PENRITH STP AMPLIFICATION & GLENBROOK WASTE WATER TRANSFER

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

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DISCLAIMER

FOREWORD

The Sydney Water Corporation has sought the approval of the Minister for Urban Affairs and Planning under Section 115B of the Environmental Planning and Assessment Act 1979 (EP&A Act) for the Penrith Sewage Treatment Plant Amplification & Glenbrook Waste Water Transfer.

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.

The purpose of this report is to review the environmental impact statement, the issues raised in representations made in response to its exhibition, the representation from Sydney Water Corporation, and other relevant matters pertaining to the potential environmental impacts of the proposal.

The report concludes that the scheme would provide a range of benefits to the local community and the environment and the potential adverse environmental impacts associated with the project can be mitigated by adopting the recommended conditions of approval and accordingly should be approved.

Sue Holliday
Director-General
Department of Urban Affairs and Planning

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Please note: the appendices mentioned above do not appear in this electronic version of the report. To view in hard copy format contact David Gainsford of the Department of Urban Affairs and Planning on (02) 9391 2095.

Glossary

AADT	Average Annual Daily Traffic
ADWF	Average dry weather flow
ANZECC	Australian and New Zealand Environment and Conservation Council
AWT	Australian Water Technologies
BMCC	Blue Mountains City Council
BMCS	Blue Mountains Conservation Society
dB(A)	Decibel (A-weighted scale)
DLWC	Department of Land and Water Conservation
DUAP	Department of Urban Affairs and Planning ('the Department')
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
ENCM	Environmental Noise Control Manual
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* ('the Act')
HIPAP	Hazardous Industry Planning Advisory Paper
HNCMT	Hawkesbury Nepean Catchment Management Trust
HRC	Healthy Rivers Commission
INP	Industrial Noise Policy
LALC	Local Aboriginal Land Council
Minister, The	Minister for Urban Affairs and Planning
mg/L	Milligram per litre
ML/d	Megalitres per day
NPWS	National Parks and Wildlife Service
OU	Odour Units
Proponent, The	Sydney Water Corporation
PRP	Pollution Reduction Program
RTA	NSW Roads and Traffic Authority
SOC Act	*State Owned Corporations Act 1989*
SPS	Sewage Pumping Station
STP	Sewage Treatment Plant
SWC	Sydney Water Corporation
TSC Act	*Threatened Species Conservation Act 1995*
UV	Ultra-violet

EXECUTIVE SUMMARY

The Proposal

Sydney Water Corporation (SWC) is seeking the approval of the Minister for Urban Affairs and Planning for the proposed amplification of Penrith Sewage Treatment Plant (STP) to cater for growth in the Penrith sewage catchment and to decommission Glenbrook STP. Sewage from Glenbrook would be transferred to Penrith STP via a new pipeline.

Amplification of Penrith STP

The Penrith STP would be amplified to cater for a growth in flows from the current capacity of 24 megalitres per day (ML/d) to a capacity of 31 ML/d. The proposed capacity would be sufficient to cater for the increased flows as a result of the transfer from the Glenbrook sewage catchment area and to cater for predicted population growth to the year 2021. The amplification works would include the construction of:

- A new fermenter with odour scrubbing;
- A new bioreactor and modifications to the existing process train;
- Fit out of an existing tertiary filter cell;
- Conversion of gas chlorination disinfection facility to a sodium hypochlorite dosing system; and
- Construction of advanced biosolids dewatering and outloading facilities.

Existing treatment levels at the plant including the biological reduction of nitrogen and phosphorus, and tertiary chemical removal of phosphorus would be retained. The STP would continue to discharge treated effluent to the Hawkesbury-Nepean River via Boundary Creek.

The Representations Report proposed to modify the amplification of the Penrith STP such that the primary treatment process facilities could accommodate flows up to 38ML/d. By constructing these facilities to accept a higher flow level, the remainder of the plant could be amplified quickly in the future to accommodate higher flows particularly if population growth exceeds current expectations.

Sewage Transfer Pipeline Construction

A sewage pipeline would be constructed from Glenbrook STP to the disused Lapstone Hill railway reserve and then to Emu Plains via Leonay. From Leonay the pipeline would cross the Nepean River at the Victoria Bridge and proceed to Penrith STP.

