NORTHSIDE
STORAGE TUNNEL
Proposed Shelly Beach Connection

Director-General's Report
Section 115C
of the Environmental
Planning and Assessment Act

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FOREWORD

On 22 December 1997, the Minister for Urban Affairs and Planning approved the Northside Storage Tunnel, subject to 128 conditions. The Minister has since approved four modifications to the project.

The tunnel will intercept the major wet weather overflows in the northern suburbs sewerage system and provide short-term storage and subsequent transfer to North Head STP for treatment. The construction of the tunnel is now complete and commissioning is underway. The tunnel is expected to be fully operational in the near future.

In accordance with section 115BA of the Environmental Planning and Assessment Act 1979 (EP&A Act), Sydney Water has sought modifications to the Minister's approval in relation to providing a connection from the Shelly Beach sewage pumping station to the Northside Storage Tunnel. The proposed connection is aimed at reducing the frequency of wet weather overflows at Shelly Beach. This is expected to reduce odours and improve water quality in this location.

In seeking the modifications, Sydney Water prepared a review of environmental factors (REF) to evaluate the impacts of the proposed tunnel connection. The REF concluded that the proposed modifications are not likely to have a significant effect on the environment and that an environmental impact statement is not required.

This report has been prepared in accordance with Section 115C of the EP&A Act which requires that the Minister obtain a report from the Director-General of Urban Affairs and Planning prior to making a decision on the modification of an approval.

This report assesses the REF, the issues raised in representations made in response to its exhibition and the submission from Sydney Water.

The report concludes that the proposal is likely to bring significant benefits to the local community and to the environment in terms of reduced odours and improved water quality at Shelly Beach, a popular recreational area. It considers that the impacts of the proposal relating to noise, traffic, visual amenity, and air and water quality can be mitigated through the requirements of the existing conditions of approval and by adopting further measures and safeguards referred to in this report and in the recommended conditions of approval.

The proposal is recommended for approval subject to the recommended conditions.

Sue Holliday
Director-General
Department of Urban Affairs and Planning

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A Northside Storage Tunnel - Conditions of Approval (as modified)

Glossary of Terms

CLC	Community Liaison Committee
CEMP	Construction Environmental Management Plan
dBA	Decibels in the A scale
Department, The	Department of Urban Affairs and Planning
Director-General, The	Director-General of the Department of Urban Affairs and Planning
DUAP	Department of Urban Affairs and Planning
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	NSW Environment Protection Authority
l/s	litre per second
Minister, The	Minister for Urban Affairs and Planning
ML	Megalitre (million litres)
MOOS	Manly Ocean Outfall Sewer
NHMRC	National Health and Medical Research Council
NPWS	National Parks and Wildlife Service
NSOOS	Northern Suburbs Ocean Outfall Sewer
NST	Northside Storage Tunnel
OEMP	Operation Environmental Management Plan
REF	Review of Environmental Factors
SEPP	State Environmental Planning Policy
SIS	Species Impact Statement
SOLP	Sewage Overflows Licensing Project
SPS	Sewage Pumping Station
STP	Sewage Treatment Plant

EXECUTIVE SUMMARY

The Northside Storage Tunnel

Sydney Water Corporation has entered into an Alliance with Transfield Pty Ltd, Montgomery Watson Australia Pty Ltd, and Connell Wagner Pty Ltd to construct the Northside Storage Tunnel. The tunnel extends from Lane Cove to North Head and will intercept and store wet weather sewage overflows from the Northern Suburbs Ocean Outfall Sewer (NSOOS). Overflows at Lane Cove River West, Tunks Park and Quakers Hat Bay would be intercepted by the main tunnel, with a branch tunnel intercepting an overflow at Scotts Creek near Willoughby. The intercepted overflows would be stored in the tunnel and then transported to North Head Sewage Treatment Plant (STP) when sufficient treatment capacity is available. After treatment, the overflows would be discharged via the deep water ocean outfall.

The EIS for the tunnel was exhibited from 12 September 1997 to 17 October 1997 inclusive. The Minister for Urban Affairs and Planning approved the Northside Storage Tunnel, subject to 128 conditions, on 22 December 1997.

To date, four modifications to the project have been approved by the Minister in relation to the following:

- construction works at North Head STP and Little Manly Point (approved 28 July 1998);
- construction works at Tunks Park (approved 17 August 1998);
- various changes, including tunnel configuration and construction works at Lane Cove River West and Scotts Creek (approved 31 August 1999); and
- number of barge movements between Tunks Park and White Bay (approved 21 December 1999).

Proposed Modification

The wet weather overflows from the Shelly Beach sewage pumping station have been ranked as a high priority in the Sydney Water Sewage Overflows Licensing Project EIS (1998). Sydney Water proposes to reduce the frequency of overflows to the environment from this pumping station by constructing a branch connection between the station and the Northside Storage Tunnel. It is thus seeking a modification of the Minister's approval for the Northside Storage Tunnel to allow the proposed connection.

In October 2000, Sydney Water exhibited a Review of Environmental Factors (REF) for the proposed Shelly Beach connection. The proposal consists of:

- a direct connection from Shelly Beach to the tunnel by drilled borehole approximately 900m from the North Head end of the tunnel;
- redevelopment of the existing pumping station at Shelly Beach, and reconfiguration of dry weather sewage pumping capacity from 235 l/s to 100 l/s;
- decommissioning the existing overflow weir at Marine Parade;
- development of a system to reduce the frequency of wet weather overflows at Shelly Beach from an average of 45-50 events in 10 years to 20 events in 10 years.

Need, Justification and Benefits

The proposal, as outlined above, will provide significant improvements to the Shelly Beach area through:

- elimination of sewage overflows directly into Cabbage Tree Bay via the Marine Parade overflow;
- reduction in the frequency of overflows at the cliff face, with a significant reduction in water pollution of Cabbage Tree Bay;
- reduction in odours due to the reconstruction of the sewage pumping station, the blocking of the Marine Parade overflow, and the relocation of the sewer vent;

- improved visual appearance of the pumping station, with removal of the existing above ground building.

REF Exhibition

The REF was exhibited from 18 October 2000 to 3 November 2000 inclusive. A total of 8 representations were received as a result of the exhibition. Three of these expressed general support for the proposal. There were no outright objections to the proposal proceeding. However, there were concerns with certain aspects of the proposal relating to noise and airborne emissions, access, spills, public health, odour, fauna, heritage assessment, etc.

Section 3 of this report provides an overview of the main issues raised in the representations.

Main Issues

The Director-General's overall assessment of the proposal is provided in Sections 4 and 5 of this report.

The Department considers that the REF adequately evaluates the environmental issues relating to the proposed modification and concurs that a further EIS is not required.

During the construction of the project, there would be some impact on the local community and businesses in terms of noise and vibration, access restrictions, additional traffic, water quality, and disruption of visual and recreational amenity. However, these impacts can be managed by mitigation measures outlined in the REF and through the combined requirements of the existing conditions of approval and proposed additional conditions. The impacts will also be limited by the relatively short 6 month construction period.

The Department recognises that during construction, there would be a risk of increased wet weather sewage overflows at Shelly Beach because the temporary pumps are operating at a reduced capacity of 100 l/s in comparison to the current 235 l/s. As the tunnel will need to be closed for part of the construction period, there would also be an increased risk of overflows at other NST sites such as Scotts Creek. However, such risks would be minimised by carrying out the construction works during the low rainfall period as proposed in the REF.

The operation of the Shelly Beach connection is expected to bring significant benefits to the local community and the environment. Any impact that it may have on other NST sites, in particular the Scotts Creek and Lane Cove River West facilities, is considered to be marginal and will be controlled and managed by the Operation Environmental

Management Plan for the tunnel.

Conclusions and Recommendations

On the basis of the assessment conducted for the REF, representations received, and the findings of this assessment report, it is concluded that the environmental impacts associated with the proposal can be managed to acceptable levels. It is also concluded that in the context of the overall Northside Storage Tunnel, the proposed modification is justified and would provide significant long term environmental and community benefits.

