

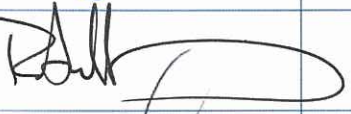





# Northern Beaches Storage Project

Preliminary Environmental Assessment  
September 2008

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## GLOSSARY AND ABBREVIATIONS

**Acid sulfate soils:** Soils and sediments containing iron sulfides, the most common being pyrite. When exposed to air due to drainage or disturbance, these soils produce sulfuric acid.

**Area plan:** A form of strategic planning, Area Planning considers the sustainable management of the urban water cycle in developing servicing strategies for potable water supply, non-potable water supply, sewerage services and stormwater management (the four water products).

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

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

**Catchment:** An area of land surrounding a dam or water storage. In this document catchment refers to areas served by a wastewater system.

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

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

**Directed overflow:** An overflow from a directed overflow structure.

**Directed overflow structure:** A designed structure (excluding access chambers) in the reticulation system which operates as a relief to allow sewage to discharge at a planned location or a sewage pumping station, but does not include a bypass from a sewage treatment plant.

**DoP:** Department of Planning.

**DG:** Director General.

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

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

**EA:** Environmental Assessment.

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

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

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

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

**EPBC Act:** Environment Protection and Biodiversity Conservation Act 1999.

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

**Estuary:** The lowermost point of a river system that is a mixture of fresh water and seawater.

**Greenhouse effect:** Warming of the Earth's atmosphere as a result of increases in carbon dioxide and other gases.

**Greenhouse gas emissions:** Gases such as carbon dioxide and other forms of air pollutants, resulting from the burning of fossil fuels such as coal, natural gas or oil, which contribute to the warming of the Earth's atmosphere.

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

**HDD:** Horizontal directional drill.

**Kilometres (km):** Unit of length, one thousand metres.

**LEP:** Local Environmental Plan – a statutory planning instrument.

**LGA:** Local Government Area.

**Litre (L):** A measure of liquid volume.

**Litres per second (L/s):** Unit of measurement over time used to measure flow rates.

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

**NBSP:** Northern Beaches Storage Project.

**NSM:** Narrabeen Sub-main.

**NSOOS:** Northern Suburbs Ocean Outfall Sewer.

**NST:** Northside Storage Tunnel.

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

**OEMP:** Operational Environmental Management Plan.

**Organism:** Any living animal or plant.

**Paleochannels:** A remnant of a stream channel cut in older rock and filled by the sediments of younger overlying rock.

**PEA:** Preliminary Environmental Assessment.

**POEO Act:** Protection of the Environment Operations Act 1997.

**Pollutants:** Contaminants in solution that, when in sufficient quantity, may cause environmental degradation.

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

**Potable:** Fit or suitable for drinking.

**PRP:** Pollution Reduction Program.

**PSC:** Professional Services Contract.

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

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

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

**REF:** Review of Environmental Factors.

**REP:** Regional Environmental Plan – a statutory planning instrument.

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

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

**SEPP:** State Environmental Planning Policy – a statutory planning instrument.

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

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

**Sewage treatment plant:** Sewage treatment plants treat sewage from the sewerage system. Once the sewage is treated it is then either discharged to the environment or it is recycled as effluent reuse.

**Spoil:** Ground material removed from an excavation.

**SPS:** Sewage pumping station.

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

**Stormwater:** Rainwater that runs off the land, frequently carrying various forms of pollution such as litter and detritus, animal droppings and dissolved chemicals. This untreated water is carried in stormwater channels and discharged directly into creeks, rivers, the harbour and the ocean.

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

**STP:** Sewage treatment plant – a facility to improve sewage quality before discharge to receiving waters.

**SOLP:** Sewer Overflow Licensing Project.

**SORT:** SWWA Options Ranking Tool.

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

**Sustainability:** See ESD.

**SWWA:** SewerFix Wet Weather Alliance.

**TBM:** Tunnel boring machine.

**TSC Act:** Threatened Species Conservation Act 1995.

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

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

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

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

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

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

**WWOAP:** Wet Weather Overflow Abatement Program.

## EXECUTIVE SUMMARY

### Introduction

This document includes a project description and Preliminary Environmental Assessment for the proposed Northern Beaches Storage Project, which includes a connection to be launched from Jacka Park, Freshwater (referred to as 'the Project'). This report describes the Project, and outlines the likely environmental impacts and the proposed scope of the Environmental Assessment. This will aid the New South Wales Department of Planning in issuing Director-General's requirements under Section 75F(3) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the purposes of any additional environmental assessment that may be required under Section 75F(5) and 75H(1) of the EP&A Act.

### Context

Sydney Water is a statutory State Owned Corporation, wholly owned by the NSW Government and responsible for providing wastewater services to more than four million customers.

In wet weather, stormwater can enter the sewerage system through cracks in pipes, faulty joints or illegal roof water connections. This stormwater can exceed the capacity of the sewerage system, leading to overflows from designed overflow points. Sydney Water carried out significant work during the 1990s to assess the environmental and public health impacts of wet weather overflows and the costs and benefits of mitigation measures. This work provided key information for the development of Water Plan 21 and the NSW Government's Waterways package.

The information was also used during the Sewer Overflow Licensing Project (SOLP) in the late 1990s. The SOLP resulted in Environmental Impact Statements (EISs) for each of Sydney's 27 sewerage catchments. These EISs identified that the consequence of wet weather overflows is an increase in risk to recreational users of waterways, particularly in swimming areas. The SOLP EISs established wet weather overflow frequency targets for the North Head and other systems. The target for the Northern Beaches catchment of 20 overflows in 10 years was established due to the sensitivity of the Northern Beaches, in particular Curl Curl and Queenscliff beach.

To date, the WWOAP 2007– 2012 for the Northern Beaches sewerage catchment has been delivered in two stages. Stage 1 involved initial planning activities and was completed using a Professional Services Contract (PSC). The SewerFix Wet Weather Alliance (SWWA) is currently delivering Stage 2. This involves the delivery of options developed by the PSC, the completion of remaining planning work, and the delivery of work that may arise from this planning.

In May 2007, SWWA began construction of the options developed by the PSC as part of Stage 1. In Stage 2, overflows caused by the under capacity of the Narrabeen Sub-main (NSM) in wet weather events were investigated. Planning work undertaken by SWWA identified the need for the Project to augment the capacity of the NSM. Stage 2 also involves planning and delivery of five solutions to resolve under-capacity in parts of the local sewerage network that also contribute to the high-frequency overflows. These solutions are also located in the Warringah local government area however they do not form part of this Project Application.

### The Project

The Project comprises a 30 – 35 megalitre (ML) storage tunnel (of 3.5 m diameter) beginning in Brookvale, at the Chard Road shaft site (being 10 m in diameter and 90 m deep), and following a straight alignment at depths ranging between 90 m and 150 m below ground level, and connecting to the Northside Storage Tunnel (NST) beneath the suburb of Fairlight. The tunnel is some 3.6 km in length. The Jacka Park connection component of the Project would involve the launch of horizontal directional drilling (HDD) activities to install a 400 mm nominal diameter pipeline from Jacka Park in Freshwater. The HDD would cover a distance of 800 m, connecting to the storage tunnel at a depth of approximately 125 m.

The overarching objective of the Project is to reduce the frequency of wet weather overflows in the Northern Beaches catchment to within 20 overflows in 10 years so as to improve water quality in beaches, lagoons and waterways within the catchment. To achieve this, the Project would augment the capacity of the NSM during wet weather events.

The Project would operate as another branch of the NST. The NST currently captures overflows from Lane Cove West (Boronia Park), Scotts Creek, Tunks Park, Quakers Hat Bay and Shelly Beach. The NST consists of nearly 20 km of tunnels ranging in diameter from 3.8 m to 6.6 m with a storage volume of approximately 500 ML. Due to the Project's intended connection to the NST, the operating parameters of the NST's ventilation facilities at Lane Cove West (Boronia Park), Scotts Creek, Quakers Hat Bay, and North Head Sewage Treatment Plant may be affected. Notwithstanding this, construction works at these sites is unlikely.

### Statutory planning

A total of five Local Environmental Plans are applicable to the project, including:

- *Warringah Local Environmental Plan 2000*
- *Manly Local Environmental Plan 1988*
- *Hunter's Hill Local Environmental Plan Number 1*
- *Willoughby City Local Environmental Plan 1995*
- *Mosman Local Environmental Plan 1998.*

Key State planning instruments include:

- *State Environmental Planning Policy (Infrastructure) 2007*
- *State Environmental Planning Policy (Major Projects) 2005*
- *State Environmental Planning Policy Number 55 (Remediation of Land)*
- *State Environmental Planning Policy Number 19 (Bushland in Urban Areas).*

Key Acts pertaining to the project include:

- *Environmental Planning and Assessment Act 1979*
- *Protection of the Environment Operations Act 1997.*

Other legislation relevant to the Project include:

- *Sydney Water Act 1994*
- *Contaminated Land Management Act 1997*
- *Crown Lands Act 1989*
- *Occupational Health and Safety Act 2000 and Regulation 2001*
- *Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation 2008*
- *Public Health Act 1991.*

The Project is permissible without consent in accordance with the provisions of the *State Environmental Planning Policy (Infrastructure) 2007*. Part 5 of the EP&A Act therefore applies to the Project, unless the Project is considered to be a project to which Part 3A could apply.

On 29 July 2005 the then Minister for Infrastructure and Planning made an order, published in the NSW Gazette (No.96, p4054, 29 July 2005), declaring activities for which the proponent is also the determining authority (within the meaning of Part 5 of the EP&A Act) and for which the proponent also considers that an environmental impact statement should be prepared, to be a project to which Part 3A of the EP&A Act applies.

Sydney Water, as proponent, has determined that the Project is considered likely to have a significant effect on the environment and, but for Part 3A, would have otherwise prepared an environmental impact statement. As a result the Project constitutes development to which Part 3A of the EP&A Act applies.

## Stakeholder and community consultation

The core objective of the consultation process in the Northern Beaches catchment is to provide a process by which the SWWA (on behalf of Sydney Water) can work with the Northern Beaches community in order to identify, test and confirm wet weather overflow problems, and potential acceptable options for their abatement. Planning phase activities have included the preparation and delivery of eight facilitated community workshops and various off line meetings aiming to gain an understanding of, and seek solutions for, wet weather overflows in the Northern Beaches catchment. The main issues arising from these workshops and meetings included:

- Human health impacts, including ventilation and odour concerns
- Construction and operational impacts eg noise and vibration, traffic etc
- Reduce, reuse and recycling alternatives
- Budget and timing of the Wet Weather Overflow Abatement Program as it relates to the Northern Beaches catchment
- Greenhouse gases, energy use, and potential climate change impacts.

During the approvals phase, the SWWA community consultation team will continue to engage with key stakeholders including the Chard Road property owner, local residents and users of Jacka Park, St John the Baptist School, Willoughby City Council, Mosman Council, Hunters Hill Council, Manly Council, Warringah Council and Glenaeon School. The SWWA will continue to manage community and stakeholder relations, on behalf of Sydney Water, throughout detailed design and the environmental approvals process.

## Preliminary environmental assessment

A preliminary environmental risk assessment was undertaken involving key SWWA and Sydney Water personnel involved in the Project. This involved identifying potential issues associated with the construction and operation of the Project. A qualitative ranking of each identified issue was then undertaken, in terms of the likelihood of the issue arising and the consequence of the potential effects if they were to remain unmitigated. A risk ranking was then assigned to each environmental issue based upon the agreed consequence and likelihood criteria.

Environmental issues with 'Very High', 'High' or 'Medium' risk ranking are assessed further in Section 6 to determine whether they are key environmental issues for the Project, or whether further assessment during the environmental assessment for the Project is required. The remaining environmental issues considered to be of 'Low' risk, or otherwise not discussed during the risk assessment workshop, are considered to be of minor risk to the Project, as relatively standard environmental control and mitigation measures could be used to successfully manage these risks.

The key environmental issue for the Project is the potential odour impacts associated with the new ventilation facility at Chard Road and the potential changes to the operation of the existing NST ventilation facilities. A detailed assessment of odour impacts will be included in the Environmental Assessment for the Project.

The environmental risks associated with the other issues, outlined below, could either be reduced with relatively standard mitigation measures or are unlikely to occur on this Project. Nevertheless an assessment of these issues will be included in the Environmental Assessment to confirm that their environmental risks can be minimised. A proposed scope of the Environmental Assessment is outlined in Section 7.

Other environmental issues for the Project are:

- Air quality (odour at Jacka Park, dust at Chard Road and Jacka Park and asbestos at Chard Road)
- Surface water quality impacts during the proposed seven week closure of the NST
- Groundwater quality
- Traffic and transport (construction and operation)
- Noise and vibration
- Soils and geology
- Greenhouse gas and climate change impacts
- Cultural heritage



- Visual amenity
- Flora and fauna
- Land use and socio-economic impacts
- Waste management and minimisation
- Cumulative impacts
- Services and utilities.

A draft Statement of Commitments is to be included in the Environmental Assessment to describe how both key and other environmental issues would be managed throughout the construction and operation of the Project.

### Conclusions

The Preliminary Environmental Assessment describes the anticipated environmental issues associated with the construction and operation of the Project, and outlines an indicative scope for the Environmental Assessment to be undertaken in accordance with Part 3A of the EP&A Act. It is anticipated that this report would assist the Director-General of the Department of Planning with the formulation of Environmental Assessment requirements for the Project.

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# 1. Introduction

## 1.1. PURPOSE AND STRUCTURE OF THIS REPORT

This Preliminary Environmental Assessment (PEA) has been prepared to support Sydney Water's project application under Section 75E of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the Northern Beaches Storage Project (the Project).

This report describes the proposal, undertakes a preliminary assessment of its likely environmental impacts and outlines the proposed scope of the Environmental Assessment. This will allow the NSW Department of Planning (DoP) to issue Director-General's (DG's) requirements under Section 75F(3) for the purposes of any additional environmental assessment which may be required under Sections 75F(5) and 75H(1).