A 920m long directional bore would be constructed to connect the Glenbrook STP with a point within the railway cutting. From this point a new gravity sewer would be laid along the railway cutting running along an access road in Skarratt Park. From Skarratt Park the new pipeline would run parallel to the existing Emu Plains Carrier along roadways connecting to SPS 894.

A new rising main would be constructed from SPS 894 across Victoria Bridge within an

existing service aqueduct. The pipeline would then proceed in road reserves and through easements on private property to Penrith STP. Key features of the proposed pipeline route are shown in Figure 2.4 from the Representations Report reproduced in Appendix A.

As part of the pipeline construction three existing SPSs in the Glenbrook and Lapstone area would be decommissioned. The proposed transfer would also necessitate an extensive upgrading of SPS 894 to accommodate the increased loads.

Decommissioning Glenbrook STP

The proposal includes the decommissioning and closure of the Glenbrook STP. The decommissioning would involve cleaning and removing sludge from digestors, cleaning of tanks and removal of chemicals. The demolition, rehabilitation and potential reuse of the site is not part of this proposal. The final use of the site has yet to be determined.

The estimated capital cost of the proposal is approximately $32.4 million with annual recurrent costs of approximately $3.5 million. Construction is expected to begin in 2001 and be completed in 2003.

EIS Exhibition

The EIS was exhibited from 23 June 2000 to 25 July 2000. A total of 21 representations were received as a result of this exhibition.

The key issues raised in representations relate to:

- The impacts on the heritage values and potential uses of Lapstone Hill railway tunnel;
- Rehabilitation of vegetation around Lapstone, Knapsack Creeks and Lapstone Hill railway reserve;
- Issues of water quality impacts from construction and operation including upgrading of Penrith STP;
- Impacts on flora and fauna communities; and
- Potential for reuse of treated waste water.

Summary of Key Findings

Lapstone Hill Railway Tunnel

The EIS proposed to utilise the heritage listed Lapstone Hill Railway Tunnel for a section of the main transfer sewage pipeline between Glenbrook STP and Penrith STP. It was proposed in the EIS that the pipeline be horizontally bored through the northern wall of the tunnel and then proceed on a concrete cradle along the tunnel floor to the eastern portal where it would dive into a trench and proceed underground through the tunnel gully.

Several representations raised strong concerns with regard to the potential impacts upon the heritage values of the tunnel from the proposed pipeline construction. Other representations suggested that boring into the northern wall of the tunnel may damage

its structural integrity.

In response SWC commissioned investigations into the structural integrity of the tunnel and various construction techniques. As a result of these investigations and the heritage concerns raised in the representations, SWC have modified the proposal to include a directional drill bore that avoids the need to use the tunnel.

Rehabilitation Works

The Glenbrook STP is situated in a gully adjacent to Knapsack Creek and discharges treated effluent via a pipeline to Lapstone Creek. Both Creeks are tributaries of the Nepean River. The proposed transfer pipeline traverses a section of the Lapstone Hill railway cutting that is vegetated but in a degraded condition, infested with weeds.

Several representations including the Blue Mountains City Council (BMCC) suggested that the proposal presented an opportunity to provide a comprehensive weed eradication/bush regeneration program for these areas. The Department is aware that the Lapstone Hill railway reserve area has been proposed to be rehabilitated and utilised for recreation such as walking and bike trails.

In response, SWC committed to rehabilitation of areas disturbed by construction works, contributing to a weed management program in a section of Lapstone Creek downstream of the discharge point and coordinating relevant stakeholders in developing a rehabilitation plan for the Lapstone Hill railway reserve. SWC stated that the proposed modification to directional drill bore a section of the pipeline would reduce disturbance within the railway reserve.

The Department recognises that the proposal presents an opportunity to rehabilitate these degraded areas and generally endorses the commitments made by SWC. The Department recommends that SWC consult with BMCC and other stakeholders with regard to their current weed management and rehabilitation programs in the area and then identify targeted works that SWC can contribute towards. The Department has also recommended conditions that require SWC to monitor and maintain rehabilitation works.

Water Quality

The EIS identified that the proposal would result in reduced flows and nutrient levels within Lapstone Creek as a result of decommissioning Glenbrook STP. The transfer of effluent from the Glenbrook STP catchment and the predicted growth in flows in the Penrith STP catchment would lead to increased treated effluent discharges into Boundary Creek which flows into the Nepean River.