1 INTRODUCTION

1.1 Nature of the Proposed Modification

Sydney Water is seeking a modification of the Minister's approval for the Northside Storage Tunnel (NST) to allow a connection to the tunnel from the Shelly Beach sewage pumping station (SPS 365). The proposed connection is aimed at reducing the frequency of wet weather overflows at Shelly Beach, reducing odours and improving water quality in this environment.

1.2 Background to the proposal

The infiltration of stormwater into Sydney's sewerage systems during wet weather events frequently results in the occurrence of sewage overflows into Sydney Harbour. The NSW Government's Waterways Package was developed to address urban wastewater and stormwater problems. The key initiatives of the package are included in Sydney Water's long term water, wastewater and stormwater plan, WaterPlan 21 (1997). This includes works to protect or enhance the ecosystem and the health of the waterways. One of these prevention measures is the construction and operation of the NST that is designed to reduce wet weather sewage overflows into Sydney Harbour by 80-90%.

In July 1997, Sydney Water prepared a report "Manly Sewage, SPS 365, Shelly Beach, Manly, Draft Options Report". This identified a number of options for the redirection of wet weather overflows to be reassessed in conjunction with the viability of the NST as a potential location.

The NST was approved by the Minister for Urban Affairs and Planning on 22 December 1997. The EIS for the NST indicated Shelly Beach as an option for further investigation.

The two overflows on the Manly Ocean Outfall Sewer (MOOS) can impact the wet weather quality on Cabbage Tree Bay (Shelly Beach). When the 235 l/s pump capacity of SPS 365 is exceeded during wet weather events, the excess flows discharge from one or both of the following locations: the cliff face discharge at Fairy Bower to the ocean; on Marine Parade, an overflow pipe discharges to Cabbage Tree Bay. Capturing these overflows would subsequently reduce odours and sewage discharge from the Marine Parade overflow and cliff face at Shelly Beach.

The Sydney Water Sewerage Overflows Licensing Project EISs (SOLP, 1998) ranked overflows throughout Sydney according to performance and environmental impacts. Shelly Beach overflows ranked high in the context of the Northern Suburbs Ocean Outfall Sewer (NSOOS) system and also Sydney wide due to the identification of an endangered population of Little Penguins (which use Cabbage Tree Bay as a foraging area) and the popularity of Shelly Beach as a recreational area. This indicates that the overflow pumping station should be addressed as a priority.

1.3 Statutory Provisions and Assessment Process

1.3.1 State Environmental Planning Policy No. 54 - Northside Storage Tunnel

State Environmental Planning Policy (SEPP) No. 54 - Northside Storage Tunnel was gazetted on 7 November 1997. SEPP 54 makes the Northside Storage Tunnel permissible without consent so that the tunnel may be assessed as an activity under Part 5 of the *Environmental Planning and Assessment Act 1979 (*EP&A Act*).* This allows for a single and consistent assessment process rather than the project being assessed in sections under the individual planning controls of the relevant local councils.

The SEPP includes the proposed branch tunnel to Shelly Beach in the definition of the Northside Storage Tunnel project.

1.3.2 State Environmental Planning Policy No. 19 - Bushland in Urban Areas

SEPP 19 applies to land zoned or reserved for open space and to other land adjoining it. It states that a public authority should not carry out development unless it has taken into account the need to retain bushland and the effect of the proposed development on areas zoned for public open space, in particular, on the erosion of soils, siltation of streams and spread of weeds. The SEPP applies to Shelly Beach, surrounding park areas and the headland.

1.3.3 Minister's Approval of the Northside Storage Tunnel

In accordance with section 115B of the EP&A Act, the Minister for Urban Affairs and Planning approved the Northside Storage Tunnel, subject to 128 conditions, on 22 December 1997.

Prior to the Minister's determination, an assessment report on the proposal was prepared by the Director-General of the Department of Urban Affairs and Planning.

1.3.4 Modification of Minister's Approval

Section 115BA(2) of the EP&A Act provides that a proponent may request the Minister to modify an approval granted under section 115B of that Act if the modification of the approved activity would be inconsistent with the approval.

Four modifications to the project have been approved by the Minister in relation to the following:

- construction works at North Head STP and Little Manly Point (approved 28 July 1998);
- construction works at Tunks Park (approved 17 August 1998);
- various changes, including tunnel configuration and construction works at Lane Cove and Scotts Creek (approved 31 August 1999); and
- number of barge movements between Tunks Park and White Bay (approved 12 December 1999).

In requesting a modification, the proponent is required under section 115BA(4) of the Act to determine whether the proposed modified activity would be likely to significantly affect the environment. In accordance with these provisions, Sydney Water has determined that the proposed works would be unlikely to significantly affect the environment and therefore a further EIS is not required.

In accordance with section 115BA(5)(b), Sydney Water prepared and publicly exhibited a review of environmental factors (REF) for the proposed Shelly Beach connection. The REF was publicly exhibited between 18 October and 3 November 2000.

Advertisements identifying public display locations and times were published in the Manly Daily and the Sydney Morning Herald. The advertisements advised that representations would be received up to the close of the exhibition.

1.4 Request for the Approval of the Minister for Urban Affairs and Planning

Sydney Water sought the approval of the Minister for the modification in a letter received by the Department on 4 January 2001. This was accompanied by a report addressing the issues raised in representations from the public exhibition of the REF.

1.5 Purpose of this Report

The purpose of this report is to review the REF for the proposed modification, the issues raised in representations made in response to the exhibition of the REF and Sydney Water's consideration of these representations.

This report is prepared in accordance with Section 115C of the EP&A Act which requires the Director-General to assess and report to the Minister for Urban Affairs and Planning on the proposal.

2 THE CURRENT PROPOSAL

This section provides a description of the proposed modified activities as outlined in the Review of Environmental Factors. The information contained in this section does not necessarily reflect the views of the Department but is based on the material provided by the Proponent.

2.1 Description of the Proposal

2.1.1 The existing system

The Shelly Beach pumping station (SPS 365) provides for the diversion of dry weather, and a proportion of wet weather flows, directly to the NSOOS. In 1991, the wet weather pumping capacity of this SPS was increased from 100 l/s to 235 l/s to reduce the number of overflows. The SPS currently serves a contributing population of 4000 EP (equivalent persons) in dry weather. The dry weather catchment area of 65 ha incorporates the north-eastern part of the Manly Peninsula (see Figure 1).

Flow generated from this catchment is transported to SPS 365 via the lower Manly Ocean Outfall Sewer (MOOS). The catchment is defined on the upstream side by the Carlton Street weir and includes the retail area of Manly around the Corso.

The Upper MOOS serves the Queenscliff area upstream of the SPS 365 sub-catchment. This flow is normally intercepted at Carlton Street and conveyed to the NSOOS at West Promenade by gravity via the Northern Interceptor. During wet weather conditions , the Interceptor is overloaded and overflows into the lower MOOS at Carlton Street. During long periods of wet weather the NSOOS flows full, or near full, causing the reflux valve installed in the Northern Interceptor to close. When this happens, all the sewage from the Upper MOOS overflows to the lower MOOS and SPS 365, effectively increasing the apparent contributing population to 30,000 EP (a 750% increase).

Average dry weather flow from the station is approximately 13 l/s. In large storm events the wet weather flow arriving at the pumping station can increase to over 650 l/s.

Wet weather flows beyond the capacity of SPS 365 discharge from one or both of the following locations:

- the cliff face discharge at Fairy Bower to the ocean
- an overflow pipe on Marine Parade discharging to Cabbage Tree Bay.

Figure 1 shows the location of these two points.

2.1.2 The problem

The Shelly Beach pumping station currently overflows 35-45 times in 10 years during wet weather events. This is based on modelling results in the Sydney Water SOLP EIS. More recent modelling data conducted by Sydney Water estimates the overflows to be 45-50 times in 10 years. Water quality impacts such as odours and visual pollution occur following these overflow events. This reduces the amenity for water users such as swimmers, surfers and divers.

Water quality at Shelly Beach is monitored as part of the EPA Beachwatch program. The monitoring conducted between 1996-98 indicates that water quality at Shelly Beach generally complies with National Health and Medical Research Council (NHMRC) Guidelines on faecal coliforms and enterococci.

Odours are generated from the Marine Parade overflow point and the pumping station. In the past 12 months, Manly Council has received approximately seven complaints concerning sewage smell in the Shelly Beach area.

