction corridors to a maximum of 10 m • Standard mitigation measures such as weed control, hygiene protocols, exclusion fencing, minimising soil disturbance and educating site staff	Construction
5	Pipelines and cleared areas would be rehabilitated to pre-existing condition following the completion of the works	Construction
Aboriginal heritage		
6	Staff and contractors on site would be made aware of the locations of known sites and the areas of sensitivity. Inductions would be undertaken prior to the commencement of works to brief staff and contractors on what to look for during construction	Prior to construction
7	Previously undiscovered unrecorded Aboriginal objects (or potential Aboriginal objects) discovered during construction would be recorded by a qualified archaeologist and reported to the AHIMS registrar as soon as practicable. 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. In the event that human remains are discovered, the following procedure would be followed: a. do not further disturb the remains b. immediately cease all work at the particular location c. secure the area so as to avoid further disturbance to the remains d. notify the local police, the Department of Planning, and DECCW's Environment Line on 131 555 as soon as practicable and provide any details of the remains and their location, and e. do not recommence any work at the particular location unless authorised in writing by relevant approval authorities.	Construction

Non-Indigenous heritage		
8	The pipeline route shall be located to avoid areas of non-Indigenous heritage value	Prior to construction
Water quality, hydrology and soils		
9	Construction activities will be carried out in a manner that minimises environmental impacts. This may include: - Managing erosion and sedimentation risks by developing and implementing appropriate standard erosion and sedimentation mitigation measures as detailed in <i>Managing Urban Stormwater, Soils and Construction</i> (Landcom, 2004) - Pumping out groundwater encountered during construction and treating it prior to discharge, if required - Storing fuels or chemicals to meet relevant standards in bunded or contained areas and providing a spill kit where fuels are used	Construction
10	The wastewater pipes will be constructed using leak-tight technology	Construction
11	The wastewater pipeline will be designed so there are no dry weather overflows and no planned wet weather overflows	Prior to construction
Human Health		
12	Safe drinking water and wastewater services will be provided to ensure that exposure to microbial hazards is minimised	Operation
Air quality – Dust and odour		
13	Appropriate dust management measures would be implemented during construction. These measures could include watering exposed soils when necessary, covering trucks removing waste materials, progressive restoration of disturbed areas and maintaining stockpiles at a height of less than 1.5 metres	Construction
14	Industry standard practices, such as the use of temporary odour control units would be made available to minimise impacts if necessary	Construction
Noise and vibration		
15	Construction activities will be carried out in a manner that minimises noise and vibration impacts. This may include: - Adopt normal working hours for construction activity (Monday to Friday 7 am to 6 pm, Saturday 8 am to 1 pm, and no work on Sundays or public holidays) - Operating plant in a quiet and efficient manner - Regularly maintaining, and repairing or replacing machinery that becomes noisy - Implementing where feasible and reasonable, alternative work practices which generate less noise - Using silenced equipment and noise shielding around stationary plant (if necessary)	Construction
16	Contact potentially noise affected neighbours at the earliest possible time before any site work begins, about the nature of the construction stages and the duration of the works	Prior to construction
Traffic, transport and access		
17	Disturbances to traffic, transportation and access would be minimised through the implementation of standard mitigation and management controls, such as: - Locating access points and tracks to the construction sites to minimise impacts to the local residents, groundcover and vegetation - Negotiating appropriate temporary access arrangements with property owners for the construction period - Consulting with Wollongong Council and other developments in the area to maintain local traffic flows	Construction
Visual Amenity		
18	Visual amenity will be maintained by employing mitigation measures, such as: - Good housekeeping practices - Progressively rehabilitating areas disturbed by pipeline construction - Erecting hoardings or temporary screening to minimise the visual impact (where appropriate)	Construction
19	Vent shafts would be green in colour to blend with the surrounding environment	Construction

Hazardous Materials		
20	Fuels and chemicals will be stored to meet relevant standards in bunded or contained areas and a spill kit would be provided at all locations where fuels and/or chemicals are used	Construction
Waste		
21	Wherever possible, suitable spoil will be reused on site for backfilling, landscaping and other uses. Where spoil is unsuitable for reuse, spoil would be classified according to the DECCW <i>Waste Classification Guidelines</i> and disposed of at an appropriately licensed facility	Construction
Energy and Greenhouse Emissions		
22	The project will be implemented in accordance with Sydney Water's Policy to be Carbon Neutral by 2020.	Operation
Social Impacts		
23	The community would be kept informed of the progress and performance of the Project and issues of interest to the community. This will be achieved by employing measures such as: • notification of construction activities to potentially affected local residents 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 social impacts and communication requirements • protocols to notify stakeholders of relevant activities and any incidents should they occur	Construction