Several representations raised concerns primarily related to the impacts on water quality from the increased discharges into Boundary Creek. It was suggested that higher targets should be set for the removal of phosphorus and nitrogen in the treated effluent discharges and that the option of UV disinfection rather than chlorination/dechlorination disinfection should be further investigated.

SWC stated that the phosphorus and nitrogen concentration targets had been set for treated effluent based on ten years of site specific water quality and flow monitoring and based on EPA licence requirements. SWC also stated that UV disinfection had been considered as an alternative treatment process but that chlorination/dechlorination processes were chosen due to their more consistent disinfection performance during storm flow events.

SWC committed to continued water quality monitoring around the Penrith STP and to the retrofitting of the STP with additional phosphorus and nitrogen removal facilities and/or UV disinfection should the monitoring indicate a need. The Department endorses the SWC commitments and has recommended a condition requiring the SWC also monitors the water quality within Lapstone Creek during and after construction.

Flora and Fauna

The main areas of potential flora and fauna impacts are the vegetated areas within the Lapstone Hill railway reserve and Skarratt Park where the proposed transfer pipeline would traverse. The EIS flora and fauna assessment targeted surveys for potential threatened flora and fauna species or ecological communities on these area. Section 5A assessments (eight part tests) under the EP&A Act concluded that there would not be a significant impact on threatened or endangered species and therefore no Species Impact Statement was required.

The Department requested further clarification with regard to a number of issues within the flora and fauna assessment and required eight part tests be conducted for several additional threatened fauna known to occur in the area. In response SWC completed an additional assessment including further survey work. They clarified that the total vegetation to be removed as part of the construction of the project would be approximately 0.5 hectares. The additional surveys also identified a community of the regionally significant flora species *Lissanthe sapida* in close proximity to the proposed works within Lapstone Hill railway reserve.

The Department is satisfied that the modified proposal would be unlikely to have a significant impact on threatened flora and fauna species or ecological communities. The Department recommends the inclusion of conditions requiring the preparation of a Flora and Fauna Management Sub-Plan, a Weed Control Plan and protecting and fencing the *Lissanthe sapida* community prior to construction to prevent disturbance.

Potential Reuse of Waste water

A number of representations suggested that the proposed amplification of the Penrith STP should present SWC with an opportunity to investigate and provide viable options for the reuse of treated effluent.

SWC responded in the Representations Report stating that a feasibility report was currently being prepared to assess the viability of various reuse schemes. Preliminary findings from this study indicated that a scheme servicing customers such as Penrith Panthers and Penrith City Council with treated effluent for use in toilets etc could be financially viable. Total reuse from such a scheme would be about 1ML per day.

Additional progress of the potential scheme would be subject to separate assessment processes.

The Department endorses SWCs investigations into developing potential reuse schemes from Penrith STP.

Need, Justification and Benefits

The project is part of SWC's *Water Plan 21* and is designed to meet the Environment Protection Authority's Pollution Reduction Program. *Water Plan 21* has been developed by SWC for sustainable waste water management across the entire Sydney region over the next 20 years. It aims at achieving sound environmental goals whilst meeting the needs of predicted urban growth.

The major benefits of the proposal have been identified in the EIS as:

- The removal of existing sewage management practices at Glenbrook which have resulted in the discharge of high nutrient flows into Lapstone Creek and eventually the Nepean River;
- To meet the EPA's Pollution Reduction Program for the Glenbrook STP and Penrith STP catchments; and
- Providing a system that caters for a predicted population growth in the Penrith STP catchment to the year 2021.

In balancing the key environmental impacts of the proposal with the identified benefits, the Department considers that both the need and justification for the project have been adequately substantiated.

Conclusions and Recommendations

On the basis of the assessment conducted for the EIS, representations received, supplementary information obtained from the proponent, and the findings of this assessment report, it is concluded that the environmental impacts associated with the proposal could be managed to an acceptable level.

It is recommended that the proposal as described in the EIS and Representations Report be approved by the Minister for Urban Affairs and Planning subject to the recommended conditions of approval specified in Chapter 8 of the Director-General's assessment report. These conditions relate to:

- construction and operational procedures to manage and resolve complaints;
- requirements for the preparation of detailed management plans to cover:
  - water quality;
  - noise and vibration;
  - air quality and odours;
  - erosion and sedimentation;

  - flora and fauna;
  - landscaping and rehabilitation;
- environmental monitoring requirements; and
- environmental reporting requirements.