2.1.3 Proposal as described in the REF

Sydney Water proposes to construct a branch connection from the Shelly Beach pumping station to the NST approximately 900 m from the North Head end of the tunnel. The proposed connection will be approximately 600m to 650m in length. Figure 2 shows the tunnel route.

The proposal includes:

- a branch connection from Shelly Beach Pumping Station to the Northside Storage Tunnel to carry wet weather overflows
- a reconfigured pumping station at Shelly Beach from 235 l/s to 100 l/s and removal of the current brick superstructure
- new above ground electrical switchboard at the pumping station
- upgrading the existing cliff face overflow weir
- closure of the existing overflow weir on Marine Parade
- interconnection works within the NST
- miscellaneous works such as landscaping and temporary works.

Excavation of the tunnel connection will be undertaken using directional drilling techniques.

The construction site will be located in two areas. The directional drilling work will be contained in the upper level of the car park at Shelly Beach headland and the pumping station works will be in the recreation reserve in Cabbage Tree Bay. The extent and indicative layout of these works are shown in Figure 3.

Construction will generally be sequential to minimise impact. The proposed staging of the project is outlined below:

- site establishment of the directional drilling equipment in the upper car park
- directional drilling and lining of the overflow connection to the NST
- demobilisation of drilling equipment and rehabilitation of this area of the car park
- site establishment of the pumping station construction area
- construction of the pumping station modifications including the temporary pumping station and diversion of the sewer
- construction inside the NST
- closure of the Marine Parade overflow
- pumping station commissioning
- site decommissioning and rehabilitation.

The existing sewerage system at Shelly Beach and the proposed connection to the NST system is illustrated in Figure 4.

The estimated capital cost of the proposal is $6 million. Construction works are expected to take approximately six months and are proposed to be undertaken during Autumn/Winter 2001.

2.2 Need, Benefit, Project Justification and Consequences of Not Proceeding

2.2.1 Objectives

The objectives for the NST project provide the context of the Shelly Beach proposal. These objectives include protecting public health, recreational uses and aquatic ecosystems in the Sydney Harbour catchment and avoiding potential environmental impact during construction and operation.

The REF lists 17 specific objectives for the Shelly Beach project which were derived from the consultation process. These objectives cover permanent and construction works and address a range of issues dealing with odours, frequency of overflows, safety of facility, recreational amenity, truck movements, construction noise, construction area, project completion and cost minimisation.

2.2.2 Justification of the Modification

The REF justifies the proposed tunnel connection at Shelly Beach in terms of its social, biophysical and economic benefits and the principles of ecologically sustainable development.

Social benefits
- reduction in odours
- improved water quality from reduced overflow
- improved visual appearance of the pumping station

Biophysical benefits
- reduction in the frequency of overflows will result in reduced stress on aquatic flora and fauna

Economic benefits
- preferred option for the Shelly Beach Pumping Station is for 20 overflow events in 10 years with a benefit/cost ratio of 2.33.

Ecologically sustainable development
- development of an Environmental Management Plan (EMP) for the proposed works to ensure impacts on the environment are minimised
- improvement in water quality at Shelly Beach will benefit both present and future generations
- the use of native species in the landscaping of the construction sites after completion of construction activities will enhance the flora population and fauna habitat in the local areas
- removal of overflow discharge from the Marine Parade overflow point would reduce impacts on aquatic flora and fauna in the area.

If the proposed works are not undertaken, the consequences would be continuing wet weather sewage overflows at the cliff face and at Marine Parade, and continued odour generation at Shelly Beach.

2.3 Options Considered

The REF considered a number of options for capturing wet weather overflows at the Shelly Beach site. These options are:

1. New pumping station at Shelly Beach
2. New pumping station in the catchment
3. Connect directly to North Head STP
4. Connect directly to the Northside Storage Tunnel
5. Undertake additional inflow and exfiltration works within the catchment.

A list of Shelly Beach objectives, formulated as part of the community consultation process, were used as a basis for comparing options. The options are briefly discussed below.

Option1 - New pumping station at Shelly Beach
Four arrangements were considered:
- a new pumping station adjacent to the existing one and demolish existing pumping station (SPS 365)
- a new pumping station adjacent to the existing one and use existing SPS 365 for storage
- a new pumping station under the toilet block and demolish SPS 365
- a new pumping station under the toilet block and use existing SPS 365 substructure for storage

Option 2 - New pumping station in the catchment
When the NSOOS runs full or near full during wet weather conditions, a reflux valve located in the Northern Interceptor closes and flows from the Manly catchment can no longer discharge to the NSOOS under gravity. By installing an additional pumping station, the Upper MOOS can be forced into the NSOOS.

Two pumping stations were considered: the corner of the Steyne and Victoria Parade or Kangaroo Lane.

Option 3 - Connect directly to North Head STP

Direct connection to North Head STP could be achieved by a gravity connection between Shelly Beach and North Head STP with a new pumping station at North Head STP to lift flows to the STP inlet works. Overflow containment can be achieved by providing adequate pumping station capacity or a combination of storage and pump capacity. The pumping station at Shelly Beach would be decommissioned and a new overflow weir installed.

Option 4 - Connect to the Northside Storage Tunnel
Two arrangements were assessed:

- 4a - decommission SPS 365 and connect to the NST to take dry and wet weather flow
- 4b - retain SPS 365 and have a wet weather overflow connection to the NST.

Option 4a means that dry weather flows would discharge to the NST. Sydney Water subsequently considered this option unacceptable as it would constitute a change to its operating licence.

Option 4b, involving retention of a pumping station at Shelly Beach, allows dry weather flows to be pumped to the NSOOS as per the current arrangement. This option includes a direct wet weather overflow connection from Shelly Beach to the NST using a directionally drilled conduit. A reconfigured pumping station would be designed to handle all current and future dry weather flows, with wet weather flows in excess of pump capacity being diverted to the tunnel.

Option 5 - Undertake inflow and exfiltration works within the catchment
This option would involve undertaking source control works to limit inflow and exfiltration flows throughout the MOOS catchment. The aim of these works is to reduce the flow to SPS 365 to within the existing pump capacity.

Preferred Option
The REF states that each option was compared against the project's 17 specific objectives and that no single option met all critical objectives. However, Option 4b was chosen as the preferred option as it best met most of the key objectives and has a number of advantages, including meeting Sydney Water containment standards, eliminating odours during operation, reducing the physical presence of the pumping station and by blocking the Marine Parade overflow, no overflows direct to Cabbage Tree Bay.

3 SUMMARY OF REPRESENTATIONS

3.1 Summary and Overview of Representations Received

A total of eight representations were received from the exhibition of the REF. The representations were received from:

- Environment Protection Authority
- National Parks and Wildlife Service
- NSW Fisheries
- NSW Heritage Office
- Manly Council
- Private individuals

Three of the representations expressed support for the project. There were no outright objections to the proposal in itself.

The Representations Report considers all the issues raised in these representations as well as the issues raised at community meetings on the proposed modification.

3.2 Overview of Main Issues raised in Representations

The main issues raised in the representations were:

Noise and Vibration
- Need to manage short term environmental effects during the construction period;
- Noise emissions should approach EPA noise goals;
- Ensure no noise exceedances above EPA noise goals and that all practical and feasible measures are implemented. Undertake community consultation to look at alternative rock removal techniques;
- The REF does not include the noise consultant's (Atkins Acoustics & Associates) recommendation regarding procedures to allow property owners direct and immediate access to the Site Environmental Officer.

Traffic and Access
- Encourage car-pooling to reduce impact on the limited car-parking;
- Restricted access of delivery trucks to Le Kiosk Restaurant.

Visual Amenity
- New design of the new pumping station is a major improvement on the existing one;
- Is it possible to make the new modern steel galvanised covers less intrusive?

Recreational and Commercial Use
- Minimise disturbance to recreational and commercial fishing, SCUBA diving and snorkelling;
- Meaning of "no significant impact" may be quite different when consideration of divers and snorkellers are taken into consideration.