The structure of the remaining sections of the document is outlined below:

- **Section 2** – Context
- **Section 3** – Project description
- **Section 4** – Statutory planning
- **Section 5** – Stakeholder and community consultation
- **Section 6** – Preliminary environmental assessment
- **Section 7** – Proposed scope of environmental assessment
- **Section 8** – Conclusions.

## 1.2. THE PROJECT

The Project comprises a 30 – 35 megalitre (ML) storage tunnel, which would start from the Chard Road shaft site in the suburb of Brookvale and follow a straight alignment of 3.6 km some 90 m to 150 m deep to connect into the Northside Storage Tunnel (NST) beneath the suburb of Fairlight. The Project also comprises a 500mm nominal bore connection, some 800 m in length, from Jacka Park in the suburb of Freshwater.

The Project forms part of the wider Wet Weather Overflow Abatement Program 2007 – 2012 (WVOAP) for the Northern Beaches sewerage catchment. However Sydney Water commenced wet weather overflow abatement planning in the Northern Beaches in 2006 in response to wet weather overflow frequency targets set by the Department of Environment and Climate Change (DECC) (formerly Environment Protection Authority). These targets are set out in a Pollution Reduction Program (PRP) contained within the Northern Suburbs Sewage Treatment System licence and aims to improve water quality within the northern suburbs rivers, creeks, lagoons and beaches.

## 1.3. LOCATION

### 1.3.1. Northern Beaches catchment

The Northern Beaches sewerage catchment extends from Manly in the south to Collaroy in the north. The catchment includes the suburbs of Collaroy, Narraweena, Dee Why, Beacon Hill, Curl Curl, Freshwater, Brookvale, Queenscliff, Manly Vale and Manly, and is located within the Warringah and Manly Local Government Areas (LGAs). An overview of the main locations within the Northern Suburbs Sewage Treatment System (also known as North Head System) that are applicable to the Project is provided in Figure 1.

The wastewater system in the Northern Beaches serves approximately 135,000 customers and 65,000 properties in the Warringah and Manly LGAs and consists of 24 sewage pumping stations, approximately 682 km of sewer mains and 123 constructed wet weather overflows.

### 1.3.2. Description of the project area

The Project area is characterised primarily by residential properties however, there are also small areas of industrial and commercial properties, specifically in the Brookvale area. In addition there are hospitals, schools and areas of open space along the proposed tunnel alignment.

The proposed shaft site for the tunnel is located within the Winbourne Industrial Estate, located on Chard Road, Brookvale (Figure 2). The proposed shaft site at Chard Road, and the Winbourne Industrial Estate, is privately owned and Sydney Water has commenced negotiations with the owner regarding the long term use of the area for the proposed shaft.

The tunnel would pass underneath the suburbs of Brookvale, Freshwater, North Manly and Fairlight. The connection into the proposed storage tunnel from the suburb of Freshwater (the Jacka Park connection) would be launched from Jacka Park, located on the corner of Wyndora and Oliver Streets.(Figure 3).

Due to the Project's connection into the NST, the Project may also affect the operation of the NST's ventilation facilities at Lane Cove West (Boronia Park) (Figure 4), Scotts Creek (Figure 5), Quakers Hat Bay (Figure 6) and North Head Sewage Treatment Plant (Figure 7). The exact nature of these changes is uncertain at this stage and is the subject of comprehensive ventilation and odour modelling. Results of this modelling and any potential environmental impact will be provided in the Environmental Assessment for the Project. However it is unlikely that any construction works would be required at these sites.

The above ground Project areas are presented in Table 1.

*Table 1 Location of potential above ground Project areas*

Project area	Legal description	Ownership	Current land use
Tunnel shaft site on Chard Road, Brookvale.	DL18 SP 58653; zoned F3 – Brookvale industrial under the Warringah LEP 2000.	Privately owned.	A lot within Winbourne Industrial Estate, currently used as a parking area. The site also contains a derelict/disused building.
Launch site for Jacka Park connection to tunnel. Jacka Park, Freshwater.	Lot 403 DP 752038, zoned open space under the Warringah LEP 2000.	Crown land in care/control of Warringah Council.	Used as a recreational park (playground equipment, walking track, memorial garden).
Existing ventilation facility, North Head STP.	Lot 1 DP 604428, zoned 5 – Special Uses under the Manly LEP 1988.	Sydney Water owned.	NST – Existing ventilation facility located within the boundaries of the North Head STP.
Existing ventilation facility, Quakers Hat Bay.	Lot 1 DP 1010799, zoned Zone 6(a) (Public Recreation Zone) under the Mosman LEP 1998.	Sydney Water owned.	NST – Existing ventilation facility.
Existing ventilation facility, Scotts Creek.	Lot 2 DP 227073, Zone 6(a) Open Space A (Existing Recreation) of Willoughby City LEP 1995.	Owned by Willoughby City Council.	NST – Existing ventilation facility.
Existing ventilation facility, Lane Cove West (Boronia Park).	Lot 1 DP 1037118 and Lot 12 DP 29009, zoned 2(a1) Residential A1 under the Hunters Hill LEP No. 1.	Sydney Water owned.	NST – Existing ventilation facility.

#### **1.4. THE PROPONENT**

Sydney Water, a statutory State owned corporation wholly owned by the NSW Government, is the proponent of the Project. The SewerFix Wet Weather Alliance (SWWA) will deliver the project on behalf of Sydney Water.

## 2. Context

Sydney Water provides reliable and efficient drinking water, recycled water and wastewater services to more than four million customers. It is committed to ensuring water quality and to protecting the health and environment of the communities in Sydney, Illawarra and the Blue Mountains.

Sydney Water is a statutory State Owned Corporation, wholly owned by the NSW Government. In meeting its core objective, to provide reliable and efficient drinking water, recycled water and wastewater services, Sydney Water is committed to:

- Protect public health
- Protect the environment in accordance with the principles of environmentally sustainable development
- Be a successful business.

### 2.1. BACKGROUND TO WET WEATHER OVERFLOW ABATEMENT PROGRAM

In wet weather, stormwater can enter the sewerage system through cracks in pipes, faulty joints or illegal roof water connections. This stormwater can exceed the capacity of the sewerage system, leading to overflows from designed overflow points. These overflows can potentially impact public health as well as aquatic ecosystems. The Wet Weather Overflow Abatement Program (WWOAP) is a long-term program to address these issues, and is part of Sydney Water's SewerFix Program.

Sydney Water carried out significant work during the 1990s to assess the environmental and public health impacts of wet weather overflows and the costs and benefits of mitigation measures. This work provided key information for the development of Water Plan 21 and the NSW Government's Waterways package.

The information was also used during the Sewer Overflow Licensing Project (SOLP) in the late 1990s. The SOLP resulted in Environmental Impact Statements (EISs) for each of Sydney's 27 sewerage catchments. These EISs identified that the consequence of wet weather overflows is an increase in risk to recreational users of waterways and in particular swimming areas. The SOLP EISs established wet weather overflow frequency targets for the North Head and other systems. The target for the Northern Beaches catchment of 20 overflows in 10 years was established due to the sensitivity of the Northern Beaches, in particular Curl Curl and Queenscliff beach.

The North Head system is covered by Environment Protection Licence (EPL) No 378, which contains a Pollution Reduction Program for reducing wet weather overflows (PRP 300.2). In developing the objectives in PRP 300.2, Sydney Water provided DECC with the current performance of all the licensed overflows in the North Head system, including an improvement plan for reducing wet weather overflows within the system. The improvement plan was based on reducing overflows to swimming sites that are in the Beachwatch/Harbourwatch Program. The Northern Beaches catchment was included in the improvement plan with a target overflow frequency of 20 overflow events in 10 years. DECC then converted the improvement plan into wet weather overflow frequencies for the entire North Head system that are not to be exceeded. These frequencies are provided in PRP 300.2 and presented below:

- 25 wet weather overflows in any 10 year period in 50 per cent of directed overflow locations
- 80 overflows in any 10 year period in 90 per cent of directed overflow locations.

## 2.2. THE WET WEATHER OVERFLOW ABATEMENT PROGRAM

The WWOAP is currently being implemented in various phases and stages to meet wet weather overflow reduction targets. The initial phase involved planning and delivery in the following sewerage catchments:

- Sydney CBD
- Blackwattle Bay (still ongoing)
- Cronulla
- Penshurst
- Peakhurst
- Winmalee
- Bondi.

Sydney Water has selected a number of sewerage catchments to be part of the WWOAP 2007-2012 based on their environmental and recreational value. These catchments include Bellambi, Bombo, Hayes Street Beach, Lane Cove, Quakers Hill, North Richmond, Northern Beaches, Port Kembla, Rouse Hill, Warriewood and Wollongong.

Lane Cove, Northern Beaches and Hayes Street Beach sewerage catchments are all part of the North Head system.

To date, the WWOAP 2007–2012 for the Northern Beaches sewerage catchment has been delivered in two stages. Stage 1 involved initial planning activities and was completed by a consortium of companies hired by Sydney Water using a Professional Services Contract (PSC).

The SewerFix Wet Weather Alliance (SWWA) is currently delivering stage 2. This involves the delivery of options developed under the PSC, the completion of remaining planning work, and the delivery of work that may arise from this planning.

### 2.2.1. The professional services contract

The PSC investigated high frequency wet weather overflows in the Lane Cove, Northern Beaches and Hayes Street Beach sewerage catchments. This work involved hydraulic modelling and community consultation to assess the causes of the problem overflows.

The PSC identified that high-frequency overflows in the Northern Beaches catchment were caused by a combination of problems in the local sewerage network and by an under-capacity of the catchment's main sewage carrier, the Narrabeen Sub-main (NSM). Options to reduce the frequency of overflows caused entirely by local network problems were then developed. This included further community consultation and the preparation of a preliminary Review of Environmental Factors (REF). This work resulted in a package of work (Package 1) for the Northern Beaches and Hayes Street Beach catchments.

### 2.2.2. The SewerFix Wet Weather Alliance (SWWA)

In May 2007, Stage 2 of the WWOAP 2007-2012 began with the formation of the SWWA. SWWA has responsibility for the planning and delivery of WWOAP 2007-2012 and is a partnership between four non-owner participant companies and Sydney Water. SWWA has undertaken the following activities in the Northern Beaches catchment:

#### **Stage 1 – delivery of Package 1**

In May 2007, SWWA began construction of the options developed by the PSC as part of Stage 1. These projects have since been constructed in the following areas:

- Beacon Hill
- Upper Cromer
- Collaroy
- Lower Cromer
- Narrabeena.



### **Stage 2 – large solution for Northern Beaches (the Project)**

SWWA recommenced planning to address the high frequency wet weather overflows caused by the under-capacity of the NSM. These overflows are located in the Curl Curl/Brookvale area. In order to reduce the frequency of these overflows to 20 overflows in 10 years, the NSM needs additional storage during wet weather events. This additional storage would be provided by the Project (refer to Figure 8).

### **Stage 2 – local solutions for Northern Beaches**

SWWA is currently developing five solutions to resolve under-capacity in parts of the local sewerage network that also contribute to the high-frequency overflows. These solutions are also located in the Warringah local government area, however they do not form part of this Project Application. In addition there is one overflow location at East Esplanade in Manly, which is currently being investigated to confirm whether it exceeds 20 overflows in 10 years. If investigations show that this overflow is exceeding 20 overflows in 10 years, appropriate solutions will be developed to address it.

SWWA believes that the local solutions and the Project are related in their broad objective, which is to reduce wet weather overflows in the Northern Beaches catchment, and in their cumulative impact, which is to positively benefit local waterways.

However, they differ considerably in purpose. The purpose of the Project is to augment the capacity of the NSM, whereas the purpose of the local solutions is to relieve constraints in the local sewerage network. In addition, the five local projects would be constructed more than two years in advance of the Project. The local solutions therefore would be subject to an independent assessment pursuant to the requirements of the EP&A Act.

## 3. Project description

### 3.1. PROJECT OBJECTIVE

The overarching objective of the Project is to reduce the frequency of wet weather overflows in the Northern Beaches catchment to within 20 overflows in 10 years so as to improve water quality in beaches, lagoons and waterways within the catchment. This would reduce the risk of health impacts from swimming in these waterways after wet weather events.

To achieve this objective, the Project would augment the capacity of the NSM in wet weather events to reduce wet weather overflows in the Northern Beaches catchment. As discussed in section 2.3.2, this Project, in combination with the Stage 1 projects and the other local solutions, will enable Sydney Water to meet the target of 20 overflows in 10 years, by the time the Project is commissioned in early 2012.

### 3.2. PROJECT OVERVIEW

The Project includes a straight tunnel starting at the Chard Road shaft site in Brookvale and connecting into the NST, at 2.7 km from North Head, beneath the suburb of Fairlight. This alignment was selected because it follows the most direct route between the NSM take-off point at Chard Road and the NST.

The shaft, at Chard Road, would be approximately 90 m deep and 10 m wide. The construction of the shaft would most likely be a segmental precast cession socketed into the sandstone. The tunnel would be approximately 3.5 m in diameter, approximately 3.62 km long and would store some 30 – 35 ML of wet weather flow. Wet weather flow would be diverted into the tunnel from the NSM during wet weather events via a weir. The tunnel would fill in wet weather and flow by gravity to the NST.

The tunnel would connect to the NST directly at invert level (approximately 150 m below ground). It would be constructed using a tunnel boring machine (TBM) for most of its length and a roadheader (or similar) for approximately 20 m before making the final connection to the NST.

In effect the tunnel would operate as an additional branch of the NST, storing and transferring flow of some 30-35 ML from the Northern Beaches catchment via the NST into North Head Sewage Treatment Plant (STP). The NST is currently ventilated at four locations, Scotts Creek, Lane Cove West (Boronia Park), Quakers Hat Bay and North Head STP. The Project will transfer 30 – 35 ML of wet weather flow into the NST, which is likely to affect the current operation of the existing ventilation facilities, in terms of frequency and volume. The Project therefore may require some minor improvement works within the ventilation and/or odour facilities at these sites, however it is unlikely that any construction works would be required.

The Project also comprises a connection from the suburb of Freshwater, which involves the launch of horizontal directional drilling (HDD) activities to install a 400 mm diameter pipe from Jacka Park in Freshwater. The HDD would cover a distance of approximately 800 m, and allow storage of an additional 0.3 ML, connecting to the main tunnel at a depth of approximately 125 m.