These conditions would ensure that unavoidable adverse environmental impacts of the proposal would be adequately mitigated within an appropriate environmental management framework.

1. INTRODUCTION

1.1 PURPOSE OF THE REPORT

The purpose of this report is to review the Environmental Impact Statement (EIS) for the proposed Penrith Sewage Treatment Plant (STP) Amplification & Glenbrook Waste Water Transfer, the issues raised in representations made in response to the exhibition of the EIS, and Sydney Water Corporation's (SWC) consideration of these representations.

This report is prepared in accordance with Section 115C of the *Environmental Planning and Assessment Act 1979* (EP&A Act) which requires the Director-General to assess and report to the Minister for Urban Affairs and Planning on the proposal.

1.2 STATUTORY PROVISIONS

Sydney Water Corporation Limited is a statutory State owned corporation under the *State Owned Corporations Act 1989* (SOC Act).

Under the SOC Act, the Minister is able to certify certain proposals as being of state or regional significance. Certification provisions of the SOC Act apply to Company State Owned Corporations, which SWC was until 1st January 1999. However, the *Sydney Water (Transitional) Regulation 1999* allows SWC to seek certification under Section 37A of the SOC Act for a number of specified projects including the Penrith STP Amplification & Glenbrook Waste Water Transfer, despite SWC's change of status to a Statutory State Owned Corporation. These are projects that commenced when Sydney Water was still a Company State Owned Corporation.

On 2 February 2000, under the provisions of the SOC Act, the Minister for Urban Affairs and Planning certified the proposed Penrith STP Amplification & Glenbrook Waste Water Transfer as being of Regional significance. The Minister also endorsed SWC's intention to prepare an EIS under the provisions of Part 5 of the EP&A Act.

Under Division 4 of Part 5 of the EP&A Act, the approval of the Minister for Urban Affairs and Planning is required for projects certified as being of State or regional significance and where an EIS has been prepared. The proposed Penrith STP Amplification & Glenbrook Waste Water Transfer meets these criteria.

An assessment report for the proposal must be prepared by the Director-General of the Department of Urban Affairs and Planning before the Minister may make a decision. This report and the Minister's decision are to be made public.

The proposal would also require several licences and approvals from various agencies including the:

- EPA for the issuing of a variation to the Environment Protection Licence for the Glenbrook and Penrith sewage treatment systems under the *Protection of the*

Environment Operations Act 1997; and

- Roads and Traffic Authority, Penrith City Council and Blue Mountains City Council for works within road reserves under the *Roads Act, 1993*.

1.3 PREPARATION AND EXHIBITION OF THE ENVIRONMENTAL IMPACT STATEMENT

SWC wrote to the Director-General of Urban Affairs and Planning on 16 December 1998 seeking advice on requirements as to the form and content for an EIS for the proposal. The Director-General's Requirements were issued to the SWC in a letter dated 8 February 1999.

The EIS was exhibited from 23 June 2000 to 25 July 2000. The EIS included a certificate signed by Robert McCotter from Environmental Resources Management Australia Pty Ltd (ERM), the consultant firm who prepared the EIS, stating that it had been prepared in accordance with the *Environmental Planning and Assessment Regulation 1994*.

Public display locations and times were advertised in the local and state papers.

Copies of representations made to the SWC were received by the Department on 11 September & 3 November 2000.

1.4 REQUEST FOR THE APPROVAL OF THE MINISTER FOR URBAN AFFAIRS AND PLANNING

SWC sought the approval of the Minister for the project in a letter received by the Department on 11 May 2001. This was accompanied by a report (hereafter referred to as the 'Representations Report') addressing issues raised in representations from the public exhibition of the EIS.

2 DISCUSSION OF PROPOSED WORKS AS DESCRIBED IN THE EIS

This section provides a description of the project as described in the EIS. The section also discusses the project need and justification, outlines the alternatives considered and the potential adverse and beneficial impacts of the proposal as identified in the EIS. The purpose is to provide an overview of the information presented and does not necessarily represent the views of the Department. The Department's assessment of the issues associated with the proposal is provided in Chapters 5 and 6 of this report.