Water Quality
- Sediment and erosion controls will need to be installed, operated and maintained;
- A drilling slurry management plan should be implemented;
- Investigate emergency spill provision, ie storage downstream;
- Maximise site safety controls to avoid spillage of oil, fuel or chemicals;
- No disposal of spoil within the aquatic environment or entering the aquatic environment;
- The REF does not state the most recent NHMRC statistics on faecal coliforms and enterococci at Shelly Beach. This information should be given as it justifies the proposal;
- Cabbage Tree Bay is "ecologically sensitive" rather than simply "of significant environmental value".

Air Quality
- Additional overflows will increase the likelihood of offensive odours being produced from the NST vents;
- Venting will increase from 112 to 117 days in 10 years causing increased emission of fumes at Scotts Creek and Lane Cove;
- Need to manage the short-term environmental effects during the construction period, in particular airborne emissions (dust and odour);
- Ensure compliance with Section 129 of the Protection of the Environment Operations (POEO) Act regarding discharge of offensive odours from scheduled premises;
- What are the effects of the green vent on odour?
- What are the results from odour measurements previously done by Sydney Water?
- Sydney Water should give answers, to the community's satisfaction, on the effect of the vent;
- Effects of gases from the vents in terms of odour and health hazard. What happens if the ventilation system in the NST fails during the filling of the Tunnel?

Public Health
- The REF is not an appropriate environmental assessment of the situation - proposal has potential to increase gaseous emissions and overflows at Scotts Creek and Lane Cove;
- Additional future overflow connections will have negative effects on the Scotts Creek community;
- The environmental effects of increased overflow at Scotts Creek and Lane Cove have not been considered properly;

- Option 3 (Connect directly to North Head STP) is preferable to the one proposed as it enables the overflows to be connected without causing effects on other communities.

Flora and Fauna

- Concerned that the use of open sediment ponds will be a threat to the bandicoots, Sydney Water should conduct site training and practices as implemented for the North Head site;
- Appendix A "Is an EIS Required?" does not consider penguins, divers/snorkellers and the environment adequately;
- Appendix C - the 8 Part Test on the Little Penguin does not consider the impact of spills on seagrasses and fish.

Heritage

- The Marine Parade overflow pipe should be removed;
- The REF does not adequately deal with potential impacts of the proposed works;
- The Heritage Act requires an excavation permit from the Heritage Council prior to commencement of works if disturbance to a site with known or potential archaeological relics is proposed.

Community Consultation

- Sydney Water should formulate a consultation strategy including: formation of a Shelly Beach Working Group, monthly updates in the Manly Daily, newsletter distribution and giving information to key staff at Manly Council;
- Impacts on commercial operators, in particular, the Le Kiosk Restaurant need to be clarified.

Overflows

- Ensure compliance with condition No. 378 of the Northern Suburbs Sewage Treatment System Licence for no dry weather overflows;
- Clarify inconsistencies in the number of overflows from the Shelly Beach Sewage Pumping Station. The REF mentions three statistics: 35, 40 and 50 events in 10 years;
- Volume of overflow will increase at Scotts Creek and Lane Cove with the addition of Shelly Beach;
- Ensure the Shelly Beach pumping station capacity can cope with future increases in dry weather flow;
- The REF states that a small increase in tourism can justify a reduction of overflows to 10 events in 10 years. Council surveys indicated an increase in tourism - why has this reduction not been adopted?
- Is the estimate of 150 events/number of overflows into the NST correct?

Miscellaneous

- The REF does not contain any information on cost of proposal and those of other options;
- Testing of potentially acid sulphate soils or contaminated soils should be undertaken, if required;
- The word "event" needs to be properly defined;
- Who is responsible for the maintenance of the Marine Parade overflow pipe?

In its submission to the Minister requesting approval of the modification, Sydney Water identified the issues raised in representations. The Department has independently reviewed the identification of issues by Sydney Water and has found it to be generally adequate and consistent with its own review. Where considered necessary, the Department has sought and obtained further information from Sydney Water to assist in its assessment.

4 ASSESSMENT OF MAIN ISSUES

This section outlines the Department's consideration of issues relating to the proposed modifications, having regard to information presented in the REF, representations received in response to its exhibition and additional information obtained by the Department. The scope of this assessment is to address the impacts of the proposed modified works only, not the impacts of works already assessed and approved by the Minister.

Where considered appropriate, management and mitigation measures to address potential

impacts are recommended. These recommendations are made only in relation to potential new or changed impacts as a result of the modified works. A reference to "existing conditions of approval" means conditions of the Minister's approval for the Northside Storage Tunnel current at the date of this report.

4.1 The Consultation Process

The Department considers that community consultation on the proposal was adequate and that Sydney Water has complied with its statutory requirements in this regard. Sydney Water conducted extensive consultations involving meetings and workshops with key stakeholders and the local community early in the process. The stakeholders of the project include the representatives of Manly Council, local residents, environment groups and recreational groups, local businesses, a representative from the Environment Protection Authority, Sydney Water and the Northside Storage Tunnel Alliance.

The purpose of the consultations was to discuss the objectives of the project, options to achieve the objectives and the criteria against which those options would be assessed. Sydney Water then technically developed and assessed the options against the criteria.

In March 2000, following the development of a preferred option, a joint NST Community Liaison Committee meeting was held with community members from Lane Cove, Scotts Creek, Quakers Hat Bay and Tunks Park. Sydney Water and the Northside Storage Tunnel Alliance presented the options and discussed the preferred option, its development and the evaluation process.

In October 2000, a meeting was held with the Shelly Beach Community Working Group to discuss issues, timing and details of the project and REF exhibition. The REF was publicly exhibited and representations received in accordance with the requirements of the EP&A Act.

4.2 Options

The REF stated that the design of all options for capturing wet weather overflow at Shelly Beach was developed to a preliminary stage, sufficient to develop a comparative cost estimate. Of these design options, Option 4b (Connect to the Tunnel) was chosen as the preferred option as it best met most of the project's key objectives. One of these objectives is the completion of the project at the minimum (capital) cost. No cost estimates were provided in the REF.

A private representation (supporting Option 3 - Connect to North Head STP) noted that because the REF does not contain any information on the costs of any of the options, it was not possible to evaluate the options.

Sydney Water has provided indicative costings for all the options considered, in response to a request from the Department. Four direct connection to the North Head STP options were considered. Indicative costs (based on minimum cost estimates) for these options ranged from $7.5 M to $12.5 M. This compares with $4.4 M for the preferred option, based on the same minimum costs estimates. (Note: the final cost estimate for the proposed scheme is now $6 M. It would be expected that the costs for the North Head STP connection would also rise if these options were further developed).

The Department is satisfied that the preferred option would be a more cost effective option than direct connection to the North Head STP.

4.3 Justification

The stated benefits of the project are identified in section 2.2. The REF states that the Shelly Beach connection will have a benefit/cost ratio (BCR) of 2.33. Sydney Water has clarified that this BCR is for the Northern Beaches and Lagoons. It is not specifically for Shelly Beach, as it is problematic to determine BCR's for individual receiving waters.

The Department notes that the REF does not provide any quantitative data on benefits (eg. improvements in the number of swimmable days). However, the Department accepts that there will be a range of benefits and this is a priority area because of its high scenic and recreational values and reported foraging of little penguins.

4.4 Noise and Vibration

Noise

The predicted noise levels from construction activities at Shelly Beach are high and will exceed EPA standards.

Noise monitoring was conducted at Nos. 4 and 36 Bower Street. These residences were chosen as they are in the area that will potentially be affected the most from construction. Results of the monitoring indicate that the existing daytime (7am to 6 pm) noise level in this location is 45dBA. For the proposed construction period of 4 - 26 weeks, the recommended daytime level based on the EPA Guidelines is 55dBA, ie 45dBA (L_{A90}, 15 min) + 10dBA = 55dBA.

Estimated noise levels during the site establishment, directional drilling, demobilisation and pumping station works would be between 59-82 at the nearest affected residents and businesses, resulting in exceedances of up to 27dBA. These are the predicted noise levels without noise mitigation measures.