Figure 8 shows the major components of the project.

### 3.3. KEY ELEMENTS OF THE PROJECT

The key elements of the Project include:

- Site establishment
- Construction
- Site restoration
- Operation.

### 3.3.1. Site establishment

#### **Chard Road – shaft site**

Following negotiations with the owner of the site, establishment at Chard Road would comprise the following activities::

- Erection of temporary fencing that would be removed once site hoarding is in place
- Demolition of the existing dilapidated building containing asbestos. This would be undertaken in accordance with the *Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation 2008* and the *Occupational Health and Safety Regulation 2001*
- Erection of hoarding surrounding the site. The hoarding would be up to two storeys high. Site sheds would be located on top of the hoarding, which would have an additional benefit of acting as noise barriers
- Construction of a hardstand for site access and temporary spoil storage
- Establishment of a temporary ventilation and water treatment/dewatering system
- Establishment of temporary electricity supply in the form of a substation
- Establishment of temporary facilities for slurry
- Construction of sewerer toilet facilities
- Construction of a temporary site workshop and stockpile area in place of the existing dilapidated building.

It is estimated that the time required for site establishment would be approximately eight weeks.

#### **Jacka Park – HDD launch site**

Site establishment at Jacka Park would involve:

- Erection of temporary site fencing
- Establishment of access, hardstand and laydown areas
- Set up of HDD and associated equipment.

It is estimated that the time required for site establishment and set up of the drilling rig would be approximately two weeks.

### 3.3.2. Construction of the Project

Construction would comprise six main stages:

- Construction of the off-take weir from the NSM (Chard Road)
- Construction of the shaft (Chard Road)
- HDD of Jacka Park connection from Jacka Park in Freshwater
- Construction of the storage tunnel
- Jacka Park connection into storage tunnel
- Connection to the NST.

The total construction duration is estimated to be 24 months.

#### **Construction of the off take weir**

The off take from the NSM would be located at the Chard Road site, close to the NSM. This would require an overflow weir chamber, vortex chamber and a borehole. It is proposed to construct these by open cut excavation. The chamber would be a poured in-situ concrete structure built around the existing section of the NSM.

#### **Construction of the shaft**

A 10 m diameter (approximately 90 m deep) shaft would be sunk by an excavator or grabs. The shaft is likely to be constructed with a segmental precast cassion or similar socketed into sandstone at a depth of approximately 35 m. Once sandstone is reached (below 35 m), rock bolts as ground support would be used to provide stability to the cut face.

Once the required depth (90 m) is reached, a Roadheader (or similar) would be lowered into the shaft to excavate a launch chamber, providing sufficient space to erect the TBM. The TBM would then be used to excavate the remainder of the tunnel. The shaft would also provide for personnel access by stairs and hoist, equipment access, muck removal, pumping, ventilation and utilities. Approximately 4,500 m<sup>3</sup> of spoil would need to be removed during the 20-week shaft construction period.

Upon completion of the tunnel, the launch chamber would be converted into a de-aeration chamber.

#### **HDD of Jacka Park connection**

A HDD is proposed for the Freshwater connection into the main tunnel. The proposed launch site for the HDD is Jacka Park in Freshwater. The HDD would start from a shallow depth and would therefore have a relatively small construction footprint of approximately 25 m x 25 m. HDD is a trenchless construction method using equipment and techniques from horizontal oil well drilling and conventional (under) road boring. A 550 mm HDD borehole would be drilled to allow for the installation of a 400 mm diameter pipe. In total, construction time at Jacka Park would be approximately 5 months. Approximately 195 m<sup>3</sup> of spoil would need to be removed from Jacka Park during construction at the site.

#### **Construction of the storage tunnel**

The tunnel would be excavated from north to south, commencing at the Chard Road shaft site in Brookvale, and connecting into the NST under Fairlight.

The tunnel would be excavated using a TBM. Depending upon the type of TBM selected, the spoil would either be removed by conveyor, or be hoisted up through the shaft by a crane positioned at the shaft edge. The spoil would be initially contained within onsite holding compounds before being disposed of or recycled according to its waste classification.

It is estimated that the construction of the tunnel would require the removal of approximately 30,000 m<sup>3</sup> of spoil (predominantly sandstone) over a 30-week period. The spoil would be transported to either a licensed disposal facility or to a buyer for possible reuse opportunities.

#### **Jacka Park connection into storage tunnel**

The Jacka Park connection would be constructed in advance of the storage tunnel. As the storage tunnel is excavated from north to south it would intersect the Jacka Park connection approximately 800 m west of Jacka Park and approximately 125 m below ground. The connection point would be secured with concrete and rock bolts into the sandstone once the TBM passes the intersection point.

It is estimated that the construction of the Freshwater branch would require the removal of some 300 m<sup>3</sup> of spoil (predominantly sandstone) over a 5 month period. The spoil would be transported to either a licensed disposal facility or to a buyer for possible reuse opportunities.

#### **Connection to NST**

The tunnel would be excavated by TBM up to a point approximately 20 m from the NST. A distance of 20 m between the NST and end of the TBM has been determined as an adequate plug of rock to resist 50 metres of hydrostatic pressure if the NST is full. It is proposed that the TBM would then be withdrawn from the tunnel through the shaft at Chard Road. All fixtures would be completed prior to making the final breakthrough into the NST. The final breakthrough to the NST would be undertaken using a roadheader or similar, which would either be lowered down the shaft once the TBM is removed, or driven through the NST via North Head to complete the final 20 m of work from the other side. It is estimated that the NST would be shut down for approximately seven weeks to facilitate all the above works, following which the commissioning and testing would commence.

#### **3.3.3. Site restoration**

After completion of the tunnel, the proposed shaft site at Brookvale, and the HDD launch site at Freshwater, would be returned to their pre-existing condition, with the exception of some above ground structures. These include new access covers, fencing and an above ground passive ventilation facility and odour control unit possibly housed in a small building, the size of which is subject to the outcome of the ventilation and odour modelling. Some of the site is likely to be utilised on an on going basis for the purposes of access to permanent facilities, however it is anticipated only infrequent access would be required.

Should any works be required at the existing NST ventilation sites as a result of this Project, appropriate restoration works would be undertaken to return these sites to their current condition.

### 3.3.4. Operation

The Project would operate as another branch of the NST. The NST currently captures overflows from Lane Cove West (Boronia Park), Scotts Creek, Tunks Park, Quakers Hat Bay and Shelly Beach. The NST consists of nearly 20 km of tunnels ranging in diameter from 3.8 m to 6.6 m with a total useable storage volume of approximately 500 ML. It has several operating modes:

- **Standby mode** – Dry weather, when the tunnel is empty and ready to receive overflows
- **Normal operating mode** – Overflows are diverted into the tunnel and transferred to North Head or stored in the tunnel
- **Maintenance mode** – when personnel enter the tunnel for inspection and maintenance
- **Emergency bypass at North Head STP mode** – power failure at North Head STP when sewage is diverted into the tunnel to avoid cliff face discharge
- **Scheduled maintenance of North Head STP mode** – sewage is dropped into tunnel during planned maintenance that cannot be done with the pumps running (estimated once every 10 years)
- **Maintenance of NSOOS mode** – tunnel carries part of the NSOOS flow while a section is isolated for essential maintenance that cannot be accomplished otherwise (estimated once every 5 years).

The Project, during standby mode, would vent from the existing North Head ventilation system. Fresh air would be drawn in at the Chard Road shaft site and the tunnel fan at North Head would extract air, a counter flow chemical scrubber would then purify the extracted air before being released to the environment.

When the Project is filling during wet weather events (normal operating mode), air would be displaced and drawn into North Head via the NST, by the ventilation fans at North Head. Once the water level in the NST has reached the ventilation changeover level (when the NST's connection with North Head is submerged at approximately 68 ML) the fans at Lane Cove West (Boronia Park), Scotts Creek and the new Chard Road site would ventilate both the NST and the Project. Air from the NST and the Project would be released to the environment through a series of filters at these sites. A passive ventilation and odour control system would be required at the Jacka Park site to treat displaced air from the Project.

It is anticipated that the overall performance of the NST ventilation facilities, with respect to air quality at and beyond the boundary of the facilities, would not change as a result of the new tunnel. However detailed ventilation and odour modeling has commenced to quantify any potential operational changes (volume and frequency) that may be required to the ventilation and/or odour facilities as a result of this Project. Notwithstanding this, it is unlikely that any construction works would be required at the sites to address any potential changes to air volume and venting frequency.

Operational maintenance activities at Chard Road would generally only occur infrequently with larger maintenance works likely required only every 5 or so years. These activities could require the use of heavy machinery such as cranes and trucks, which may have temporary traffic and noise implications. Operational maintenance requirements at Jacka Park would be less than at Chard Road, as the permanent passive ventilation facility at Jacka Park would not require regular, or large scale, maintenance works.

## 4. Statutory planning

### 4.1. LOCAL PLANNING INSTRUMENTS

Five local environment plans are applicable to the Project, as surface works are either proposed or possible within these local government areas:

- *Warringah Local Environment Plan 2000*
- *Manly Local Environment Plan 1988*
- *Hunters Hill Local Environment Plan No.1*
- *Willoughby City Local Environment Plan 1995*
- *Mosman Local Environment Plan 1998.*

The NST also passes through the North Sydney local government area, however as there are no surface works required within this area, the North Sydney Local Environment Plan has not been considered in this document.

#### 4.1.1. Warringah Local Environment Plan 2000

The Chard Road shaft site is within the Brookvale Industrial Locality (Locality F3) of the Curl Curl Lagoon Catchment Locality Statement, within the *Warringah Local Environment Plan 2000*. Part of the tunnel alignment would include the Curl Curl Locality (Locality F5) of the Curl Curl Lagoon Catchment Locality Statement. The possible Freshwater connection into the tunnel would be launched from Jacka Park in Freshwater. Jacka Park is Public Open Space within the Freshwater Beach Locality (Locality H1).

The Project is not prohibited development within the relevant Locality Statements.

The Project is characterised as a public utility installation within the provisions of Schedule 2 of the *Warringah Local Environment Plan 2000* (Other development not requiring consent). Public utility installations, being sewerage undertakings, include:

- Development of any description at or below the surface of the ground
- Additions, extensions or replacement of structures already installed or erected.

Consequently the Project does not require development consent from Warringah Council.

#### 4.1.2. Manly Local Environment Plan 1988

The tunnel alignment would be under Residential Zone 2 and Open Space Zone 6 of the *Manly Local Environment Plan 1988*. North Head Sewage Treatment Plant is within the Special Uses Zone 5 of the *Manly Local Environment Plan 1988*. The Project can be characterised as a public utility installation in terms of the provisions of the *Manly Local Environment Plan 1988*. Development consent is required for utility installation works within all relevant zones.

*State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) prevails over the *Manly Local Environment Plan 1988* and Division 18 Clause 106 (Development for the purposes of sewage reticulation systems) of the Infrastructure SEPP applies. Consequently the Project does not require development consent from Manly Council.

#### 4.1.3. Hunters Hill Local Environment Plan No.1

The ventilation and odour control facility (part of the NST development) in Lane Cove West (Boronia Park) is within the Hunters Hill LGA. The ventilation and odour control facility and other Sydney Water infrastructure on the site is within Zone 2 (a1) (Residential A1) of the *Hunters Hill Local Environment Plan No. 1*. Should any works be required at the Lane Cove West (Boronia Park) ventilation site, these works would be characterised as a public utility installation in terms of the provisions of the local environment plan. Development consent from Hunters Hill Council is required for utility installation works within Zone 2(a1).

The Infrastructure SEPP prevails over the *Hunters Hill Local Environment Plan No. 1* and Division 18 Clause 106 (Development for the purposes of sewage reticulation systems) of the Infrastructure SEPP applies. Consequently the Project does not require development consent from Hunters Hill Council.

#### 4.1.4. Willoughby Local Environment Plan 1995

The Scotts Creek ventilation and odour control facility (part of the NST development) is within the Willoughby City LGA. The facility is within Zone 6(a) Open Space A (Existing Recreation) of the *Willoughby City Local Environment Plan 1995*.

Should any works be required at the Scotts Creek ventilation site, these works would be characterised as a public utility installation in terms of the provisions of the local environment plan. Clause 53A (b) of the *Willoughby City Local Environment Plan 1995* states that within Zone 6(a), utility installations are permissible with development consent.

The Infrastructure SEPP prevails over the *Willoughby City Local Environment Plan 1995* and Division 18 Clause 106 (Development for the purposes of sewage reticulation systems) of the Infrastructure SEPP applies. Consequently the Project does not require development consent from Willoughby City Council.

#### 4.1.5. Mosman Local Environment Plan 1998

The Quakers Hat Bay ventilation site (part of the NST development) is within the Mosman LGA. The ventilation and odour control facility is within Zone 6(a) (Public Recreation Zone) of the *Mosman Local Environment Plan 1998*.

Should any works be required at the Quakers Hat Bay ventilation site, these works would be characterised as a public utility installation in terms of the provisions of the local environment plan. Part 5 Clause 23 of the *Mosman Local Environment Plan 1998* states that within zone 6(a) utility installations are permissible with development consent.

The Infrastructure SEPP prevails over the *Mosman Local Environment Plan 1998* and Division 18 Clause 106 (Development for the purposes of sewage reticulation systems) of the Infrastructure SEPP applies.

Consequently the Project does not require development consent from Mosman Council.

## 4.2. REGIONAL AND STATE PLANNING INSTRUMENTS

The following state planning instruments have varying applicability to the Project:

- *State Environmental Planning Policy (Infrastructure) 2007*
- *State Environmental Planning Policy (Major Projects) 2005*
- *State Environmental Planning Policy No. 55 (Remediation of Land)*
- *State Environmental Planning Policy No. 19 (Bushland in Urban Areas).*

### 4.2.1. State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP was gazetted on 21 December 2007 and came into effect on 1 January 2008.