2.1 INTRODUCTION

Sydney Water Corporation is proposing to amplify the Penrith STP to cater for growth in the Penrith sewage catchment and to decommission Glenbrook STP. Sewage from Glenbrook would be transferred to Penrith STP via a new pipeline. The two main justifications for the proposal were described in the EIS as predicted population growth within the Penrith STP catchment and the failure of the existing Glenbrook STP to meet the requirements of the EPA's Pollution Reduction Program (PRP).

2.1.1 Amplification of Penrith STP

The Penrith STP would be amplified to cater for a growth in flows from the current capacity of 24 megalitres per day (ML/d) to a capacity of 31 ML/d. The proposed capacity would be sufficient to cater for the increased flows as a result of the transfer from the Glenbrook sewage catchment area (currently 3 ML/d average dry weather flow (ADWF)) and to cater for predicted population growth to the year 2021. The amplification works would include the construction of:

- A new fermenter with odour scrubbing, associated pumping stations and rotary drum thickeners;
- A new continuous flow bioreactor (approx. 9,000m^3) and modifications to the existing process train;
- Complete construction of a tertiary filter cell to approximately 31ML/d;
- Conversion of gas chlorination disinfection facility to a sodium hypochlorite dosing system; and
- Advanced biosolids dewatering and outloading facilities including new dewatering units, extension of dewatering building and new automated sludge cake outloading system in a new building. Biosolids would be treated at the Penrith STP to Grade B standard and then transferred to St Marys STP for further treatment.

Existing treatment levels at the plant including the biological reduction of nitrogen and phosphorus, and tertiary chemical removal of phosphorus would be retained. The STP would continue to discharge treated effluent to the Hawkesbury-Nepean River via Boundary Creek.

2.1.2 Sewage Transfer Pipeline Construction

A 375mm sewage pipeline would be constructed from Glenbrook STP to the north-western end of the Lapstone Hill Tunnel. The pipeline would enter the tunnel via a short horizontal bore through the tunnel wall. The pipeline would site on concrete pads situated below the existing mushroom farm shelves and exit the tunnel at the south-eastern portal a distance of 660m from the northern entrance.

From the south-eastern portal the pipeline would drop through the tunnel floor via a horizontal bore and continue along the Lapstone Hill railway reserve via a short trench a distance of 700m to Skarratt Park. The pipeline would traverse Skarratt Park along the alignment of an existing service road and would pass under the Main Western Railway line via a horizontal bore into Dryad Place. The pipeline would then largely run parallel to the existing Emu Plains Carrier through Leonay and Emu Plains along roadways connecting to SPS 894.

A new rising main approximately 2,800m long would be constructed from SPS 894 across Victoria Bridge within an existing service aqueduct. The pipeline would then proceed in road reserves and through easements on private property to connect to a previous main laid underneath Castlereagh Road and then proceed to the inlet works at Penrith STP. Castlereagh Road would not be disturbed by the construction works.

As part of the pipeline construction three existing SPSs in the Glenbrook and Lapstone area would be decommissioned (SPSs 801, 805 and 806). Decommissioning works would include construction of new pipework to intercept the incoming sewer, pumping out and demolition of wet wells, removal of above ground structures and rehabilitation of the site.

The proposed transfer would also necessitate an extensive upgrading of SPS 894 to accommodate the increased loads. The upgrading would include the construction of a new wet well and new SPS control facility. The duration of the upgrade works would be approximately 6-8 months.

The pipeline included a directional drill borehole approximately 135m long to connect SPS 805 with the main transfer pipeline within the Lapstone Hill railway reserve.

Five new vents were proposed in the EIS along the transfer route at Lapstone, Leonay and Emu Plains.

2.1.3 Decommissioning Glenbrook STP

The proposal includes the decommissioning and closure of the Glenbrook STP. The decommissioning would involve cleaning and removing sludge from digestors, cleaning of tanks and removal of chemicals. The demolition, rehabilitation and potential reuse of the site is not part of this proposal. The final use of the site has yet to be determined and would be subject to separate environmental investigations and stakeholder consultation.

2.1.4 Capital Cost

The estimated capital cost of the proposal as described in the EIS was approximately $30 million with annual recurrent costs of approximately $3.5 million. Construction is expected to begin in 2001 and be completed in 2003.

2.2 OBJECTIVES

The EIS identifies several Sydney Water goals applicable to the project, which include:

- To meet future licence conditions and water quality objectives;
- To meet predicted future sewage loads from both the Glenbrook and Penrith STP catchments;
- Offer environmental and economic benefits for the future management of waste water in the lower Blue Mountains; and
- To meet SWC's Ecologically Sustainable Development (ESD) policy by integrating environmental, social and economic considerations in business activities.