Whilst the Department considers the potential noise impacts of the proposed activities to be a critical issue, specific noise control measures would reduce the noise impacts. Proposed mitigative measures include installation of acoustic walls around construction sites, use of vinyl acoustic blankets on generators and other machinery, and operation of plant and equipment at minimum practical settings at all times. A noise and vibration impact assessment undertaken as part of the REF (Atkins Acoustics and Associates, May 2000) suggested that the implementation of these controls may reduce the noise level by up to 10-15dBA for residential properties and 15-20 for the Le Kiosk restaurant.

Sydney Water acknowledges that there would be exceedances, even with noise attenuation measures, and will be requesting the EPA to consider adopting higher noise levels for the construction works at Shelly Beach.

The EPA indicated in its submission on the REF that appropriate controls should be installed, operated and maintained at the construction works to ensure that noise emissions approach the noise goals specified in chapter 171 of the EPA's Environmental Noise Control Manual. It also suggested that the proponent/contractor closely consult and possibly negotiate with the affected community on noise mitigation measures (eg limiting working hours).

The noise predictions in the REF exceed the relevant noise goals. The EPA is aware that Sydney Water will be seeking higher noise goals for the construction phase of the project and would consult with that body on any noise reduction techniques.

Existing conditions of approval on noise and vibration management will apply to the proposal. Condition 26 requires the Proponent to prepare a Noise and Vibration Management Procedure with details of noise monitoring and noise control measures. Condition 27 requires construction noise to comply with relevant EPA requirements, which include any higher noise goals granted by the EPA.

The operation of Le Kiosk restaurant at Shelly Beach would experience some impact from noise arising from the construction activities. A condition is proposed requiring the proponent to consult with the restaurant operator in the preparation of the Noise and Vibration Management Procedure (Condition 26) to ensure that adequate measures are in place to minimise impacts on special functions and restaurant activities at the premises.

Sydney Water has had a few meetings with Le Kiosk operators and undertakes to have regular consultation with them throughout the construction period. To date, the outcomes of these consultation are the possibility of negotiated hours for noisy activities and finding ways of enabling truck delivery of goods when vehicular access to the restaurant is restricted.

While there would be inconvenience and reduction in amenity to the restaurant and to all affected residents and recreational users of the area during the project's construction phase, this would be for a relatively short period. This would be compensated by longer term benefits of improved water quality in the area's bays and beaches and increased amenity and aesthetics in this recreational area.

Vibration

The main sources of vibration will be associated with rock breakers. The REF indicates that vibration monitoring will be conducted at the nearest resident or sensitive structure whenever vibration causing activities or complaints occur on the site.

No significant vibration impact is expected from the directional drilling operations and the tunnel works, as assessed by Atkins Acoustics. However, to ensure that vibration levels at the closest structures/buildings comply with the limit set, a condition is proposed requiring the monitoring of noise and vibration resulting from the use of directional drilling during the excavation of the spoil tunnel at the Shelly Beach headland.

4.5 Air Quality

Construction

Potential air quality impacts during the construction period, as identified in the REF, include:

- dust from excavation and associated earthworks;
- diesel fumes from plant and machinery;
- potential odour generation from the temporary relocation of the pumping station during the pumping station works.

To mitigate the air quality impacts arising from construction works, proposed management measures outlined in the REF include:

- use of dust and odour suppressants;
- covering of stockpiles, as required;
- covering of trucks carrying excavated material;
- pre-start checklists on equipment and machinery to ensure no fumes.

The Department considers that air quality impacts that may result from construction works can be adequately addressed through the existing conditions of approval. In particular, Condition 10 requires the proponent to prepare a project specific Construction Environmental Management Plan (CEMP) which is to incorporate a Dust Management Plan, referred to in Condition 43. Condition 44 requires dust monitoring at all construction sites and Condition 45 calls for compliance with EPA requirements for dust deposition rates. Condition 48 requires fitting of appropriate emission control equipment to all plant and equipment. These conditions would continue to apply to the construction activity at Shelly Beach.

To ensure that the operation of Le Kiosk restaurant is not adversely affected during construction works, a condition is proposed requiring the proponent to consult with the restaurant operator in the preparation of the Dust Management Plan.

Operation

The ventilation of the Shelly Beach pumping station and sewer will be relocated from its current position (top of the pumping station structure) to the starting point of the directional borehole in the upper car park. It will be a small 'green vent' 150mm in diameter and approximately 3 metres high. The vent stack will be located in the small stand of trees between the upper and lower car parks.

A few representations raised issues concerning odour and gaseous emissions from the green vent at Shelly Beach.

The REF indicates that the new ventilation system will not emit air all of the time as occurs at present. It will only emit air when the NST is storing water and then only the very small volume of air in the connection pipe alone. During normal operation the new ventilation system will draw in air from the existing sewer and wet well, and from the new green vent stack, and exhaust air through the NST to the scrubber at North Head STP. Consequently, total air emissions in this area will be reduced. In addition, the venting will occur in a less sensitive location than occurs now. The elevated position of the vent stack will also allow better dispersion of emissions.

It is concluded that odour generation at Shelly Beach will be significantly reduced once the pumping station is redeveloped.

The potential of emissions being increased at Scotts Creek and Lane Cove River West as a result of the Shelly Beach connection, and the issue of public health impact from these emissions was a particular concern in one private representation. A discussion of the public health issue from vent emissions at Scotts Creek and Lane Cove River West is contained in section 4.7. The NSW Department of Health and a Health Expert Panel have assessed this issue and concluded that the risks to public health are negligible.

The REF indicates that the capture of the Shelly Beach overflows would marginally increase the number of days that the vent facility at the other two locations will be operating, ie from 112 to 117 in 10 years. This increase translates to 5 to 10 hours per year.

The air vented from the facilities at Scotts Creek and Lane Cove River West will pass through activated carbon filters designed to remove all offensive odours. The facilities are licensed by EPA and the performance of the odour control facilities will be continuously monitored and reported. The air will also pass through a High Efficiency Particulate Air (HEPA) filter before being released.

It should be noted that the operation of the Shelly Beach connection will need to be undertaken in accordance with the Operation Environmental Management Plan (OEMP) for the NST. The OEMP requires the Director-General's approval before the tunnel could commence operation.

4.6 Water Quality

Construction

During the directional drilling and pumping station construction works, the following potential impacts could occur:

- escape of surface runoff from the construction site areas into recreational/public spaces, potentially increasing turbidity of Cabbage Tree Bay;
- escape of runoff containing oil/fuel/chemicals which could result in contamination of the water quality of the area;
- unintentional release of oil/fuel that may contaminate surrounding ground and waters;
- overflows at Lane Cove River West, Scotts Creek, Tunks Park and Quakers Hat Bay when the Northside Storage Tunnel is out of operation for approximately 4-8 weeks during the tunnel construction works;
- potential spillage of waste water (containing bentonite from the directional drilling works) into the Shelly Beach area or along transportation routes;
- potential during wet weather events, when the diversion pump is being used, for an increase in the frequency of overflows at Shelly Beach, because of the pump's reduced capacity.

The tunnel will be shut down for a period of 4-8 weeks during the construction of the tunnel connection scheduled in August/September 2001. The REF indicates that as an overflow to the waterways could occur when the tunnel is shut down, Sydney Water will apply to the EPA for approval to discharge to waterways if necessary.

Mitigative measures proposed to be put in place include:

- installation of erosion and sedimentation controls such as straw bales, silt fences and a sediment basin;
- diversion of run off from the area directly above the site with the possible use of dish drains, barriers, etc to minimise the volume of contaminated water generated;
- removal of drilling waste from the site in large sealed skip bins;
- bunding of all fuels/chemicals kept on site and sump in place to capture any contaminated site water;
- training of all staff in environmental management and risk identification;
- management system/operational procedures in place for the handling of directional drill waste water that is generated during operations.

The Department recognises that there would be a risk of increased overflows at Shelly Beach during the construction period because the temporary pumps are operating at a reduced capacity of 100 l/s in comparison to the current 235 l/s. However, this risk would be minimised as the construction works are scheduled during the low rainfall period.

As the tunnel will need to be closed for part of the construction period, there would also be an increased risk of overflows at other NST sites such as Scotts Creek. However, this will be similar to the pre-tunnel situation at these sites and the risks will be minimised by construction in the low rainfall period.

The Department considers that the long term benefits of the project would outweigh the potential risks that may occur.