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Appendix A – Project Declaration and Director-General’s Environmental Assessment Requirements

Department of Planning

ORDER DECLARING DEVELOPMENT TO BE A PROJECT UNDER PART 3A OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

I, the Minister for Planning, having formed the opinion that the development described in Schedule 1 is of State and regional environmental planning significance, declare that development, pursuant to section 75B of the Environmental Planning and Assessment Act 1979, to be a project to which Part 3A of the Environmental Planning and Assessment Act 1979 applies.

The Hon. KRISTINA KENEALLY, M.P.,
Minister for Planning

Sydney, 7 September 2009.

SCHEDULE 1

The water and wastewater servicing of the West Dapto Urban Release Area and Adjacent Growth Areas comprising:

- the construction and operation of drinking water and wastewater pipelines, pumping stations, drinking water reservoirs and associated infrastructure; and
- upgrades to the Wollongong and Shellharbour sewage treatment plants.

The West Dapto Urban Release Area is defined as the suburbs of Kembla Grange, Sheaffes/Wongawilli, West Horsley, East Horsley, Cleveland, Avondale, Yallah/Marshall Mount and the Dapto Sub Regional Centre.

The Adjacent Growth Areas are defined as Tallawarra lands, Calderwood, Tullimbar Village and the Yellow Rock health care facility.

As generally shown on the indicative map prepared by Sydney Water dated July 2009 and titled Indicative WDURA and Adjacent Servicing Areas.

Note: The assessment of the project under Part 3A will include the consideration of one or more options for the alignment of the drinking water and wastewater pipelines and location of drinking water reservoirs.



Planning

Contact: Swati Sharma
Phone: 02 9228 6221
Fax: 02 9228 6355
Email: swati.sharma@planning.nsw.gov.au
Our ref: S09/01026
Your ref:
File: Final Early Works West Horsley
DGRs_Dec 2010.doc

Dr Judy Hansen
General Manager, Sustainability Division
Sydney Water Corporation
PARRAMATTA NSW 2124

Dear Dr Hansen

Subject: Water and Wastewater Servicing of the West Dapto Urban Release Area and Adjacent Growth Areas – West Horsley Early Release Lead-in Works (Application: 10_0197)

The Department has received your application for the above project.

I have attached a copy of the Director-General's Requirements (DGRs) for the preparation of an Environmental Assessment for the project. These requirements have been prepared in consultation with relevant government authorities. I have attached a copy of the government authorities' comments for your information.

The DGRs have been prepared based on the information you have provided to date. Please note that under section 75F(3) of the *Environmental Planning and Assessment Act 1979*, the Director-General may alter these requirements at any time. If you do not submit an Environmental Assessment for the project within two years, the DGRs will expire.

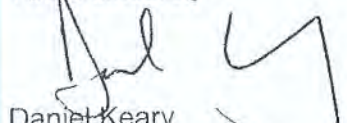
Prior to exhibiting the Environmental Assessment that you submit for the project, the Department will review the document to determine if it adequately addresses the DGRs. The Department may consult with other relevant government authorities in making this decision. Please provide three (3) hard copies and two (2) CD copies of the Environmental Assessment to assist this review.

If the Director-General considers that the Environmental Assessment does not adequately address the DGRs, the Director-General may require you to revise the Environmental Assessment. Once the Director-General is satisfied that the DGRs have been adequately addressed, the Environmental Assessment will be made publicly available for at least 30 days.

If your project is likely to have a significant impact on matters of National Environmental Significance, it will require an approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval would be in addition to any approvals required under NSW legislation and it is your responsibility to contact the Department of Sustainability, Environment, Water, Population and Communities to determine if an approval under the EPBC Act is required for your project (<http://www.environment.gov.au> or 6274 1111).

Your contact officer for this proposal, Ms Swati Sharma, can be contacted on the above contact details. Please mark all correspondence regarding the proposal to the attention of the contact officer.