Under Division 18 Clause 106:

3) *Development for the purpose of sewage reticulation systems may be carried out:*

*(a) by or on behalf of a public authority or any person licensed under the Water Industry Competition Act 2006 without consent on any land, and*

*(b) by any other person with consent on any land.*

Clause 105 provides that a sewage reticulation system means a facility for the collection and transfer of sewage to a sewage treatment plant or water recycling facility for treatment or transfer of the treated water for use or disposal. The Project can be characterised as a sewage reticulation system as it involves the collection and transfer of wet weather sewage overflows from the NSM into the NST. Consequently the Project does not require development consent under Part 4 of the EP&A Act. Therefore Part 5 of the EP&A Act applies, unless the Project is declared to be a project to which Part 3A of the EP&A Act applies.

#### 4.2.2. State Environmental Planning Policy (Major Projects) 2005

*State Environmental Planning Policy (Major Projects) 2005* (Major Projects SEPP) was gazetted on 25 May 2005.

Schedule 1 of the Major Projects SEPP provides a list of projects for which Part 3A of the EP&A Act applies, based on classes of development. Clause 26(2) of Schedule 1 (development for the purposes of sewage and related wastewater treatment plants), when undertaken by a public authority, is not characterised as a major project under the Major Projects SEPP, therefore the Major Projects SEPP does not apply to this Project.

#### 4.2.3. State Environmental Planning Policy No. 55 – Remediation of land

The aim of *State Environmental Planning Policy No. 55 – Remediation of Land* (SEPP 55) is to provide for a State-wide planning approach to the remediation of contaminated land, and to promote the remediation of contaminated land so as to reduce the risk of harm to human health or any other aspect of the environment.

Clause 7(1) of SEPP 55 states that:

*A consent authority must not consent to the carrying out of any development on land unless:*

- (a) it has considered whether the land is contaminated, and*
- (b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out.*

For the purposes of SEPP 55, remediation includes:

*“removing, dispersing, destroying, reducing, mitigating or containing the contamination of any land.”*

The proposed Chard Road shaft site was found to have contaminated fill material (refer section 6.2). During construction of the shaft, this material would be removed from the site and transported to a suitably licensed disposal facility. The proposed remediation on the site can be characterised by clause 14 (a) of SEPP 55 and would be remediation work not requiring consent. Nevertheless, all remediation work at the shaft site would be undertaken in accordance with *Managing Land Contamination: Planning Guidelines SEPP 55 Remediation of Land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998).

#### 4.2.4. State Environmental Planning Policy No. 19 – Bushland in urban areas

The aim of *State Environmental Planning Policy No. 19 – Bushland in Urban Areas* (SEPP 19) is to protect and preserve bushland in urban areas for its natural heritage, aesthetic, recreational, educational and scientific resource values. Under clause 4 of SEPP 19, bushland refers to:

*“land on which there is vegetation which is either a remainder of the natural vegetation of the land or, if altered, is still representative of the structure and floristics of the natural vegetation.”*

SEPP 19 applies to bushland within the urban areas identified in SEPP 19 Schedule 1, which includes the local government areas of Lane Cove, Hunters Hill, Manly, Warringah and Willoughby City.

Under clause 6 of SEPP 19, a consent authority must not consent to development affecting bushland unless it:

- a) has made an assessment of the need to protect and preserve the bushland having regard to the aims of this Policy*
- b) is satisfied that the disturbance of the bushland is essential for a purpose in the public interest and no reasonable alternative is available to the disturbance of that bushland*
- c) is satisfied that the amount of bushland proposed to be disturbed is as little as possible and, where bushland is disturbed to allow construction work to be carried out, the bushland will be reinstated upon completion of that work as far as is possible.*

The Project may affect the NST ventilation facility at Lane Cove West (Boronia Park), which is located within Thorn Street bushland and at Scotts Creek, which is located within Willis Park. However, it is unlikely that any construction works would be required at these sites and therefore it is unlikely that any bushland would be removed for the purposes of the Project. If required, an assessment of any disturbance to the bushland area surrounding these facilities would be undertaken as part of the Environmental Assessment.



### 4.3. ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The EP&A Act, the associated *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), and environmental planning instruments made under the EP&A Act provide the framework for the assessment of environmental impacts and planning approval of development proposals in NSW. 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 a State Environmental Planning Policy or Ministerial Order.

On 29 July 2005, the then Minister for Infrastructure and Planning made an order, published in the NSW Gazette (No.96, p4054, 29 July 2005), declaring activities for which the proponent is also the determining authority (within the meaning of Part 5 of the EP&A Act) and for which the proponent also considers that an environmental impact statement should be prepared, to be a project to which Part 3A of the EP&A Act applies.

The Project falls within the definition of a “sewage reticulation system” under State Environmental Planning Policy (Infrastructure) 2007. Consequently, the Project does not require development consent under Part 4 of the EP&A Act in accordance with the provisions of the Infrastructure SEPP. Therefore Part 5 of the EP&A Act applies to the Project unless Sydney Water determines that an environmental impact statement is required. Sydney Water, as proponent, has determined that the Project is considered to be likely to have a significant effect on the environment and, but for Part 3A, would have otherwise prepared an environmental impact statement. As a result the Project constitutes development to which Part 3A of the EP&A Act applies.

The Project also falls within the definition of “linear infrastructure” in terms of the provisions of the EP&A Regulation. Consequently the consent of the owner of the land(s) potentially affected by the Project is not required to perform works on the owners land, but rather a notice of the development is to be given by advertisement in a newspaper circulating the area, before the start of the public exhibition period for the Project.

### 4.4. PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is administered by DECC and includes provisions for licensing scheduled activities and pollution of air and water. The NST and the associated ventilation sites are operated under an Environment Protection License (EPL No. 378). Should changes be required to the ventilation facilities as a result of the Project, a variation to this license may be required. In addition, a licence for aspects of the Project’s construction activities (eg discharge to waters) may be applicable. Sydney Water would liaise with DECC to determine appropriate license requirements.

### 4.5. OTHER APPLICABLE LEGISLATION

Table 2 Legislation requirements

Legislation	Relevant requirements	Analysis of project application
<b>Sydney Water Act 1994</b>	The <i>Sydney Water Act</i> establishes Sydney Water Corporation as a statutory State owned corporation and outlines the statutory powers and responsibilities that apply to Sydney Water. Of relevance to the Project are sections 38 Entry onto land and 47 Acquisition of land for the purposes of this Act.	Neither the shaft site on Chard Road nor the launch site for the Jacka Park connection to the tunnel are owned by Sydney Water, therefore Sydney Water needs to exercise powers under the Sydney Water Act to undertake work on these sites.
<b>Contaminated Land Management Act 1997</b>	The <i>Contaminated Land Management Act 1997</i> (CLM Act) regulates contaminated sites to ensure the protection of human health and the environment. It provides for a comprehensive regime for the assessment, management and remediation of contaminated land.	As Sydney Water does not own the shaft site it is not responsible for the existing contamination on site. Should Sydney Water disturb the contamination on site as part of the Project, it is responsible for appropriate removal, disposal and remediation of the area disturbed by the works. A more comprehensive assessment of the provisions of this Act would be undertaken as part of the Environmental Assessment. No contamination was found at Jacka Park.

Legislation	Relevant requirements	Analysis of project application
<b>Crown Lands Act 1989</b>	The objects of this Act are to ensure that Crown land is managed for the benefit of the people of NSW.	The launch site for the Jacka Park connection, is Crown Land, and managed by Warringah Council. Section 98 of the <i>Sydney Water Act</i> "... binds the Crown in right of New South Wales and, in so far as the legislative power of Parliament permits, the Crown in all its other capacities." That is, the Sydney Water Act prevails over any approval requirements within the Crown Lands Act.
<b>Heritage Act 1977</b>	The <i>Heritage Act 1977 (NSW)</i> (Heritage Act) provides for the conservation of "environmental heritage" in New South Wales. Environmental heritage includes places, buildings, works, relics, moveable objects and precincts that are of State or local heritage significance.	There is a local heritage item in Jacka Park, Freshwater, which is listed in the <i>Warringah Local Environment Plan 2000</i> . In addition the tunnel alignment may be beneath some heritage items listed on the State Heritage Register. Since the tunnel would be constructed below 90m, it is unlikely to affect any heritage-listed items.
<b>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Commonwealth)</b>	Approval of the Commonwealth Minister for Environment, Heritage and the Arts is required for any action that may have a significant impact on matters of national significance. These matters are: <ul style="list-style-type: none"> <li>• World Heritage properties</li> <li>• National Heritage Places</li> <li>• Ramsar wetlands</li> <li>• Migratory species, threatened species, or ecological communities listed in the EPBC Act</li> <li>• Commonwealth land and Commonwealth marine areas</li> <li>• Nuclear actions.</li> </ul>	The Project does not impact on Commonwealth Land nor does it impact any matter of National Environmental Significance (NES).
<b>National Parks and Wildlife Act 1974</b>	This Act provides for the protection, preservation and management of all Aboriginal relics throughout New South Wales. A Section 90 permit is required prior to the destruction of any known Aboriginal archaeological sites. A Section 87 application is required prior to the excavation of potential archaeological deposits. These permits are not required for a project approved under Part 3A of the EP&A Act.	Desktop studies indicate no Aboriginal sites are located within the footprint of the Project.
<b>Occupational Health and Safety Act 2000 and Regulation 2001</b>	The collection and storage of asbestos waste is regulated solely by WorkCover NSW under the current provisions of the <i>Occupational Health and Safety Regulation 2001</i> (OH&S Regulation).	The Chard Road shaft site contains a dilapidated building with suspected asbestos containing building materials. Removal and disposal of this material would be undertaken in accordance with the provisions of the OH&S Act 2000 and Regulation 2001.

Legislation	Relevant requirements	Analysis of project application
<p><b>Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation 2008</b></p>	<p>This regulation includes changes to Asbestos Waste Management.</p>	<p>The Chard Road shaft site contains a dilapidated building with suspected asbestos containing building materials. Removal and disposal of this material would be undertaken in accordance with the <i>Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation 2008</i>.</p>
<p><b>Public Health Act 1991</b></p>	<p>Section 9 of the Public Health Act provides that the Minister (for Health) can direct public authorities to take action if the Minister considers that the health of the public is, or is likely to be, endangered because of an action by a public authority.</p>	<p>The Project will require ventilation at two locations – the Chard Road shaft site at Brookvale and at Jacka Park. In addition there may be changes at the existing NST ventilation sites as a result of the Project. Consequently it is anticipated that the NSW Department of Health will be consulted during preparation of the Environmental Assessment, particularly with respect to potential air quality impacts.</p>
<p><b>Threatened Species Conservation Act 1995</b></p>	<p>The TSC Act aims to conserve threatened species, populations and ecological communities of animals and plants native to NSW.</p>	<p>Desktop studies indicate that there are no listed threatened species, habitats or endangered ecological communities within the above ground project footprint.</p>

# 5. Stakeholder and community engagement

## 5.1. INTRODUCTION

Stakeholder and community engagement for the Project to date has been undertaken by the SWWA on behalf of Sydney Water, and is divided into two phases, the planning phase and the approval phase. Consultation during the planning phase was undertaken with community representatives and stakeholders within the Northern Beaches and focused on potential solutions for addressing wet weather overflows in the catchment. Consultation in the approval phase has commenced with community representatives and stakeholders potentially affected by the Project and will continue throughout the environmental approval process.

## 5.2. PLANNING PHASE: STAKEHOLDER AND COMMUNITY CONSULTATION

A total of eight facilitated community workshops have been held regarding wet weather overflow abatement in the Northern Beaches catchment. Four of these workshops were held during Stage 1 of WWOAP 2007-2012 and were based on high-level wet weather overflow abatement strategies. The four remaining workshops were facilitated by the SWWA and focused on more specific options for addressing wet weather overflows in the Northern Beaches catchment. Two additional meetings have also been held to address issues of community concern that emerged during the workshops but weren't central to the WWOAP planning. These meetings addressed water quality issues around Manly Lagoon and opportunities for water reuse and recycling in the Northern Beaches catchment. The details and outcomes of each planning phase workshop have been summarised and presented in Table 3.

Stakeholders (including community groups) who participated in the planning phase consultation activities included:

- The Manly Environment Centre
- North Head Consultative Forum
- Warringah Council
- Warringah Mall
- Dee Why/Curl Curl Joint Floodplain and Estuary Management Committee
- Manly Council (including the Mayor of Manly)
- NSW State Member of Parliament for Manly
- Manly Lagoon Catchment Coordinating Committee
- Local Residents
- Surfriders Foundation
- Friends of Dee Why Lagoon; Friends of Manly Dam
- Manly Dam Catchment Committee.