The Department is satisfied that proposed mitigation measures and the existing conditions of approval would provide the necessary controls to minimise potential impacts. Condition 35, in particular, requires the preparation of a comprehensive Erosion and Sedimentation Control Procedure to satisfy all approval and licensing requirements. An additional condition is, however, proposed to specify that the CEMP referred to in Condition 10 incorporates a drilling slurry management plan for Shelly Beach.

Operation

The REF indicates that the project, when completed, is expected to reduce significantly the frequency of overflows at Shelly Beach from the current estimated rate of 45-50 events in 10 years to the targeted frequency of 20 events in 10 years[*]. However, it also indicates that while the Shelly Beach connection is closed 20 times in 10 years, modelling indicates that overflows may only occur 6 times. Sydney Water has advised the Department that this is attributed to a combination of three factors:

- the isolation of the overflow from Shelly Beach to the Tunnel occurs in response to the shutdown sequences in the NST itself. However, not every site on the NST overflows at the same time and not all sites overflow exactly 20 times in 10 years;
- the Lower MOOS is very transient and high levels decrease very quickly; and
- the weir level to overflow to the cliff face at Shelly Beach is higher than the overflow to the Tunnel and the sewer carrier has some storage capacity before an overflow to the cliff face occurs.

Sydney Water has also advised the Department that 20 events in 10 years remains the committed maximum overflow frequency. However, it may be possible to operate the Shelly Beach facility to achieve a lesser overflow frequency, possibly down to zero overflows in the future. Sydney Water aims to achieve this where it can be done at no detriment to other communities or the environment.

The Department considers that the expected reduced overflows will be a marked improvement over the current situation where odour and water pollution problems affect the recreational amenity and water quality in the area. If Sydney Water can achieve less overflows than 20/10, greater social and environmental benefits should result.

The connection of Shelly Beach to the tunnel will enable the proposed reduction in the pumping station capacity from the current 235 l/s to 100 l/s. When the connection is operational, all flows in excess of 100 l/s will be overflowed to the Tunnel. This means that there will be more overflows to the Tunnel than the current overflows to the environment at Marine Parade and the cliff face.

In regard to impact of the Shelly Beach proposal on f*requency* of overflows at Scotts Creek and Lane Cove River West, modelling conducted by Sydney Water indicates that Shelly Beach overflows will not cause any additional overflow events, ie cause the NST to fill when it would not otherwise do so. However, it does show that there will be an increased number of days (ie from 112 to 117 days in 10 years or half a day per year) when the venting facilities would be activated.

[*] The maximum of 20 overflows in 10 years is the overall Sydney Water target for overflow reduction in all established areas under the SOLP EIS. "Event" is defined as an overflow occurrence either from a whole sewerage system or at a single overflow location.

In regard to impact on *volume* of overflow, modelling results predict that the Shelly Beach connection would be contributing a small amount to the overflows at the above locations. At Scotts Creek, for example, Sydney Water advised that the existing volume of overflow is 18,000 ML from 133 events per year. With the NST, this volume is predicted to substantially reduce to 800 ML from 14 events per year. With the Shelly Beach connection to the Tunnel, the volume is predicted to increase by 20% to 1000 ML from 14 events per year. This increased amount is considered insignificant when measured against the expected huge reduction in overflow at Scotts Creek (ie 90%+ reduction) as a result of the Tunnel.

4.7 Public Health

Concerns about the effects of the Shelly Beach connection on Scotts Creek and Lane Cove River West in terms of increasing gaseous emissions and overflows at these two sites were raised in a private representation. Underlying these concerns is the public health impact of vent emissions.

As discussed in sections 4.4 and 4.5, the potential impact of the Shelly Beach proposal in terms of increasing the frequency and volume of overflows at Scotts Creek and Lane Cove River West is not considered significant.

The REF indicates that during the targeted maximum of 20 overflow events in 10 years when the NST is not available to prevent overflow to the environment, there may be minor increases in overflow volumes at these two locations. However, for the many other occasions when the NST is in operation and does not fill, the capture of the Shelly Beach overflows is a substantial improvement on the environment at Shelly Beach, with no impact at Scotts Creek and Lane Cove River West.

The possible health effect of gaseous emissions from the vent at Scotts Creek was a major issue of deliberation in the Parliamentary Inquiry into the Northside Storage Tunnel - Scotts Creek Vent conducted in October 2000. The Inquiry Report noted that the major health concerns centred on risks associated with the various types of pathogens that might be emitted from the Scotts Creek vent including:

- The types of pathogens in sewage that may pose a risk;
- The risk of pathogen transfer from the tunnel to the vent;
- The effectiveness of the vent filter to minimise the emission of pathogens;
- The potential of the filter to be a growth medium for Legionella; and
- The risks of harm to human health if pathogens are emitted from the vent.

The various types of pathogenic micro-organisms that can be found in raw sewage include bacteria, protozoa, helminths and viruses.

The NSW Health Department and a Health Expert Panel have expressed a firm view at the Inquiry that no significant health risks are posed by the Scotts Creek vent. The Inquiry Committee concluded, having considered the various submissions from the community, Sydney Water, Northside Storage Tunnel Alliance, NSW Health Expert Panel and the Waterways Advisory Panel, that there would appear to be insufficient evidence to determine whether or not there is a significant risk of certain pathogenic micro-organisms remaining viable or proliferating in the tunnel environment.

The Committee has made a number of recommendations addressing health associated issues relating to the NST. One of these recommendations is for NSW Health to immediately prepare appropriate testing protocols to regularly evaluate the potential public health risks from Legionella and other pathogens that may survive and proliferate in the NST. Another is the installation of a 0.3 micron HEPA filter, in addition to the pre-filter and impregnated granulated activated carbon filter, as a means to alleviate concerns raised by the community. The Department notes that Sydney Water has recently installed these HEPA filters at the vent facilities in Scotts Creek and Lane Cove River West. The NSW Health Department has obtained an opinion on the need for monitoring from the Health Expert Panel. The Panel is of the unanimous view that the addition of the HEPA filter removes any possibility of microbial dispersion from the vent, and believe that the previously recommended aerosol and pathogen monitoring is no longer necessary.

It should be noted that during the operation of the NST, the venting of emissions at Scotts Creek and Lane Cove River West will be controlled by existing conditions of approval

designed to avoid any adverse environmental and public health impact.

The operation of the proposal will be in accordance with the OEMP for the NST.

4.8 Flora and Fauna

Terrestrial environment

Construction activities at the Shelly Beach sewage pumping station will involve the temporary uprooting and storage on site of three cabbage palms. They will be transplanted following completion of the SPS construction works. Some minor tree lopping and vegetation clearing around the pumping station will also be undertaken to facilitate truck access. At the directional drilling construction site, minor clearing of vegetation will be necessary near the entry point for the drill rig.

The threatened population of Long-nosed Bandicoot has been previously recorded in the vicinity of the proposed works. These animals are highly mobile and may be attracted to the construction site to forage. For the purposes of the Threatened Species Conservation Act, an eight-part test has been applied to determine whether the proposal is likely to have a significant effect on this population. The test concluded that the proposed works are not expected to displace the population or affect core habitat. As no adverse impact is expected on the Long-nosed Bandicoot, a species impact statement (SIS) is not required to be prepared for this species.

A private representation expressed concern that construction of open sediment ponds may pose a threat to the Long-nosed Bandicoot. It suggested that a training program for construction staff, similar to that given at the North Head site for the storage tunnel project, be implemented for Shelly Beach.

Aquatic environment

Potential impacts that exist during construction include:

- possible unintentional release of fuel/oils or bentonite into Cabbage Tree Bay resulting in impact on aquatic species;
- erosion or runoff of soil from construction activities.

The REF indicates that no impact on aquatic flora and fauna is expected during construction due to the distance between the construction site and Cabbage Tree Bay. Although a threatened population of Little Penguins is known to swim and feed near the development site, the land based construction activities should not result in any reduction in foraging area nor interfere directly with other aspects of the life cycle of these birds.

An eight-part test was applied to the Little Penguins which concluded that there will not be any adverse impact on this population and therefore a species impact statement is not required to be prepared.