Yours sincerely


Daniel Keary
Director, Infrastructure Projects
as delegate of the Director-General

Director-General's Requirements

Section 75F of the *Environmental Planning and Assessment Act 1979*

Application number	MP 10_0197
Project	Project Application: construction, operation and maintenance of drinking water and wastewater lead-in infrastructure, including a one kilometre long water pipeline and 1.5 kilometre long wastewater pipeline, to service the early release of the West Horsley Precinct, within the West Dapto Urban Release Area. The wastewater pipeline would connect to an existing sewage pumping station that forms part of the Wollongong Wastewater Treatment System. The water pipeline would connect to the existing network supplied by the Kembla Grange Water Filtration Plant.
Location	The West Horsley Precinct, which is a part of the West Dapto Release Area and located in the Wollongong Local Government Area.
Proponent	Sydney Water Corporation
Date issued	7 December 2010
Expiry date	7 December 2012
General requirements	The Environmental Assessment (EA) must include: ▪ an executive summary; ▪ a detailed description of the project including construction methods, location and alignment of project components, operation details including treatment technology and water quality standards to be applied, means of minimising wet weather infiltration, water demand management measures and interfaces with existing sewage treatment infrastructure, energy requirements and any staging. This shall include a description of the existing water and wastewater treatment systems, including system capacity and ability to continue to operate under existing licence conditions; ▪ consideration of any relevant statutory provisions including the consistency of the project with the objects of the <i>Environmental Planning and Assessment Act 1979</i> and permissibility; ▪ an assessment of the environmental impacts of the project, with particular focus on the key assessment requirements specified below; ▪ a draft Statement of Commitments detailing measures for environmental mitigation, management and monitoring for the project; ▪ justification for undertaking the project with consideration of the environmental, social and economic benefits and impacts of the proposal; and ▪ certification by the author of the Environmental Assessment that the information contained in the Assessment is neither false nor misleading.
Key issues	The EA must include assessment of the following key issues: ▪ Strategic Justification – the EA must: ➢ clearly outline the strategic context of the project, having regard to existing and future development of West Dapto; ➢ discuss how the project relates to relevant strategic and statutory

planning documents including the following: the *Illawarra Regional Strategy* (2007); the *West Dapto Release Area Review Planning and Infrastructure Report* (Growth Centres Commission, 2008); the *Sydney Water Integrated Servicing Strategy*; the *Lake Illawarra Estuary Management Study and Strategic Plan* (March 2006); the *Illawarra Regional Environmental Plan No. 1*; and relevant local environmental plans including *draft Wollongong Local Environmental Plan (West Dapto) 2009*; and

- describe the need for and objectives of the project, including its relevance to the overall water and wastewater scheme for the West Dapto Urban Release Area and Adjacent Growth Areas; alternatives considered, including locations and routes for linear infrastructure (including an assessment of the environmental costs and benefits of the project relative to alternatives) and provide justification for the preferred project.
- **Flora and Fauna** – the EA must:
 - include an assessment of flora and fauna impacts taking into consideration impacts on any threatened species, populations, ecological communities and/or critical habitat listed under both State and Commonwealth legislation that have been recorded on the site and/or surrounding land and any relevant recovery plan, consistent with the *Draft Guidelines for Threatened Species Assessment* (DEC, 2005). The assessment must take into consideration the *Illawarra Escarpment and Coastal Plain - Bioregional Assessment* (DEC July 2003), demonstrate how the project design has avoided impacts where possible and clearly identify the existing condition and extent of vegetation (including fragmentation impacts and impacts to biodiversity corridors) and habitat on site (including riparian and/or instream habitat in the case of disturbance of waterways);
 - document and map each of the ecosystems (vegetation communities), including any foraging, roosting, feeding and nesting trees that will be impacted, quantify the impacts, and assess the significance of the impact within the context of the landscape and region in which the ecosystem is located, including the location, intensity and extent of impact;
 - provide details of how flora and fauna impacts would be managed during all stages of the project; and
 - describe the measures to avoid, mitigate or offset impacts to vegetation, consistent with "improve or maintain" principles. Sufficient details must be provided to demonstrate the availability of viable and achievable options to offset the impacts of the project.
- **Aboriginal Heritage** – include an assessment of the potential impact on Aboriginal heritage values/items and proposed mitigation measures in accordance with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, 2005). The EA must demonstrate effective consultation with indigenous stakeholders during the assessment and in developing mitigation options (including the final recommended measures) and describe the actions that will be taken to avoid, mitigate or offset impacts.
- **Non Indigenous Heritage** – the EA must include an assessment of the potential impact on non indigenous heritage values/items and proposed mitigation measures, consistent with updated guidelines in the *NSW Heritage Manual*. Where impacts to State or local non-indigenous heritage items are proposed, a statement of heritage significance must be included and measures identified to mitigate and manage impacts.