2.3 PROJECT ALTERNATIVES

A detailed assessment of alternatives is contained within the EIS and further justified within the Representations Report.

The main scenarios considered were the:

- Do Nothing;
- Upgrade of Penrith and Glenbrook STPs with no transfer; and
- Decommission Glenbrook STP and transfer to Penrith STP.

The 'Do Nothing' scenario was discounted as it would result in the restricted growth in the Penrith and Glenbrook STP sewerage catchment areas, due to limited treatment capacity and the failure of Glenbrook STP to meet the discharge requirements of the EPA's PRP.

The upgrading of Glenbrook STP was compared to the potential transfer to Penrith STP. The analysis indicated that decommissioning Glenbrook STP and transferring to Penrith would be less expensive than upgrading Glenbrook. Additional disadvantages of upgrading Glenbrook were that the area of the STP site and the buffer were constrained, limiting potential growth.

In transferring the effluent from Glenbrook to Penrith STP consideration was given to connecting to the existing Emu Plains carriers that currently transfer to Penrith. It was determined that significant upgrading of the Emu Plains carriers would be required to receive the Glenbrook catchment flows and therefore a new pipeline should be constructed.

A number of transfer routes and collection options were investigated, a few of which involved the directional drilling of a section of the pipeline route from Glenbrook STP. The route finally chosen in the EIS involved the use of the Lapstone Hill tunnel for the transfer pipeline. SWC subsequently modified the proposal in the Representations Report to include a directional drilled section of proposed pipeline between the tunnel

gully and Glenbrook STP negating the need for use of Lapstone Hill tunnel (refer to Section 4.1).

2.4 CONSEQUENCES OF NOT PROCEEDING

The consequences of not proceeding with the proposal are described in the EIS in terms of assessing the 'do nothing' alternative. This alternative was rejected in the assessment process as the poorest performing of the concept alternatives. The EIS states that the 'do nothing' alternative would have the following consequences:

- restricted growth in the Penrith and Glenbrook STP sewerage catchment areas, due to limited sewage treatment capacity;
- potential adverse impact on the quality of local waterways caused by a treatment system that was not designed to achieve high levels of effluent quality discharged to receiving waterways; and
- failure to meet the requirements of the EPA's PRP for Glenbrook STP and community expectations of improving water quality.

2.5 MAJOR BENEFICIAL AND ADVERSE EFFECTS IDENTIFIED IN THE EIS

The EIS identifies the likely major benefits of the proposal to be:

- increased capacity to cope with population increases and wet weather loads;
- restoration of Lapstone Creek to more 'natural flows';
- less reliance on chemicals for phosphorus removal; and
- meeting the EPA's PRP for Glenbrook and Penrith STP including greater ability to reduce nitrogen and phosphorus loadings in discharged treated effluent.

The EIS identifies a number of potentially adverse impacts including clearing of vegetation and potential fauna habitat, potential impacts on the heritage listed Lapstone Hill railway tunnel and a listed indigenous archaeology site, increased odour from Penrith STP, impacts on the flows and nutrient levels within Lapstone Creek including effects on aquatic flora and fauna and short term impacts from construction noise, visual effects, air quality and traffic could occur. However, a range of mitigation measures were proposed in the EIS which would, in large part, negate or minimise these impacts. These include:

- minimising the scale of construction works and therefore disturbance, where possible, to existing vegetation;
- completing restoration of disturbed areas in a timely and effective manner and contributing to rehabilitation works in surrounding areas;
- implementing best practice controls during construction and operation in relation to odour, noise, erosion and sediment control etc; and

- monitoring of water quality and aquatic fauna in Lapstone and Boundary Creek.

It is subsequently concluded that these impacts could be adequately managed and their net effect would therefore be comparatively minor.

3 SUMMARY OF REPRESENTATIONS

A total of 21 representations were received as a result of the exhibition of the EIS. Copies of all representations were forwarded to the Department by SWC.

The category types of the representations are summarised below.