Table 3 Stakeholder consultation workshops undertaken during the planning phase and main issues/outcomes

Planning Stages	Workshop number and date held	Workshop objectives	Workshop outcomes
Stage 1 PSC	Workshop 1: 23 August 2006	<ul style="list-style-type: none"> <li>To reach a common understanding of the problem to be addressed by the WWOAP</li> <li>To develop a set of evaluation criteria that could be used to identify and rank wet weather overflow abatement options.</li> </ul>	<ul style="list-style-type: none"> <li>Additional overflow locations were identified by workshop participants</li> <li>Option Ranking Criteria were developed</li> <li>Request that the SWWA investigate the economic benefits of reducing wet weather overflow frequency targets below the DECC target of 20 events/10 years for the Northern Beaches catchment</li> <li>Request that community groups remain informed and involved throughout the WWOAP</li> <li>Participants showed an interest in concepts that dealt with overflows caused by the inadequate capacity of the NSM (that impact on Manly and Curl Curl lagoons).</li> </ul>
	Workshop 2: 4 October 2006 Workshop 3 (repeat): 26 October 2006	<ul style="list-style-type: none"> <li>To present information on potential options for the Northern Beaches catchment</li> <li>To receive feedback on the presented options (to aid in the refinement of options as part of the modelling process).</li> </ul>	
	Workshop 4: 1 November 2006	<ul style="list-style-type: none"> <li>To reach an agreement on the preferred local solutions for wet weather overflows in the Northern Beaches catchment not caused by the under-capacity of the NSM</li> <li>To develop an approach aimed at resolving the issues surrounding the remaining wet weather overflows in the Northern Beaches catchment.</li> </ul>	
Stage 2 SWWA	Workshop 5: 1 August 2007	<ul style="list-style-type: none"> <li>To explore potential water reuse and recycling options aimed at reducing dry weather flows in the system.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts of future climate change and altered weather conditions on the modelling process</li> <li>Validity/sources of population growth data</li> <li>Budget issues and queries relating to the scope of the WWOAP</li> <li>Queries relating to overflows and overflow criteria as set by DECC</li> <li>Queries and questions around Sydney Waters' Reduce, Re-use, Recycle program</li> <li>Concerns regarding the previous history of the NST (human health impacts, NST inquiry etc.), the proposed size/scale of the potential storage options, and concerns regarding the age of the sewerage catchment and its leakiness.</li> </ul>

Planning Stages	Workshop number and date held	Workshop objectives	Workshop outcomes
<b>Stage 2 SWWA (con't)</b>	Workshop 6: 10 December 2007	<ul style="list-style-type: none"> <li>• To outline the aims, timelines and decision-making processes to be employed by the SWWA to address wet weather overflow abatement options/strategies</li> <li>• To explain the purpose and range of small options considered to address specific wet weather overflows (including the overflows in the vicinity of Jacka Park)</li> <li>• To explain the purpose and features of the large option strategies being considered to supplement the capacity of the Narrabeen sub main</li> <li>• To gather participant feedback on the presented options/strategies and decision-making processes.</li> </ul>	<ul style="list-style-type: none"> <li>• Over 140 queries/questions were received, with the main areas of concern in regard to the large option strategies. Being:               <ul style="list-style-type: none"> <li>– Energy use</li> <li>– Surface level disruptions during construction and operation</li> <li>– Impacts to the North Head STP and the NST</li> <li>– Transferring problems to other areas, and 'spreading the problem'</li> <li>– Re-use alternatives</li> <li>– Climate change considerations</li> <li>– Consideration of infrastructure capacity as a whole</li> <li>– Potential impacts to other areas within the Northern Beaches catchment</li> <li>– Cost.</li> </ul> </li> </ul>
	Off-line meeting 1 10 March 2008	<ul style="list-style-type: none"> <li>• To explain changes in predicted overflow frequencies cited in the 2002 Manly SCAMP Needs Assessment Report</li> <li>• To explain the causes of high faecal coliform counts in Manly Lagoon and contribution of wet weather overflows to those counts</li> <li>• To outline Sydney Water's water quality monitoring program around Manly Lagoon.</li> </ul>	<ul style="list-style-type: none"> <li>• Continuing concern over the cause and frequency of wet weather overflows at Spring Creek and Queenscliff Siphon</li> <li>• Method of valuing Sydney Water assets</li> <li>• Questions around Sydney Water modelling data and method</li> <li>• Reducing further the DECC target of 20 overflows in ten years.</li> </ul>

Planning Stages	Workshop number and date held	Workshop objectives	Workshop outcomes
Stage 2 SWWA (con't)	Workshop 7: 20 March 2008	<ul style="list-style-type: none"> <li>• To provide an update on Sydney Water projects within the Northern Beaches catchment</li> <li>• To explain the SWWA decision making process, and how the community fits into this process</li> <li>• To explain the aim of the options being considered to address major wet weather overflows in the Northern Beaches catchment</li> <li>• To describe the purpose and features of each presented option</li> <li>• To generate participant feedback on each presented option.</li> </ul>	<ul style="list-style-type: none"> <li>• Over 70 questions/comments were received, and the workshop participants completed seven Options Scoring forms. The main areas of concern included:               <ul style="list-style-type: none"> <li>– DECC targets</li> <li>– Water re-use and recycling alternatives, demand management alternatives</li> <li>– Impacts to North Head STP operations</li> <li>– Climate change and its lack of incorporation into the planning models</li> <li>– Ventilation and odour impacts</li> <li>– Construction impacts (tunnelling under houses, truck movements through residential areas)</li> <li>– Operational costs</li> <li>– Cost-benefit of sewer mining along the length of the proposed NBSP</li> <li>– Preference for a deep connection, and potential for future sewer mining opportunities for irrigation (Warringah and Manly Golf Clubs).</li> </ul> </li> </ul>
	Off-line meeting 2 10 June 2008	<ul style="list-style-type: none"> <li>• To explain the recycled water targets in the Metropolitan Water Plan and what Sydney Water is doing to meet those targets</li> <li>• To explain the constraints that the IPART pricing structure puts around the commercial viability to Sydney Water of recycled water schemes</li> <li>• To outline the investigations done by Sydney Water into recycled water opportunities in the Northern Beaches</li> <li>• To explain the extent of the impact that recycling could make to the proposed wet weather overflow storage options.</li> </ul>	<ul style="list-style-type: none"> <li>• Issues raised included:               <ul style="list-style-type: none"> <li>– Concern that Sydney Water consider sewage as a waste product rather than a resource</li> <li>– Concern about engineering solutions being “end of pipe” rather than “top of pipe”</li> <li>– Method of valuing Sydney Water assets</li> <li>– Determining costs around sewer-mining operations.</li> </ul> </li> </ul>
	Workshop 7 July 2008	<ul style="list-style-type: none"> <li>• To get feedback on options (including the Jacka Park connection) to reduce the frequency of overflows at Glen Street and at Eric and Soldiers Streets.</li> </ul>	<ul style="list-style-type: none"> <li>• Concerns about any potential need to acquire land on Jacka Park for operational infrastructure</li> <li>• Stakeholders were more concerned about operational impacts than construction impacts</li> <li>• Concerns about diverting flows nearer to environmentally sensitive areas (ie Freshwater Beach).</li> </ul>

Planning Stages	Workshop number and date held	Workshop objectives	Workshop outcomes
<b>Stage 2 SWWA (con't)</b>	Workshop 8 24 July 2008	<ul style="list-style-type: none"> <li>• To inform community representatives of Sydney Water's decision to select a storage tunnel as its preferred option</li> <li>• To explain how Sydney Water arrived at that decision</li> <li>• To outline the environmental approval and consultation process moving forward.</li> </ul>	<ul style="list-style-type: none"> <li>• Greater understanding of the option selection process</li> <li>• Greater understanding of the preferred option</li> <li>• General acceptance of the preferred option.</li> </ul>



### 5.2.1. Summary of main issues raised during planning phase consultation

The main issues arising from the stakeholder and community consultation work undertaken to date during both the planning and approval phase, include:

- Human health impacts, including ventilation and odour
- Construction and operational impacts including noise and vibration, traffic and air quality
- Reduce, reuse and recycling alternatives
- Climate change and greenhouse gas impacts
- Budget and timing of the WWOAP as it relates to the Northern Beaches catchment.

## 5.3. APPROVALS PHASE: STAKEHOLDER AND COMMUNITY CONSULTATION

The objectives for the community and stakeholder consultation process during the approvals phase includes:

- Informing stakeholders and community groups about the Project and it's purpose/context within the Northern Beaches catchment
- Facilitating community and stakeholder input into the Environmental Assessment for the Project
- The early involvement of community representatives to aid in development of appropriate mitigation measures (with respect to potential impacts on the community resulting from the construction and operation of the Project)
- Identifying (and responding to) community and stakeholder concerns prior to the exhibition of the Environmental Assessment.

### 5.3.1. Stakeholders to be engaged during the approvals phase

During the planning phase, consultation was undertaken with community representatives and stakeholders within the Northern Beaches catchment. Once the Project had been identified as the preferred option, the SWWA and Sydney Water identified additional community representatives and stakeholders outside from the Northern Beaches catchment (including Willoughby City, Lane Cove, Hunters Hill and Mosman) to be consulted with during the approvals phase.

The key stakeholder groups associated with the approvals phase are outlined in Table 4. These include Members of Parliament, Councillors, Council officers, peak environment non-government organisations (PENGOs), Catchment Management Authorities (CMAs), regional organisations of councils (ROCs), and established community groups. The SWWA (on behalf of Sydney Water) will also seek to involve the wider public during the approvals phase of the project.

*Table 4 Stakeholder groups to be engaged during the approvals phase*

Group	Northern Beaches	Scotts Creek	Lane Cove West	Quakers Hat Bay
<b>Minister for Water</b>	<ul style="list-style-type: none"> <li>• Minister for Water (via Sydney Water Government Relations)</li> </ul>			
<b>Council officers</b>	<ul style="list-style-type: none"> <li>• Manly Council officers</li> <li>• Warringah Council officers</li> </ul>	<ul style="list-style-type: none"> <li>• Willoughby Council officers</li> </ul>	<ul style="list-style-type: none"> <li>• Hunters Hill Council officers</li> </ul>	<ul style="list-style-type: none"> <li>• Mosman Council officers</li> </ul>
<b>Local MPs</b> (via Sydney Water Government Relations)	<ul style="list-style-type: none"> <li>• Mike Baird – Member for Manly</li> </ul>	<ul style="list-style-type: none"> <li>• Gladys Berejiklian – Member for Willoughby</li> </ul>	<ul style="list-style-type: none"> <li>• Anthony Roberts – Member for Lane Cove</li> </ul>	<ul style="list-style-type: none"> <li>• Jillian Skinner – Member for North Shore</li> </ul>
<b>Local Mayors</b>	<ul style="list-style-type: none"> <li>• Peter McDonald – Mayor of Manly</li> <li>• Dick Persson – Administrator, Warringah Council</li> </ul>	<ul style="list-style-type: none"> <li>• Patrick Reilly – Mayor of Willoughby</li> </ul>	<ul style="list-style-type: none"> <li>• Iain Longbottom – Mayor of Lane Cove</li> </ul>	<ul style="list-style-type: none"> <li>• Denise Wilton – Mayor of Mosman</li> </ul>

Group	Northern Beaches	Scotts Creek	Lane Cove West	Quakers Hat Bay
<b>Community groups</b>	<ul style="list-style-type: none"> <li>• Dee Why/Curl Curl Joint Floodplain and Estuary Management Committee</li> <li>• Friends of Dee Why Lagoon</li> <li>• Friends of Manly Dam</li> <li>• Manly Dam Catchment Committee</li> <li>• Manly Lagoon Catchment Coordinating Committee</li> <li>• Manly Partnership</li> <li>• North Head STP Community Consultative Group</li> </ul>	<ul style="list-style-type: none"> <li>• Castle Cove Progress Association</li> <li>• Federation of Willoughby Progress Associations</li> <li>• Willoughby Environmental Protection Association</li> <li>• Glenaeon Rudolf Steiner School</li> </ul>	<ul style="list-style-type: none"> <li>• Hunters Hill Trust</li> <li>• Friends of Boronia Park</li> <li>• Hunters Hill Flora and Fauna Preservation Society</li> <li>• Tarban Community Action Group</li> </ul>	<i>To be identified</i>
<b>ROCs</b>	<ul style="list-style-type: none"> <li>• Shore Regional Organisation of Councils (SHROC)</li> </ul>	<ul style="list-style-type: none"> <li>• North Sydney Regional Organisation of Councils (NSROC)</li> </ul>		
<b>PENGOS, CMAs</b>	<ul style="list-style-type: none"> <li>• Peak environment non-government organisations (PENGOS)</li> <li>• Sydney Metropolitan Catchment Management Authority</li> </ul>			
<b>Residents, businesses, schools, etc</b>	<ul style="list-style-type: none"> <li>• Property owners along the tunnel alignment</li> <li>• Property owner, tenants and workers on Brookvale industrial Estate</li> <li>• Local residents and users of Jacka Park</li> <li>• St John the Baptist School, near Jacka Park</li> <li>• Schools in vicinity of proposed Brookvale vent shaft</li> <li>• Wider Northern Beaches public</li> </ul>	<ul style="list-style-type: none"> <li>• Local residents and business owners near vent shaft</li> </ul>	<ul style="list-style-type: none"> <li>• Local residents and business owners near vent shaft</li> </ul>	<ul style="list-style-type: none"> <li>• Local residents near Quakers Hat Bay ventilation facility</li> </ul>

Some preliminary meetings have already taken place to advise key stakeholders that Sydney Water has endorsed the Project, and to advise of future consultation on the Project. Meetings that have taken place to date include:

- Hunters Hill Trust (members of Lane Cove West Community Liaison Committee (CLC<sup>1</sup>))
- Lane Cove West CLC
- Hunter's Hill Council Officers (including the General Manager)
- Members of Scotts Creek CLC
- Northern Beaches community representatives
- Willoughby City Councillors (as members of Scotts Creek CLC) and Mayor
- Mosman Council Officers.

A summary of the these meetings and main outcomes is presented below:

*Table 5 Summary of main outcomes from approvals phase meetings held to date*

Stakeholder Group	Meeting summary
<b>Chard Road property owner (Aust Equity Properties)</b>	<ul style="list-style-type: none"> <li>• Property owner notified in writing of the preferred option</li> <li>• Stated that a significant commercial investment in the area would be impacted by our project</li> <li>• Would prefer the Project be located on suitable community land as project is for community benefit.</li> </ul>
<b>Hunters Hill Trust/Lane Cove West CLC</b>	<ul style="list-style-type: none"> <li>• Members expressed concern that the NBSP contradicts a community desire to see North Head STP phased out in the long term</li> <li>• Wanted more reuse and onsite treatment to limit the need for projects like this</li> <li>• Concerned about venting and possibility of additional connections to the NST</li> <li>• They wanted to be kept involved.</li> </ul>
<b>Willoughby City Council Officers</b>	<ul style="list-style-type: none"> <li>• Expressed concern about ventilation in their local government area</li> <li>• Suggested Council should be engaged during the process, in particular those previously involved in the NST.</li> </ul>
<b>Resident next to Lane Cove West vent facility)/Lane Cove West CLC</b>	<ul style="list-style-type: none"> <li>• Resident concerned about ventilation and asked how often the vent shaft in Boronia Park will vent as a result of the Project</li> <li>• Resident wants to be kept informed in regards to changes in venting.</li> </ul>
<b>Willoughby City Councillors/Scotts Creek CLC</b>	<ul style="list-style-type: none"> <li>• Councillors and the Mayor expressed grave concern about the project</li> <li>• Enquired about status of the Sydney Water decision and wanted input into the ongoing planning and approvals process</li> <li>• Negative about Part 3A approvals process</li> <li>• Commitment by SWWA to work closely with Councillors, council officers and Scotts Creek CLC.</li> </ul>
<b>Hunter's Hill Council</b>	<ul style="list-style-type: none"> <li>• Engaged in discussion about the Project and asked to be kept up to date with the project.</li> </ul>
<b>Willoughby Environmental Protection Association/Scotts Creek CLC</b>	<ul style="list-style-type: none"> <li>• Member expressed interest in operational history of the NST, including vent filters</li> <li>• would like to be kept informed and receive any updates around the project.</li> </ul>

<sup>1</sup> CLCs were established following planning approval for the NST to facilitate on going consultation between Sydney Water and community and stakeholder representatives. Sydney Water made a commitment to the members of the CLCs to advise them of any proposed changes to the NST. The CLCs are therefore part of the consultation process for the approvals phase of the Project.