- **Water Quality, Hydrology and Soils** – the Environmental Assessment must:
 - include an assessment of water quality impacts arising from the construction and operation of the project, taking into account applicable NSW Government policies. Construction risks, including watercourse crossings, potential for acid sulfate soils, salinity, erosion and sedimentation must be addressed. Measures to prevent or minimise sewage discharge or overflows and subsequent impacts to nearby watercourses, groundwater and water bodies shall be addressed;
 - include an assessment of the potential flood risks associated with the project including a risk screening of proposed water infrastructure development areas against the benchmarks identified in the *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (DOP, 2010). The assessment shall consider the full range of flood events including probable maximum flood and proposed mitigation measures with respect to operation;
 - provide details on the impacts and management of wastewater, including frequency, overflow volume and pollutant load for dry and wet weather events, the quality of the treated wastewater in dry and wet weather, and potential effluent generation beyond existing approved levels;
- **Human Health** – the Environmental Assessment must outline risks to human health, including mitigation measures and how the operation of the project would be consistent with current standards.
- **Dust and Odour** – the Environmental Assessment shall include an assessment of the dust and odour impacts associated with construction and operation respectively. The odour analysis shall be undertaken in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (DEC, 2005), *Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2001) and *Technical Notes: Draft Policy: Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2001).
- **Noise and Vibration** – the Environmental Assessment shall include an assessment of noise and vibration impacts during construction and operation and in a cumulative context with existing development. Construction traffic noise must also be addressed. The assessment must take into account the following guidelines, as relevant: *Interim Construction Noise Guidelines* (DECC 2009), *Environmental Criteria for Road Traffic Noise* (EPA, 1999), *Industrial Noise Policy* (EPA, 2000) and *Assessing Vibration: A Technical Guideline* (DECC, 2006).
- **Traffic and Transport** – the EA shall include an assessment of impacts to the local and regional road network and intersections, including direct impacts from any traffic rerouting and any access restrictions to property. This assessment must include details on the nature/mode of traffic generated from the construction and operation of the project, transport routes and traffic volumes. Consideration must also be given to the impact of the project in the context of any other major construction traffic likely to be utilising the same roads during project construction.
- **Visual Amenity** – the EA shall include an assessment of impacts on visual amenity, with reference to surface components such as ventilation shafts. This assessment must include any proposed mitigation measures for visual amenity.
- **Hazards and Risk** – the Environmental Assessment shall include an assessment of the hazards and risk associated with the project including

	details of the handling and disposal of waste during construction and identification of existing management measures associated with the Wollongong Sewage Treatment Plant that are to be used during operation of the project. ▪ Environmental Risk Analysis– notwithstanding the above key assessment requirements, the Environmental Assessment shall include an environmental risk analysis to identify potential environmental impacts associated with the project (construction and operation), proposed mitigation measures and potentially significant residual environmental impacts after the application of proposed mitigation measures. Where additional key environmental impacts are identified through this environmental risk analysis, an appropriately detailed impact assessment of this additional key environmental impact must be included in the Environmental Assessment.
Consultation	You must undertake an appropriate and justified level of consultation with relevant parties during the preparation of the Environmental Assessment, including: ▪ local, State or Commonwealth government authorities and service providers such as the Department of Health, the NSW Office of Water, the Department of Environment, Climate Change and Water, the Lake Illawarra Authority, the Department of Industry and Investment, the Southern Rivers Catchment Management Authority, Roads and Traffic Authority, and Shellharbour and Wollongong City Councils; ▪ specialist interest groups, including local Aboriginal land councils; and ▪ the local community, including affected landowners. The Environmental Assessment must describe the consultation process, document all community consultation undertaken to date and identify the issues raised (including where these have been addressed in the Environmental Assessment).

Appendix B – Flora and Fauna Impact Assessment