Type	Number
State Government	9
Local Government	2
Private individuals/groups	10
Total:	21

The key issues raised in representations relate to, in general:

- The impacts on the heritage values and potential uses of Lapstone Hill railway tunnel;
- Rehabilitation of vegetation around Lapstone, Knapsack Creeks and Lapstone Hill railway reserve;
- Issues of water quality impacts from construction and operation including upgrading of Penrith STP;
- Impacts on flora and fauna communities; and
- Potential for reuse of treated waste water.

These issues are considered in detail in Chapter 5 of this report. Additional issues are considered in Chapter 6.

Ten representations expressed neither support nor opposition to the proposal. Eight representations expressed support for the construction of the proposal, although in some cases this support was based on the proviso that construction of the pipeline in the Lapstone Hill tunnel not impact upon its heritage values and that a more thorough investigation of potential environmental impacts than that contained within the EIS occur. Three representations expressed objections to the proposal of the grounds of the proposed use of the Lapstone Hill tunnel.

4 MODIFICATIONS TO THE PROPOSAL FOLLOWING THE EIS EXHIBITION

This Section describes the current proposal for which the SWC has sought approval from the Minister for Urban Affairs and Planning as described in its Representations Report. The modifications to the proposal described in this Section have been made by the SWC following exhibition of the Environmental Impact Statement in response to the issues raised in representations.

4.1 TRANSFER OPTION

Following a number of concerns by the community regarding the proposal to lay the proposed pipeline on concrete pads on the Lapstone Hill tunnel floor, investigations were undertaken into the feasibility of burying the pipe below the tunnel floor for the entire length of the tunnel. To assess the feasibility a report was commissioned by SWC to assess the ground conditions below the existing concrete floor. The report found that the brick tunnel lining extends under the floor of the tunnel, forming an inverted arch, which is integral to the structure of the tunnel. As a result of these investigations a number of concerns were raised with the practicalities of burying the pipeline under the tunnel without affecting its structural integrity.

As a result of the report's concerns and the heritage value of the tunnel, SWC has modified the proposal by proposing the construction of a 920m long directional drill between the Glenbrook STP site and a site within the Lapstone Hill railway reserve where the EIS proposed a drill site to connect SPS 805. The proposed directional drill would avoid the Lapstone Hill railway tunnel and the wetland area adjacent to the south-eastern tunnel portal.

Construction of the directional drill would involve the establishment of a drill rig in an existing clearing about 500m into the railway cutting and accessible from Governors Drive. The drill would commence at the toe of the cliff and drill upwards to a point close to the Glenbrook STP.

Once the drill is complete a pipeline, welded at the drill site would be pulled into the borehole and grouted. At the completion of this drill the rig would be reoriented to complete the proposed connection to SPS 805.

Total construction time of both drills is expected to take between 3-6 months. It is estimated that this modification would increase the cost of the project from that envisaged in the EIS by approximately $1.1 million. The capital cost of the project was revised to $32.4 million in the Representations Report.

The key features of the modified transfer pipeline are shown in Figure 2.4 from the Representations Report reproduced in Appendix A.

4.2 PENRITH STP AMPLIFICATION

The proposed amplification of the Penrith STP as described in the EIS was designed to accommodate ADWF of 31ML/d from the existing 24 ML/d. Existing dry weather flows are around 21ML/d. The augmentation was designed to take the transferred flows from the Glenbrook STP as well as predicted population growth to the year 2021.

In response to representations querying the reliability of the population projections and to enable SWC to accommodate a easy and quick augmentation of the plant to an ADWF of 38ML/d in the future, SWC have modified the proposal. The modification increases the size and capacity of the new facilities from that described in the EIS and includes:

- A larger and potentially altered new bioreactor. The EIS proposed a 9,000m^3 new continuous flow bioreactor. The Representations Report proposed that either a new continuous flow or intermittent flow bioreactor could be built. A continuous flow reactor would be sized at approx. 14,000m^3 and an intermittent reactor at approx 18,000m^3. The continuous flow reactor proposed would require a slightly larger fermenter than that envisaged in the EIS whereas an intermittent reactor would not require a new fermenter but would require two new equalisation basins of approx. 3,600m^3 total volume for the clarified effluent; and

- Upgrading of aerobic digesters including increasing the capacity of the surface aerators by installing new blowers in an acoustic enclosure. This would also include modifications to the existing flow splitting facilities.

The Representations Report states that although the combination of the existing and new reactors would be sufficient to handle a total of around 38ML/d, the STP rating would remain constrained to 31ML/d due to capacity limitations of other facilities such as the tertiary filtration.