Stakeholder Group	Meeting summary
<b>Glennaeon Rudolf Steiner School</b>	<ul style="list-style-type: none"> <li>• Appreciated the early stages of the project, responded well when SWWA offered an on-going dialogue with them</li> <li>• Recognised benefits of the program. Emphasised the community's concerns around ventilation</li> <li>• They asked about future connections to the NST; concerned about continued expansion of the NST.</li> </ul>
<b>Mosman Council Officers</b>	<ul style="list-style-type: none"> <li>• Officers concerned about truck movements during construction. Opposed to use of the Spit Bridge/Military Rd corridor to transfer spoil</li> <li>• Officers were also concerned about the seven week NST closure period during construction</li> <li>• Officers weren't too concerned about ventilation changes at Quakers Hat Bay but believed that resident's living nearby might be concerned</li> <li>• SWWA offered to talk to any residents or community groups concerned</li> <li>• SWWA committed to provide regular updates to involve Council during planning and approvals process.</li> </ul>

A letter, officially introducing the project to Manly, Mosman, Willoughby City, North Sydney, Lane Cove, Warringah and Hunter's Hill Councils and to NST CLC members not covered by the above consultation, has also been sent out.

# 6. Preliminary Environmental Assessment

## 6.1. INTRODUCTION

This section provides a preliminary assessment of the potential environmental issues relevant to the Project. A risk assessment was undertaken for the Project, as described in Section 6.2, to help inform the prioritisation of potential environmental issues. Based on the results of the preliminary risk assessment, a further assessment of environmental issues has been provided in Section 6.3 to determine the key environmental issues for the Project and whether further assessment is required as part of the Environmental Assessment for the Project.

## 6.2. PRELIMINARY RISK ASSESSMENT PROCESS

The preliminary environmental risk assessment was undertaken using a multidisciplinary approach involving SWWA and Sydney Water personnel. The methodology for the risk assessment was taken from Sydney Water's Corporate Risk Management System which is based on Australian Standard AS/NZS 4360:1999 Risk Management and Environmental Risk Management – Principles and Process (Standards Australia, 2000).

The prioritisation of potential issues involved:

- The identification of potential environmental issues that may arise as a result of the construction and operation of the Project
- A qualitative ranking of the identified environmental issues in terms of likelihood (or chance) of the issue arising and the consequence (or severity) of the potential effects if they were to remain unmitigated
- The application of a risk ranking specific to each identified environmental issue, as either 'Very High', 'High', 'Medium' or 'Low'.

Environmental issues with 'Very High', 'High' or 'Medium' risk ranking, are assessed further in section 6.3 to determine whether they are key environmental issues for the Project and whether further assessment during the environmental assessment for the Project is required. The remaining environmental issues considered to be of 'Low' risk, or otherwise not discussed during the risk assessment workshop, are considered to be of minor risk to the Project as relatively standard environmental control and mitigation measures could be used to successfully manage these already low risks. These other environmental issues are outlined in Section 6.4.

## 6.3. ASSESSMENT OF ENVIRONMENTAL ISSUES

### 6.3.1. Air Quality

#### **Existing environment – proposed Chard Road shaft site in Brookvale**

The proposed shaft site in Brookvale is located within the Brookvale Industrial Estate in the Warringah local government area. Existing ambient air quality would be characteristic of an industrial air shed (with the presence of air ventilation/exhaust fans on adjacent building rooftops noted during site inspections). Air quality would be further influenced by the site's proximity to major traffic routes, particularly Pittwater Road, which is located approximately 300m to the north-west of the proposed shaft site. Potential sensitive receivers include Manly High School (approximately 200m to the north-east of the proposed shaft site), Freshwater High School (approximately 330m to the south-east of the proposed shaft site), and recreational users of John Fisher Park (approximately 200m east of the proposed shaft site).

There is currently a dilapidated building, suspected to contain asbestos materials, situated on the eastern half of the site.

#### **Existing environment – Lane Cove West (Boronia Park) ventilation facility**

The existing Lane Cove West (Boronia Park) ventilation facility comprises both pre-filters and carbon bed absorbers that absorb hydrogen sulphide (H<sub>2</sub>S) and other odorous compounds. Air then passes through a final filter that removes particulates and aerosols before the air is discharged to the atmosphere. Gas monitors measure H<sub>2</sub>S levels as they enter and leave the facility.

The Lane Cove West (Boronia Park) ventilation facility is surrounded by Residential A1 and Special Uses zones. The existing air quality is expected to be characteristic of an urban air shed.

An Operational Environmental Management Plan (OEMP), based on a combination of licence requirements and Minister's Conditions of Approval for operations, for the NST includes performance requirements for the Lane Cove West (Boronia Park) ventilation facility. The OEMP requires that under all operating and meteorological conditions, discharges at Lane Cove West (Boronia Park) should not result in offensive odour or air quality impacts at or beyond the boundary of the premises of any sensitive receptor.

Since the facility's commissioning in 2000, Sydney Water has not received any complaints relating to the performance of the facility.

#### **Existing environment – Scotts Creek ventilation facility**

The Scotts Creek ventilation facility is located approximately 50m north of Scotts Creek, within Willis Park (a reserve zoned Open Space A under the Willoughby City LEP 1995). Adjacent land uses include North Arm Reserve (a reserve zoned Open Space A, approximately 80 m to the east), Glenaeon Rudolf Steiner School (approximately 700 m to the south, and across Scotts Creek), with residential areas approximately 100 m to the north.

In July 2000, a public enquiry was held into the NST Scotts Creek ventilation facility due to overwhelming public concern over the potential health risks posed by the ventilation system. Concern was also expressed over associated odour issues, the ability of the vent to meet ambient air quality standards and license requirements during operation, the responsibilities of bodies accountable for monitoring and maintaining air quality standards, and consideration of alternative options to the proposed venting arrangements at Scotts Creek.

Following the public enquiry, the current Scotts Creek ventilation facility was designed and constructed to operate using pre-filters, followed by carbon bed adsorbers to adsorb H<sub>2</sub>S and other odorous compounds. Air then passes through a final filter that removes particulates and aerosols before being discharged to the atmosphere. Gas monitors measure H<sub>2</sub>S levels as they enter and leave the system. As a result, the existing air quality is expected to be characteristic of an urban-bushland air shed with acceptable levels of particulates and aerosols.

The OEMP requires that under all operating and meteorological conditions, discharges at Scotts Creek should not result in offensive odour or air quality impacts at or beyond the boundary of the premises of any sensitive receptor.

Since the facility's commissioning in 2000, Sydney Water has not received any complaints relating to the performance of the facility.

### **Existing Environment – Quakers Hat Bay overflow ventilation shaft**

The Quakers Hat Bay ventilation system is a passive facility whereby air is drawn through a carbon bed by pressure differences caused by changes in water levels within the Quakers Hat Bay overflow shaft. The Quakers Hat Bay ventilation system only discharges air when the overflow at this site is operating. The ventilation shaft is located within Urban Bushland of Quakers Hat Bay Reserve, zoned 5(a) Community Use under the Mosman LEP 1998, approximately 140 m south-east of Quakers Hat Bay. Surrounding land uses include Residential (2(a1) and 2(a2)) and 7(a) Environment Protection (Bushland). Existing air quality is expected to be characteristic of an urban bushland and foreshore air shed.

The OEMP for the NST includes performance requirements for the Quakers Hat Bay ventilation facility. Since the facility's commissioning in 2000, Sydney Water has not received any complaints relating to the performance of the facility.

### **Existing environment – North Head Sewage Treatment Plant**

The North Head STP ventilation facility draws air into North Head from the NST while the NST is empty and filling. Once the NST has filled so that the North Head connection to the NST is submerged, the air in the NST vents discharges to the environment through a series of filters at the Lane Cove West (Boronia Park) and Scotts Creek ventilation sites. Air at North Head is first passed through a scrubber that removes H<sub>2</sub>S and other odorous compounds before being washed with a dilute solution containing sodium hypochlorite and sodium hydroxide. Levels of H<sub>2</sub>S into and out of the scrubber are continuously monitored.

The North Head STP is zoned Special Uses under the Manly LEP 1988, with a surrounding land zoning of Foreshore Scenic Protection/Conservation Area. The site is surrounded by Sydney Harbour National Park and Urban Bushland areas, with a hanging wetland (Bluefish Drive) situated approximately 450 m to the west. Existing air quality is anticipated to be characteristic of a coastal air shed (influenced by STP operations).

The OEMP for the NST describes how the North Head ventilation facility operates and requires that under all operating and meteorological conditions, discharges at Lane Cove West (Boronia Park), Scotts Creek and North Head STP should not result in offensive odour or air quality impacts at or beyond the boundary of the premises of any sensitive receptor.

### **Existing environment – Jacka Park connection (Jacka Park, Freshwater)**

A passive ventilation facility is anticipated for the Jacka Park connection at Jacka Park. Displaced air in the connection would be forced into the facility where odorous gases would be treated, possibly with a carbon filter. The ventilation facility for the Jacka Park connection would be sited within Jacka Park, which is zoned as Open Space. Surrounding land uses comprise mainly of residential (zoned H1 – Freshwater Beach). St John the Baptist Primary School is situated approximately 100m to the west of the possible passive ventilation shaft site. Existing air quality is expected to be characteristic of an urban air shed.

### **Assessment of environmental issues**

Operation of the Project has the potential to cause air quality impacts. Based on preliminary design and operational philosophy, the Project has the potential to change the operation (frequency and volume) of the ventilation facilities located at Lane Cove West (Boronia Park), Scotts Creek, Quakers Hat Bay, and the North Head STP during wet weather events. Notwithstanding potential impacts to the venting frequency and air volume that may be caused as a result of the Project, it is unlikely that any construction works would be required at these facilities. New permanent ventilation facilities would be provided at Chard Road shaft site, in Brookvale, and at Jacka Park, in Freshwater.

It is likely that community acceptance of the Project could be at risk due to persistent concerns regarding odour and associated human health impacts, associated with the development of the NST and the potential for operational changes to the NST ventilation facilities. Odour emissions from the new ventilation facilities and changes to the existing NST ventilation, when unmitigated, were ranked 'very high' in the risk assessment. Potential odour impacts resulting from the new ventilation facility at Chard Road and the potential changes at the existing NST ventilation facilities are considered to be key environmental issues for the Project. However, potential odour impacts at Jacka Park are not considered to be a key environmental issue for the Project, given the relatively small scale of the ventilation proposed, and likely odour control requirements at Jacka Park.

Human health impacts associated with the new ventilation facilities and changes to the existing NST facilities were ranked 'medium', when unmitigated. An assessment of potential health impacts associated with the ventilation of the Project and any operational changes to the NST ventilation, including appropriate mitigation measures, will be included in the Environmental Assessment.

Temporary air quality impacts are anticipated during the construction of the shaft for the tunnel and the launch site for the Jacka Park connection. In particular, demolition of the existing building at Chard Road, suspected to contain asbestos, has the potential to create air quality issues if unmitigated. The unmitigated risk ranking for demolition of the derelict building and removal of asbestos was 'very high'. However the demolition and removal of this building would be carried out by specialist contractors, in accordance with the provisions of the OH&S Act 2000 and Regulation 2001, and thus air quality impacts from this activity are unlikely.

Other temporary air quality impacts include dust emissions from activities such as excavation, spoil transport, and truck and vehicle movements at Chard Road and Jacka Park. Dust generation at Chard Road, when unmitigated, was assessed as a 'high' risk, whereas dust generation at Jacka Park, when unmitigated, was assessed as a 'medium' risk. Dust emissions at Chard Road, as construction activities occur over a longer duration, and spoil from the tunnel boring activities would be removed from Chard Road, are considered a greater impact. However, dust generation at both Chard Road and Jacka Park can be mitigated using relatively standard mitigation measures. Air quality impacts due to dust generation from the Project are therefore considered to be unlikely.

### **Conclusions**

Based on the assessment of unmitigated risk, and the assessment of environmental issues above, it is considered that odour impacts associated with the new ventilation facility at Chard Road and the potential changes to the operation of the existing NST ventilation facilities are key environmental issues for the Project. A comprehensive assessment of odour impacts will be undertaken at the existing NST ventilation sites and the Chard Road ventilation site, including appropriate mitigation measures. This assessment will also address potential odour impacts from the Jacka Park ventilation site. A summary of the performance of the existing NST ventilation facilities, since commissioning, will be provided in the Environmental Assessment. An assessment of potential human health impacts from the ventilation of the Project and any operational changes at the existing NST ventilation sites, including mitigation measures where appropriate, will be included in the Environmental Assessment.

Other air quality impacts, such as dust generation at Chard Road and Jacka Park, and removal of asbestos material from the Chard Road site can be managed through standard mitigation measures and are not considered key environmental issues. However assessment of these issues will be provided in the Environmental Assessment.