Proposed mitigative measures

Proposed mitigative measures to minimise the potential impacts on terrestrial and aquatic flora and fauna, as outlined in the REF, include:

- fencing around the construction works preventing bandicoot encroachment;
- speed restrictions along the roadway from the car park to the bottom of the site, to a maximum speed of 20 km/hour;
- minimising the size of the site compound to reduce the impact on foraging areas;
- construction of sediment basins to ensure no spillage of fuels/oils or bentonite into Cabbage Tree Bay;
- provision of spill kits to ensure immediate clean up if a spill occurs.

The National Parks and Wildlife Service concurred with the REF that there will not be a significant impact on the threatened populations of Long-nosed Bandicoots and Little Penguins provided that the identified mitigative measures for flora and fauna and for soil erosion and sedimentation are implemented. Notwithstanding, it is proposed that a condition be imposed specifying that the CEMP referred to in condition 10 must include management measures to ensure protection of

Long-nose Bandicoots and Little Penguins in the Shelly Beach area. Note that there are already provisions in condition 10 that require training of personnel involved in construction activities.

The Department considers that the proposed construction activities and operation of the Shelly Beach connection are not likely to have any significant impact on the two identified threatened fauna nor on their habitat.

4.9 Traffic

The restricted access for delivery trucks to Le Kiosk restaurant and reduction in parking spaces at the Shelly Beach carpark are the major concerns raised in the representations.

Reconstruction of the sewage pumping station would take place over eleven weeks. During this period, use of the bitumen access road for delivery trucks would be restricted. The works would also necessitate a diversion of the road on to the grassed area and removal of the existing 3 Cabbage Tree Palms. The limited access, including problems of noise and disruption to diners and special functions, are of great concern to the Le Kiosk restaurant operators. Difficulties with vehicular access would also affect other users of Shelly Beach, in particular, the diving schools which drop off divers in this location.

Sydney Water has advised that cars used by construction staff will park in the upper carpark or along Bower Street. Car pooling may be employed. It is anticipated that about 5-8 vehicles will be required for both the drilling and pump station work. As the construction is proposed to be undertaken in the cooler months, the use of the carpark would be at its lowest.

Sydney Water conducted traffic monitoring in Bower Street in February 2000. The monitoring recorded traffic movements of 15-22 cars and 1-5 heavy vehicles, on average per hour, over the three peak hours of the day.

Figure 5 illustrates the predicted heavy vehicle movements during construction. Figure 6 indicates the proposed construction traffic route.

During the proposed six month construction period, heavy vehicle movements will fluctuate according to the activity being undertaken. The highest number of heavy vehicle movements is predicted to occur over a period of 10 weeks coinciding with the pumping station works (see Figure 5). The expected number of vehicle movements during this period will range from 27 - 33 a week. At other stages of construction, this will reduce to 4 - 10 movements a week.

Parking for construction trucks is not considered to be a problem. Sydney Water advised that only one truck at a time is expected to arrive at the directional drilling site at the upper carpark. Any trucks waiting in line may have to park beyond Bower Street .

The Department considers that the increased traffic anticipated during construction will not cause any excessive problems. It is satisfied that the existing conditions of approval (COA 10, 56, 57, 58, 59, 64 and 65) would be adequate to control potential traffic safety and congestion problems. Condition 56, in particular, requires the proponent to prepare a specific Traffic Management Plan for approval of the Director-General prior to the commencement of construction work on the site. This Plan will describe the designated traffic routes, movement hours, truck numbers, responsibilities, etc.

To ensure that delivery access to the restaurant is not adversely impeded by construction activities, a condition is proposed requiring that the Traffic Management Plan referred to in Condition 56 identify how adequate delivery vehicle access (and other authorised access) to the Shelly Beach Reserve will be maintained.

4.10 Visual amenity

The proposed construction facilities at the Shelly Beach site will be located in two areas. The directional drilling work will be contained in the upper level of the Shelly Beach headland car park and the pumping station works will be in the recreation reserve in Cabbage Tree Bay.

During the construction period, there will be visual intrusion to the landscape and amenity of the area. Inconvenience will be also be caused to the immediate residents and visitors of the beach

and surrounding headland area. However, when construction activities are completed, the REF states that the area will be reinstated to at least the condition prior to the commencement of the work. The rehabilitation work will be undertaken in consultation with Manly Council and the local community.

In its Representations Report, Sydney Water commits to undertake measures that will reduce the visibility of construction activities. Specifically, a green mesh is proposed to be placed around a fenced construction compound to minimise the visual impact on the restaurant and on Shelly Beach.

The Department considers that the improvement of the visual amenity of the area in the long term outweighs the short term inconvenience and visual intrusion due to:

- the reduction in the frequency of overflows into the bay;
- removal of the existing pumping station brick structure and its replacement with an underground station with a small aboveground projection.

There is no adverse impact expected on the visual amenity during operation of the Shelly Beach connection.

4.11 Recreational and commercial use

Shelly Beach is a popular recreation area, particularly on weekends, with both local residents and tourists. Common activities in the area are swimming, picnicking, recreational diving, and walking along the scenic walkway provided. Local and nearby SCUBA Dive Centres use Cabbage Tree Bay frequently for diving classes.

A restaurant 'Le Kiosk' is located along the walking path on the foreshore. It is open for lunch and dinner everyday. It is busiest for dinner during weekdays and both lunch and dinner on weekends.

During the pumping station works, there will be inconvenience caused to the nearby residents, restaurant and beach users caused by noise and access disruption and possibly airborne emissions. The bitumen access road is not a public access road, however, it is used for delivery vehicles, Council vehicles, disabled access, and drop off and pick up of divers.

The directional drilling works in the upper car park will cause short term impacts as parking will be limited. However, a turning circle will be maintained.

The REF indicates that the movement of vehicles on the pumping station area will be coordinated as much as possible with the restaurant to minimise any disturbance. A small area of the beach side reserve will be fenced off and restricted from access, leaving use of the remaining reserve area.

The Department considers that existing conditions of approval concerning traffic, noise and vibration, and dust as outlined in sections 4.4, 4.5 and 4.9 of this report would manage the impacts on recreational and commercial use of the Shelly Beach area.

4.12 Heritage

The REF indicates that the Shelly Beach proposal will have no direct impact during construction or operation on the two heritage items that have been identified in this area. These items are: the overflow structure along Marine Parade which is a heritage relic listed on Sydney Water's heritage register; and an Aboriginal carving at Cabbage Tree Bay. In addition, any items that are found during construction which may have heritage significance will be assessed by a qualified heritage specialist. Works will cease until the item is managed according to recommendations by a heritage expert.

When the Shelly Beach connection to the tunnel is completed, the overflow structure will cease to be an overflow point but the infrastructure will remain intact. The Aboriginal carving is not within the proposed works area and will not be impacted on by construction activities.

The Heritage Office's representation raised a number of issues:

- the REF does not adequately deal with the potential impacts of the proposed works upon non-indigenous heritage site;
- need to expand assessment of the heritage significance of the site to include natural areas and places of Aboriginal, historic or archaeological significance;
- identification by field survey of non-Aboriginal heritage items within the area which are to be affected by the proposal;
- the relics provision in the Heritage Act requires an excavation permit to be obtained from the Heritage Council prior to commencement of works if disturbance to a site with known or potential archaeological relics is proposed.

The Department and Sydney Water have discussed these issues with the Heritage Office. The Office was advised that heritage studies were conducted for the NST project and that there are existing conditions of approval relating to heritage (Conditions 117, 120 -123) including the development of a Conservation Management Strategy that will apply to the Shelly Beach project. The Strategy is developed to identify and manage heritage items and archaeological resources located within the impact zone of the proposal. It is to include Conservation Management Plans for any item to be relocated, assessment and archival recording of items to be demolished, and procedures for carrying out detailed assessment.

The Heritage Office was unable to identify any specific heritage items which may be impacted during construction and has raised no further issues after the above consultation.

A private representation has suggested that the Marine Parade overflow pipe should be removed. The pipe is a heritage item and it is not within the scope of the project to remove the structure.

The Department considers that the REF has sufficiently addressed the heritage aspects of the proposal and that existing controls and procedures are adequate to protect any heritage items (eg archaeological relics) that may be encountered during construction.