### **6.3.2. Surface water and groundwater quality**

#### **Existing environment**

The Project areas are located within the water catchments of the Northern Lagoons (including Manly Lagoon and Curl Curl Lagoon) and North Harbour (part of Sydney Harbour). The surface water drainage network within these catchments is highly urbanised (with the exception of parklands such as John Fisher Park and Jacka Park), and surface water quality is likely to be impacted by urban stormwater run-off (industrial), wet weather overflows, industrial discharges (e.g. from the Winbourne Industrial Estate), and run-off from open space. The closest water bodies to the Project are:

- Proposed shaft site on Chard Road (Brookvale): Greendale Creek, approximately 20 m south-west of the proposed site, which drains to Curl Curl Lagoon (approximately 1 km downstream of the proposed site)
- Project tunnel alignment: the Project's tunnel alignment passes under Greendale Creek and Manly Lagoon at an approximate depth of 90m. The Project's tunnel connects to the NST at an approximate depth of 150m, approximately 390 m north of North Harbour
- Jacka Park connection: the HDD launch site at Jacka Park would be approximately 900 m south-west of Curl Curl Lagoon, approximately 1 km north of Manly Lagoon, and some 800m west of the NSW coast line.

The NST captures wet weather overflows at Lane Cove West (Boronia Park), Scotts Creek, Quakers Hat Bay, Tunks Park and Shelly Beach that would otherwise discharge to the Sydney harbour catchment or the coastal waters off North Head.

During preliminary geotechnical investigations at the proposed Chard Road shaft site in Brookvale, groundwater was first encountered at a depth of 1.2 m below ground level. At Jacka Park groundwater was first encountered at 0.4 m below ground level.



### **Assessment of environmental issues**

While the overall objective of the Project is to improve water quality and catchment health in the long term, to facilitate the safe connection of the Project into the NST, the NST would need to be taken off-line for a period of seven weeks. During this time it is possible that there could be two or three wet weather events that would overflow to waterways from overflow sites at Tunks Park, Lane Cove West (Boronia Park), Scotts Creek and Quakers Hat Bay. This would temporarily increase the risk of health impacts from swimming in Sydney Harbour. DECC currently recommends not to swim for three days after rain events in these areas as other sewage overflows and stormwater runoff also make it unsuitable for swimming. During the NST closure Sydney Water would reinforce the message of 'do not swim for three days after rain events'.

Adverse impacts associated with the closure of the NST for seven weeks was given a 'high' unmitigated risk ranking. However Sydney Water intends to commence negotiations with DECC around the proposed closure of the NST and anticipates an appropriate agreement can be reached about this component of the Project. Furthermore the closure of the NST is not considered a key issue for the Project when compared against the long term water quality benefits of the Project.

The construction of the Project would involve handling and disposal of wastewater, which if unmitigated could pose a 'very high' risk to water quality in surrounding receiving environments. However given that relatively standard mitigation measures could be adopted during construction to minimise this risk, it is not considered a key issue for this Project.

Potential surface water and groundwater quality impacts during the construction phase of the Project with a 'medium' unmitigated risk ranking include:

- Potential contamination of groundwater and/or surface drainage networks as a result of site runoff. For example, soil contaminants and acid sulfate soil, sediments (from such sources as vehicle movements, and spoil excavation, storage, loading and transport), fuels and other materials may enter surface water and/or groundwater systems, leading to migration offsite, resulting in downstream impacts if not appropriately mitigated
- Potential for significant consumption of water resources (eg during TBM activities) and/or the treatment and disposal of large volumes of wastewater (eg dewatering during shaft excavation and inflow during tunnelling) impacting upon local and regional water resources if not appropriately managed (eg on-site water recycling).

It is considered that relatively standard mitigation measures could be adopted during construction to minimise the risks outlined above, therefore they are not considered a key issue for the Project.

There is potential for groundwater contamination during the operation of the tunnel should there be any leakage from the tunnel when it's full. Given that the tunnel would contain wet weather sewage overflows, which would therefore be highly diluted with stormwater, the potential risk to surrounding groundwater quality is not considered a key issue for the Project.

### **Conclusions**

Both surface water and groundwater assessments for the construction and operation phase of the Project will form part of the Environmental Assessment for the Project.

As described above, the potential impacts to surface water quality and groundwater quality is not considered a key environmental issue for the Project. However an assessment of surface water and groundwater quality, including appropriate mitigation measures, will be included in the Environmental Assessment.

### **6.3.3. Traffic and transport**

#### **Existing environment**

The proposed Chard Road shaft site is located within the Winbourne Industrial Estate (an industrial and employment centre incorporating industries, warehouses and ancillary service uses), which comprises private road networks. The proposed shaft site is accessible from the south via Chard Road and a private access road, and/or from the north via Winbourne Road and a private access road. The closest arterial road is Pittwater Road, which carries a mix of light and heavy vehicles, public bus services, and pedestrian and cyclist movements, and is approximately 550m from the proposed shaft site. The HDD launch site for the Jacka Park connection HDD launch site is situated within Jacka Park in Freshwater and is bordered by Wyndora Avenue to the north, Soldiers Avenue to the south, Eric Street to the east, and Oliver Street to the west. The most likely haulage route from the sites would be via Pittwater Road and the Spit Bridge.

Both Pittwater Road and the Spit Bridge currently carry significant volumes of traffic and can become congested during peak hours.

Access to the NST ventilation sites is through locked gates with a private roadway to the facilities. It is unlikely that significant volumes of heavy vehicles would need to access these facilities.

#### **Assessment of environmental issues**

The main issue associated with traffic and transport during construction of the Project is heavy vehicles accessing and egressing the sites at Chard Road and Jacka Park to transport materials from the sites to disposal facilities or reuse destinations over a total construction period of 24 months. Approximately 4,500 truck movements over a 30 week period are anticipated at the height of construction activities. This is likely to impact traffic flow and travel times on Pittwater Road and in particular Spit Bridge. The transportation of spoil from the sites for re-use or disposal is considered to be a 'very high' to 'high' risk when unmitigated. Potential traffic disruptions to Pittwater Road and Spit Bridge will need to be assessed and mitigated where practicable. Alternative haulage routes would also be considered and appropriate mitigation measures would be adopted during construction to minimise disruptions where practicable. Traffic and transport during construction therefore is not considered to be a key issue for the Project.

#### **Conclusions**

Traffic impacts associated with spoil movements to re-use or disposal facilities during construction of the Project would be assessed in the Environmental Assessment, based on a more detailed construction schedule which is currently being developed. The assessment would consider the extent and nature of any impacts to traffic flow and level of service around the Chard Road and Jacka Park sites as well as on Pittwater Road and Spit Bridge. Mitigation measures and alternative haulage routes would be considered (via Roseville Bridge or Mona Vale Road) so as to minimise traffic impacts.

### **6.3.4. Noise and vibration**

#### **Existing environment – shaft site on Chard Road (Brookvale)**

As stated previously, the proposed shaft site is located within the Brookvale Industrial Estate, where the existing ambient noise environment is expected to be typical of a light industrial area. Surrounding sensitive land uses include Manly High School (approximately 200 m to the north-east of the proposed site), Freshwater High School (approximately 330 m to the south-east of the proposed site), and recreational use of John Fisher Park (approximately 200 m east of the proposed site).

#### **Existing environment – Jacka Park connection HDD launch site (Jacka Park, Freshwater)**

The Jacka Park connection HDD launch site is located within Jacka Park, in Freshwater, with an existing ambient noise environment anticipated to be typical of a residential area influenced by traffic movements along local road networks and recreational use of Jacka Park. Surrounding sensitive receivers are likely to include local residents, St John the Baptist Primary School (approximately 100 m to the west of the proposed site), Harbord Primary School (approximately 270 m to the north of the proposed site), and Harbord Park recreational users (approximately 300 m to the north-west of the proposed site).

#### **Existing environment – tunnel alignment**

The tunnel would be located below a mix of residential, open space and industrial land uses. Residential and open space land uses, including any schools or day care facilities and heritage items, would be considered sensitive receivers for the purposes of a construction noise and vibration assessment above the tunnel alignment. Industrial land users may be sensitive receivers to any potential vibration impacts during construction, for example where they rely on vibration-sensitive equipment.

#### **Assessment of environmental issues**

During construction, noise would be generated by general construction activities such as excavation, spoil handling and transport, equipment and material deliveries, and purpose built machinery such as HDD drill rigs (associated with the Jacka Park connection), excavators, rock hammers and saws, drills, roadheaders and TBM (associated with the Project's tunnel). Construction activities have the potential to cause noise impacts to adjacent residences, surrounding industrial activities, along transport/haulage routes and above the tunnel alignment. The risk associated with potential noise impacts from construction activities at Chard Road and along the tunnel alignment is considered to be 'high' when unmitigated. Given that relatively standard noise mitigation measures would be adopted at the Chard Road shaft site and the Jacka Park site, construction noise is not considered a key issue for the Project. In addition, given the depth of the

tunnel, noise from the tunnel excavation is unlikely to be heard at sensitive receivers above the alignment, therefore noise from tunnel excavation is not considered a key issue for the Project.

Vibration impacts would be primarily associated with the operation of the HDD, TBM, excavators and roadheader equipment. Construction activities have the potential to impact properties including items of heritage significance in proximity to the proposed construction sites and above the tunnel alignments. Vibration at the construction sites and along the tunnel alignment was given a 'high' (and 'medium' for potential impacts to heritage items) risk ranking when unmitigated. However, vibration at the construction sites would be temporary and localised in nature and therefore is not considered a key issue for the Project. Vibration at residences and sensitive receivers, including potential heritage items, above the tunnel alignment is considered unlikely due to the depth of the tunnel (90 – 150 m). Therefore vibration is not considered a key issue for the Project.

In addition, vibration emanating from the shaft construction at Chard Road may adversely impact adjacent industrial activities such as sensitive electronic equipment and/or tall storage areas. This was given a 'high' risk ranking, when unmitigated. The sensitivity of surrounding industrial activities will be confirmed during the Environmental Assessment. However, given the temporary duration of the works, this is not considered a key issue for the Project.

Operational noise and vibration impacts associated with the operation of the Project (including routine inspection and maintenance activities) are expected to be minimal and therefore are not considered a key issue for the Project.

### **Conclusions**

Potential noise and vibration impacts generated from construction and operation of the Project are not considered key issues for the Project. However a noise and vibration assessment will be undertaken for the Project and included in the Environmental Assessment. This assessment will be based on more detailed construction information which is being developed as part of the detailed design for the Project. In particular the assessment would assess the extent and nature of any noise and vibration impacts around the Chard Road and Jacka Park sites, as well as along the tunnel alignment. Mitigation measures would be identified so as to reduce the risk of noise and vibration impacts associated with the Project.

### **6.3.5. Soils and geology**

#### **Existing environment**

A desktop review of the Sydney Soil Landscape Series (Sheet 9130 from the Soil Conservation Service of N.S.W) shows that the proposed shaft site in Brookvale resides on 'Disturbed Terrain', adjacent to the 'Warriewood' (swamp) soil landscape group. Limitations associated with Disturbed Terrain are dependent upon the nature of the fill material, but may include mass movement hazard, unconsolidated low wet strength materials, impermeable soils with poor drainage, localised areas with very low soil fertility, and potential soil toxicity. Limitations of the Warriewood Swamp soil landscape group include localised flooding and run-on, high water tables and highly permeable soils.

Results from the preliminary geotechnical investigation at Chard Road indicated the presence of a thin layer of sandy fill material (approximately 4m thick) overlying a layer of alluvial material that extends to a depth of some 35 m. Sandstone was encountered beneath the alluvium (except for two thin shale layers, both less than 300mm thick, at some 38 m and 40 m). The sandstone is generally fine to coarse-grained with occasional fine-grained gravel inclusions and silty lenses of medium to high strength, and is moderately to slightly weathered. The chemical testing results of preliminary soil sampling undertaken at the proposed Chard Road site indicates that the fill layer is contaminated with both polycyclic aromatic hydrocarbons and organochlorine pesticides, whilst the alluvial soils were found to contain horizons of potential acid sulfate soils (PASS).

Jacka Park in Freshwater is the HDD launch site for the Jacka Park connection. Jacka Park resides on the Newport (aeolian) soil landscape group, with potentially very high soil erosion hazard, very low soil fertility, and non-cohesive topsoil. The proposed HDD alignment also passes under the Gynea (erosional) soil landscape group, characterised by high soil erosion hazard, rock outcrops, and shallow highly permeable soils with very low soil fertility. Soil samples taken from Jacka Park showed no contamination at this site.

A review of Acid Sulfate Soils Risk maps (DIPNR) shows the proposed shaft site in Brookvale residing on 'Low Probability' (greater than 3m below ground level) risk of acid sulfate soils. Preliminary investigations at the HDD launch site in Jacka Park identified PASS within the alluvial soils (>1.9mbgl) however most of the HDD alignment would be located within sandstone where PASS would not be encountered.

The geology of the region surrounding the Project indicates the presence of a paleochannel comprising alluvial soils such as quartz sand, silty sand, silt, and clay, underlain by Hawkesbury Sandstone. Further geotechnical investigations are being undertaken at the proposed Chard Road shaft site in Brookvale, to determine the invert level of the paleochannel and the quality of the sandstone below.

#### **Assessment of environmental issues**

Potential adverse impacts associated with the transportation, storage and disposal of contaminated spoil from the Chard Road site, has a 'very high' unmitigated risk ranking. However, relatively standard mitigation measures would be adopted during construction of the shaft at Chard Road to minimise this risk therefore it is not considered a key issue for the Project.

The handling, treatment and disposal of PASS at Chard Road and Jacka Park was given a 'high' to 'medium' risk ranking when unmitigated as there is potential, when the soil is disturbed during construction, for the formation of acid sulfate soils (ASS) which may contaminate surrounding surface water and shallow groundwater. However relatively standard mitigation measures would be adopted during construction of the shaft at Chard Road and all materials would be disposed of at licensed disposal facilities. Therefore the risk of adverse impacts to soils and geology when mitigated is likely to be minimal and it is not considered a key issue for the Project.

Given the depth of the shaft at Chard Road, and the length and depth of the tunnel alignment, there is a 'medium' unmitigated risk of ground settlement occurring around the Chard Road site and along the tunnel alignment. Notwithstanding this, should ground settlement occur at Chard Road, it is likely to be very localised. Ground settlement along the tunnel alignment is unlikely given that the tunnel would be constructed in high quality sandstone material at a depth of between 90 – 150 m below ground level. Ground settlement at the shaft site at Chard Road and along the tunnel alignment is not considered a key issue for the Project.