4.13 Geology and Soils

The proposed tunnel connection at Shelly Beach will be constructed by using directional drilling techniques. The proposed starting point of the directional borehole in the upper car park will miss the dyke which traverses the car park, the beach side reserve, and the beach. Sydney Water has advised that one of the advantages of the upper carpark location, relative to the other options (reserve, and lower carpark), is that it misses the dyke because this runs parallel with that location. It undertakes to carry further investigations as part of detailed design. If the final route between the upper carpark and the pump station (about 100 meters) has some contact with the dyke, thus presenting problems with drilling, there are other methods that can be used to overcome the issue.

Sydney Water has indicated that significant geotechnical investigations have been carried out on the North Head area as part of the NST and that it is not necessary that further investigations be undertaken on the nature of geology of the Shelly Beach area. It expects good drilling conditions between the pump station and the NST.

The REF indicates that given the depth of the tunnel (95 m underground from the pump station site) and the geological nature of Shelly Beach, no significant impacts on groundwater are expected. The directional drilling site is located in the upper car park on an existing hard stand area. Controls will be implemented including installation of sediment basins to ensure any runoff is captured before entering any stormwater drains or water course.

The NSW Fisheries in its representation recommends, among other things, testing for potentialy acid sulfate soils or contaminated soils, where appropriate. To address the possibility of encountering acid sulfate soils, a condition is proposed requiring the proponent to undertake a site assessment in accordance with the Acid Sulfate Soil Manual 1998 (ASSMAC). If required, an ASS Management Plan shall be developed in accordance with the Guideline.

Contaminated soils are dealt with by existing conditions 10 and 128.

4.14 Spoil and waste management

An estimated 900 tonnes of spoil will be produced during excavation of the Shelly Beach connection and associated pumping station works. The spoil will consist of crushed rock and some bentonite. The REF indicates that although most of the bentonite used during the drilling works will be recycled and separated, some of the drilling fluid may be retained within the excavated sediment. This would require the material to be classified according to EPA Guidelines for Liquid and Non-liquid Wastes for subsequent disposal to an appropriate facility.

General construction waste may include concrete, oil, metal, timber, paper and general waste.

Mitigative measures proposed to minimise the amount of waste disposed to landfill and the risk of contamination include:

- ensuring spoil is beneficially reused where possible;
- checking that waste is segregated in appropriately labelled bins, ie paper, aluminium, glass and plastics;
- arranging for spent oil to be collected in a bunded area for recycling;
- ensuring that concrete waste is recovered and wherever possible, sent to a recycling centre.

The Department considers that these measures and existing conditions of approval are adequate to mitigate the predicted impacts of waste generation and spoil at the site. Conditions 10 and 13 require the preparation of project specific construction and operational EMPs and Condition 128 require these EMPs to identify requirements for handling and disposal of all wastes, including disposal site and any remedial works required at the disposal site. Conditions 21-23 contain requirements on the preparation of a Spoil Management Plan for reuse and disposal of spoil.

5 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The proposed connection from Shelly Beach to the Northside Storage Tunnel was included as an option for further investigation in the NST EIS . The overall objective of the proposed modification, as stated in the REF, is to reduce the frequency of wet weather overflows into Cabbage Tree Bay from the two overflow points and reduce odours generated at Marine Parade and the Shelly Beach Pumping Station by redeveloping the existing pumping station.

Only a small number of representations were received from the public exhibition of the REF. The predominant concern in the submissions is the need for appropriate management and mitigation measures to minimise the environmental impacts of the proposed construction works.

The Department considers that the REF prepared by Sydney Water adequately evaluates the environmental issues relating to the proposed modification. However, there are aspects of the proposal and certain issues raised in the representations which required additional information or clarification to be obtained from Sydney Water. These matters include the estimated costs of the alternative options, containment standards, quantification of the increased overflow at Scotts Creek and Lane Cove River West as a result of the Shelly Beach proposal, noise mitigation, construction days/timing, and consultation arrangements with Le Kiosk restaurant operator.

The proposal is justified in terms of its social, biophysical and economic benefits and the principles of ecologically sustainable development as outlined in section 2.2. However, the Department recognises that the project would create some localised environmental impacts during the construction period.

The impact on the community will be in terms of noise, traffic generation and disruption of the recreational and visual amenity of the area. However, the inconvenience and reduction in amenity would be temporary over a relatively short construction period (6 months estimate) and would be clearly compensated by a long term improvement in the water quality of Cabbage Tree Bay.

During the site establishment, directional drilling, demobilisation and pumping station works, there would be some exceedances of the relevant EPA noise levels. Sydney Water acknowledges that

there would be exceedances, even with noise attenuation measures, and will be requesting the EPA to consider allowing higher noise levels for the construction works at Shelly Beach.

The beach side Le Kiosk restaurant would potentially be one of the most affected from the proposed works due to its proximity to the construction sites. Sydney Water has advised that it will continue to consult with the restaurant operator throughout the construction period to ensure that the impacts are minimised.

The Department considers that with implementation of the proposed mitigation measures outlined in the REF, and compliance with the (relevant) existing and recommended conditions of approval, identified impacts from the proposed works can be managed to acceptable levels.

Few, if any, adverse impacts can be expected when the project is operational. At Scotts Creek and Lane Cove River West, the expected changes are only marginal and would be subject to existing controls for the operation of the NST. The OEMP for the NST (which requires approval from the Director-General before the Tunnel can commence operation) is the means to manage impacts at these sites, including any marginal increase in overflows that would result because of the Shelly Beach connection.

It is therefore concluded that the proposed works at Shelly Beach would not be likely to have a significant adverse impact on the environment and the community. Any impacts could be adequately managed through the existing conditions of approval and the additional conditions recommended in this report.

Recommendations

It is recommended that the proposal, as described in the REF, proceed subject to the additional conditions recommended in this report. These are specified in the following section and are based on the issues raised in representations and on the Department's independent assessment of the proposed works. These conditions supplement the existing conditions of approval and are aimed at ensuring that environmental impacts associated with the proposed works would be managed and mitigated to an acceptable level.

6 RECOMMENDED CONDITIONS OF APPROVAL

This section provides the Department's recommended conditions of approval for the project under Section 115BA(6) of the EP&A Act. These recommended conditions are based on the Department's assessment of the REF, the representations made to Sydney Water and supplementary advice provided. These conditions would either be incorporated into the existing conditions of approval as new conditions or by modifying the existing conditions.

The REF contains procedures and mitigation strategies to be implemented to ameliorate impacts of the proposal. The recommended conditions should therefore be implemented in conjunction with those procedures and mitigation strategies specified in the REF. Where there is an inconsistency with the recommendations in the REF, the recommendations in this report would prevail.

NEW CONDITIONS

Traffic and Access

1. The Traffic Management Plan referred to in condition 56 must identify how adequate delivery vehicle access (and other authorised access) to the Shelly Beach Reserve will be maintained.

Noise and Vibration Management

2. In the preparation of the Noise and Vibration Management Procedure referred to in Condition 26 and the Dust Management Plan referred to in Condition 43, the proponent must consult with the operator of 'Le Kiosk' and ensure that adequate measures are in place to minimise impacts on special functions and restaurant activities at the premises.

3. The Proponent shall monitor noise and vibration resulting from the use of the directional drill during the excavation of the tunnel at the Shelly Beach headland carpark. Should it become evident that EPA noise and vibration standards are exceeded, the Proponent shall undertake appropriate measures agreed to by the EPA. The monitoring procedures and mitigation measures shall be detailed in the Noise and Vibration Management Procedure, as required under Condition 26.

Acid Sulfate Soil

4. Should potential acid sulfate soils be encountered in the Shelly Beach area, the Proponent shall undertake a site assessment in accordance with the Acid Sulfate Soil Manual 1998 (ASSMAC). If required, an ASS Management Plan shall be developed in accordance with the Guideline and submitted to the Director-General.

Water Quality

5. The Construction Environmental Management Plan referred to in Condition10 must incorporate a drilling slurry management plan for Shelly Beach.

Flora and Fauna

6. The Construction Environmental Management Plan referred to in Condition10 must include management measures to ensure protection of Long-nosed Bandicoots and Little Penguins in the Shelly Beach area.