#### **Conclusions**

Based on the assessment above and the likelihood of the risks to soils and geology being realised and the potential to mitigate these risks, impacts to soils and geology is not considered a key issue for this Project.

However the risks to soils and geology would be further assessed in the Environmental Assessment based on results of current geotechnical investigations.

### **6.3.6. Greenhouse gases and climate change impacts**

#### **Existing environment**

In July 2007 Sydney Water made a commitment to become carbon neutral for energy and electricity consumption by 2020, and set an interim target of a 60 per cent decrease in emissions by 2012. To achieve these aims, Sydney Water has adopted carbon management principles that form the basis of a Greenhouse Mitigation Framework, whereby priority is first given to reducing emissions, then the cogeneration or purchase of renewable energy, with any remaining emissions to be offset with carbon credits.

In keeping with Sydney Water's Climate Change Strategy, the SWWA has developed a greenhouse gas and energy tool that can be used to compare energy and embodied energy levels of different construction methodologies, over a defined operational period of 2 years. The tool may be used to consider electricity usage, fuel consumption (diesel, petrol and LPG), and spoil and delivery transport, as well as embodied energy and greenhouse gases involved with structural and non-structural concrete and steel. This tool was used throughout the options evaluation process, and in the selection of the preferred solution for the Northern Beaches catchment.

#### **Assessment of environmental issues**

Electricity demand is anticipated to be high during the 24 month construction period for activities including flood lighting, provision of temporary ventilation during shaft and tunnel construction, and TBM operation. Fossil fuel consumption is also anticipated to be high, through truck movements for transport of spoil, and delivery of construction materials. Fossil fuel usage (diesel) is anticipated to be highest during the operation of non-electric driven excavation plant, with a significant number of truck movements also required during construction for the transport of spoil and construction materials. Energy use, and greenhouse gas emissions associated with the construction of the Project was given a 'high' risk ranking when unmitigated. Community representatives and stakeholders consulted within the Northern Beaches were concerned about greenhouse gas emissions and in particular measures that Sydney Water would take to mitigate or offset emissions. In addition, community representatives and stakeholders were also concerned about the impacts of climate change on the Project (eg impacts of changing climate and potential sea level rise on the future operation of the

Project). Greenhouse gas emissions from the Project would be temporary in nature (during construction), therefore it is not considered to be a key issue for the Project. Nevertheless given that Sydney Water is committed to greenhouse mitigation, an assessment of greenhouse gas emissions from the Project, and impacts of climate change on the future operation of the Project, would be included in the Environmental Assessment for the Project.

Operation of the Project may also lead to a net increase in energy (electricity) demand, with a potential to slightly increase power consumption at the Scotts Creek and Lane Cove West (Boronia Park) ventilation sites and at the North Head STP (including a potential slight increase in truck movements associated with the North Head STP). However this is predicted to be minimal and is not considered a key issue for the Project.

### **Conclusions**

Greenhouse gas emissions and the impacts of climate change on the Project were concerns raised by community representatives and stakeholders within the Northern Beaches. Whilst it is not considered a key issue for the Project, an assessment will be included in the Environmental Assessment to assess the scale and nature of the impacts.

## **6.4. SUMMARY OF ENVIRONMENTAL ISSUES**

Based on the above assessment, environmental issues are divided into key environmental issues for the Project and other environmental issues.

### **6.4.1. Key environmental issues**

The key environmental issue for the Project is the potential odour impacts associated with the new ventilation facility at Chard Road and the potential changes to the operation of the existing NST ventilation facilities. A detailed assessment of this key issue will be included in the Environmental Assessment. The proposed scope of the Environmental Assessment is outlined in Section 7.

### **6.4.2. Other environmental issues**

Other environmental issues for the Project are as follows:

- Air quality (odour at Jacka Park, dust at Chard Road and Jacka Park and asbestos at Chard Road)
- Surface water quality impacts during the proposed seven week closure of the NST
- Groundwater quality
- Traffic and transport (construction and operation)
- Noise and vibration
- Soils and geology
- Greenhouse gas and climate change impacts
- Cultural heritage
- Visual amenity
- Flora and fauna
- Land use and socio-economic impacts
- Waste management and minimisation
- Cumulative impacts
- Services and utilities.

The environmental risks associated with these issues could either be reduced with relatively standard mitigation measures or are unlikely to occur on this Project. Nevertheless an assessment of these issues will be included in the Environmental Assessment to confirm that their environmental risks can be minimised. The proposed scope of the Environmental Assessment is outlined in Section 7.

# 7. Proposed scope of the Environmental Assessment

Table 6 outlines the proposed scope of the Environmental Assessment for the Project, based on the risk analysis and the preliminary assessment of environmental issues as described in Chapter 6.

Table 6 Proposed scope of the Environmental Assessment for the Project

Issue	Proposed Scope of the Environmental Assessment
<b>General</b>	<ul style="list-style-type: none"> <li>• Assess the Project in terms of the Principles of Ecologically Sustainable Development (ESD)</li> <li>• Expand on the relevant planning and statutory requirements included in this PEA</li> <li>• Update and expand on the Project description based on further design refinements</li> <li>• Provide details regarding construction, for example: confirmation of work sites/areas; outline the proposed construction program and staging; identify haulage routes, delivery routes and waste disposal facilities; describe temporary traffic arrangements; state proposed construction work hours etc</li> <li>• Outline alternative options to the Project, including 'do nothing'.</li> </ul>
<b>Key environmental issues</b>	
<b>Air quality (odour at Chard Road and existing NST ventilation sites)</b>	<ul style="list-style-type: none"> <li>• Undertake an air quality assessment, including:               <ul style="list-style-type: none"> <li>– Establish the current ambient air quality at Lane Cove West (Boronia Park), Scotts Creek, Quakers Hat Bay, North Head STP, and Chard Road (Brookvale)</li> <li>– Identify potential sensitive receivers that may be impacted by odour during the operation of the Project</li> <li>– Use dispersion modelling to predict the anticipated odour impacts as a result of the operation of the Project</li> <li>– Incorporate a Human Health Impact Assessment into the Environmental Assessment</li> <li>– Mitigation measures to be adopted to mitigate or prevent odour impacts to the identified sensitive receivers during operation of the Project (including odour management).</li> </ul> </li> </ul>
<b>Other environmental issues</b>	
<b>Air quality</b>	<ul style="list-style-type: none"> <li>• Other air quality impacts to be assessed in the Environmental Assessment include:               <ul style="list-style-type: none"> <li>– Odour impacts from ventilation at Jacka Park</li> <li>– Dust at Chard Road and Jacka Park during construction</li> <li>– Removal and disposal of asbestos material from derelict building on the Chard Road shaft site in Brookvale.</li> </ul> </li> </ul>
<b>Surface water quality (NST closure)</b>	<ul style="list-style-type: none"> <li>• Undertake an assessment of the closure of the NST on receiving waters at Lane Cove West (Boronia Park), Scotts Creek, Quakers Hat Bay and Tunks Park, under nominated weather scenarios. This assessment would include:               <ul style="list-style-type: none"> <li>– The characteristics of the regional catchment and sub-catchments</li> <li>– Identification of the surface water overland flow pathways</li> <li>– Identification and characterisation of the receiving waters likely to be impacted by the Project</li> <li>– Using real data from the NST overflow sites, undertake hydraulic modelling of how these sites would perform if the NST was off line during nominated weather scenarios</li> <li>– Consideration of strategies to minimise potential impacts.</li> </ul> </li> </ul>

Issue	Proposed Scope of the Environmental Assessment
<b>Groundwater quality</b>	<ul style="list-style-type: none"> <li>• Undertake an assessment of potential groundwater quality impacts during construction and operation of the Project, in particular:               <ul style="list-style-type: none"> <li>– Contamination of groundwater during construction from handling and movement of contaminated soil and PASS</li> <li>– Contamination of groundwater during operation of the Project (when the tunnel is full)</li> <li>– Disposal of groundwater removed from the shaft during excavation.</li> </ul> </li> </ul>
<b>Traffic and transport (construction)</b>	<ul style="list-style-type: none"> <li>• Prepare an assessment of potential traffic impacts resulting from construction vehicles utilising critical road networks within the Northern Beaches, in particular Pittwater Road and Spit Bridge. The assessment would include:               <ul style="list-style-type: none"> <li>– Identification of preferred transport and haulage routes</li> <li>– Classification of each road, and their level of service, that may be impacted during construction activities</li> <li>– Summarising existing traffic mix and relative volumes</li> <li>– Accident histories on the critical road networks to be utilised during construction</li> <li>– Public transport provisions</li> <li>– Consideration of alternative haulage routes, if required, in order to minimise potential impacts of construction activities associated with the Project</li> <li>– Mitigation measures to minimise traffic disruption and congestion on preferred haulage route.</li> </ul> </li> </ul>
<b>Traffic and transport (operation)</b>	<ul style="list-style-type: none"> <li>• Undertake an assessment of potential impacts on traffic along critical transport networks within the Northern Beaches due to maintenance activities during the operation of the Project.</li> </ul>
<b>Noise and vibration</b>	<ul style="list-style-type: none"> <li>• Undertake a detailed Noise and Vibration Assessment, including:               <ul style="list-style-type: none"> <li>– Baseline monitoring at locations of sensitive receivers</li> <li>– Modelling/prediction of construction and operational noise and vibration impacts for the Project (including tunnelling activities)</li> <li>– Establishing appropriate noise and vibration goals for construction and operational activities associated with the Project</li> <li>– Assessing predicted noise and vibration impacts against the Project noise and vibration goals</li> <li>– Mitigation measures to address potential noise and vibration impacts identified.</li> </ul> </li> </ul>
<b>Soils and geology</b>	<ul style="list-style-type: none"> <li>• Undertake an assessment of the contamination at Chard Road (including soil sampling, waste classification and management) to confirm preliminary findings and provide input into detailed design and construction methodology</li> <li>• Undertaking a hydrogeological assessment to assess potential impacts of the Project on the groundwater regime (flow and levels) surrounding the Project areas</li> <li>• Assessment of the scale and extent of any potential impacts to soils, geology or hydrogeology as a result of the construction and operation of the Project</li> <li>• Identifying mitigation measures, if appropriate, to be adopted to minimise any potential impacts during construction and operation of the Project.</li> </ul>
<b>Energy, greenhouse gases and climate change impacts</b>	<ul style="list-style-type: none"> <li>• Undertake a greenhouse gas assessment to aid in the selection of appropriate materials and construction methodologies to minimise (where practicable) energy consumption and greenhouse gas emissions, within the context of Sydney Water's Greenhouse Mitigation Framework</li> <li>• Undertake an assessment of the impacts of climate change scenarios on the future operation of the Project.</li> </ul>
<b>Cultural heritage</b>	<ul style="list-style-type: none"> <li>• Based on preliminary desktop assessment, a detailed assessment is not proposed as part of the Environmental Assessment.</li> </ul>

Issue	Proposed Scope of the Environmental Assessment
<b>Visual amenity</b>	<ul style="list-style-type: none"> <li>Potential impacts on visual amenity as a result of the Project are predicted to be minor. However potential impacts will be addressed in the Environmental Assessment, including the development of appropriate mitigation measures. Specific sites to be assessed are the proposed new ventilation facilities at Chard Road and Jacka Park.</li> </ul>
<b>Flora and fauna</b>	<ul style="list-style-type: none"> <li>Based on preliminary desk top assessment a detailed assessment is not proposed as part of the Environmental Assessment. However, site inspections would be undertaken to confirm that there are no threatened species or endangered ecological communities likely to be impacted by the Project. Appropriate mitigation measures (as required) would be outlined in the Environmental Assessment</li> <li>Should any traffic and transport changes be predicted at North Head STP, potential impacts on the Long-nosed Bandicoot population at North Head STP would be assessed.</li> </ul>
<b>Land use and socio-economic impacts</b>	<ul style="list-style-type: none"> <li>Landuse and socio-economic impacts would be addressed as part of the Environmental Assessment. If adverse impacts were identified, appropriate mitigation measures would be developed. A summary of findings would be presented in the Environmental Assessment.</li> </ul>
<b>Waste management and minimisation</b>	<ul style="list-style-type: none"> <li>Waste streams likely to be produced during both the construction and operation phases of the Project would be identified, classified, and managed in accordance with the appropriate DECC guidelines. Standard environmental management measures based on these guidelines would be prepared prior to construction as part of a Construction Environmental Management Plan. A summary of findings would be presented in the Environmental Assessment.</li> </ul>
<b>Cumulative impacts</b>	<ul style="list-style-type: none"> <li>An assessment of cumulative impacts is proposed as part of the Environmental Assessment. The assessment would consider the cumulative impacts of the Project with any adjacent and related developments. The assessment will also identify the positive cumulative impacts caused as a result of the Project, for example water quality within Curl Curl Lagoon.</li> </ul>
<b>Services and utilities</b>	<ul style="list-style-type: none"> <li>A number of utilities (such as overhead power lines, and water, sewer and stormwater systems) would be located/confirmed prior to the commencement of construction and appropriate safeguards identified and adopted. A summary of findings would be presented in the Environmental Assessment.</li> </ul>



## 8. Conclusion

This PEA describes the Project and potential environmental issues associated with its construction and operation. The PEA outlines an indicative scope for the Environmental Assessment to be undertaken in accordance with the assessment and approval process under Part 3A of the EP&A Act. It is anticipated that this report will assist the Director-General with the formulation of environmental assessment requirements for the Project.

The potential environmental issues have been categorised into 'key environmental issues' and 'other environmental issues'. Potential odour impacts resulting from the new ventilation facility at Chard Road and the potential changes at the existing NST ventilation facilities is considered to be the key environmental issue for the Project.

The other environmental issues for the Project are outlined in Section 6 and where appropriate would be subject to further assessment during the Environmental Assessment for the Project.

The proposed scope of the Environmental Assessment for both key and other environmental issues for the Project is outlined in Section 7.

Following receipt of the Environmental Assessment Requirements (EARs) from the Director-General of the Department of Planning, a draft Environmental Assessment will be provided to the Department of Planning for its review.

# Appendix A Figures