The proposed works at Penrith STP are shown in Figure 2.3 from the Representations Report reproduced in Appendix B.

5 CONSIDERATION OF KEY ISSUES

This section outlines the Department's consideration of the key issues relating to the current proposal having regard to information presented in the EIS, representations received in response to its exhibition and other additional information obtained by the Department.

Sydney Water Corporation has also provided the Department with its assessment of the issues raised in representations. The assessment has been reviewed by the Department and where required further assessment has been undertaken and discussed. It is therefore important that this section be read in conjunction with SWC's Representations Report to understand how all issues raised in representations were addressed.

Where considered appropriate, recommendations are made with regard to the manner in which a particular issue should be addressed during construction and/or operation. It should be noted that private individuals who made representations to the EIS have not been identified in order to maintain their privacy.

The key issues addressed in Chapter 5 correspond directly to the issues raised in the representations, namely:

- The impacts on the heritage values and potential uses of Lapstone Hill railway tunnel;
- Rehabilitation of vegetation around Lapstone, Knapsack Creeks and Lapstone Hill railway reserve;
- Issues of water quality impacts from construction and operation including upgrading of Penrith STP;
- Impacts on flora and fauna communities; and
- Potential for reuse of treated waste water.

5.1 LAPSTONE HILL RAILWAY TUNNEL

5.1.1 Background

The Lapstone Hill Railway Tunnel was constructed in 1891-92 as part of the route to the Blue Mountains. The tunnel is approximately 660m long and runs from approximately the site of the Glenbrook STP in a south-easterly direction to the railway cutting and reserve. The tunnel was designed to avoid the problems with the original zig-zag rail route traversing the base of the Blue Mountains. The use of the tunnel, however, for rail was short lived due to problems with its steep gradients and seepage of water onto the tracks. Since 1913 the main use of the tunnel has been for mushroom farming.

In recognition of the historic value of the tunnel and surrounding landscape area it has been listed on the Register of the National Estate, National Trust Register, the REP for

the Blue Mountains and Blue Mountains City Council LEP.

The EIS proposed that the main transfer sewage pipeline from Glenbrook STP to Penrith STP would utilise the railway tunnel. It was proposed that the pipeline would be horizontally bored through the north tunnel wall close to the western portal and then proceed on a concrete cradle along the tunnel floor. The pipeline was proposed to be situated underneath the modified mushroom racks to minimise any operational disturbance to this use.

At the south-eastern portal it was proposed that the pipeline would dive into a trench and continue underground through the tunnel gully.

5.1.2 Key Issues

Several representations raised concerns regarding the use of the tunnel as the pipeline route. The concerns generally related to the heritage impacts of the pipeline construction and operation and the impacts on the potential adaptive community use for the tunnel. There were concerns raised that boring into the northern wall may damage the tunnels structural integrity.

As a result of the concerns raised, SWC commissioned investigations into options to laying the pipeline below the tunnel floor. The investigations indicated that laying the pipeline beneath the tunnel floor may have presented concerns for the structural integrity of the tunnel.

As a result of the structural and heritage concerns SWC have modified the proposal to include a directional drill bore that avoids the need to use the tunnel. This modification is described in more detail in Section 4.1.

5.1.3 Consideration of Key Issues and Conclusion

The modifications to the proposal have removed the need to use the tunnel for the pipeline and therefore negated the concerns that the proposal would have a detrimental impact on the heritage values and potential for adaptive reuse of the tunnel.

SWC held a community meeting in Leonay in December 2000 to present the proposed modification. The minutes of the meeting indicate an overall community satisfaction that the modification had been made to the proposal.

5.2 REHABILITATION OF LAPSTONE, KNAPSACK CREEKS AND LAPSTONE HILL RAILWAY CUTTING

5.2.1 Background

The Glenbrook STP is situated in a gully adjacent to Knapsack Creek. Although Knapsack Creek is the closest waterway, treated effluent from the STP is pumped approximately 800m to a discharge point into an unnamed tributary of Lapstone Creek. Both Lapstone and Knapsack Creeks are tributaries of the Nepean River. Lapstone

Creek joins the Nepean downstream of the Penrith Weir.

The EIS found that the south eastern portal of the Lapstone Hill Railway Tunnel and surrounding railway reserve gully is in a degraded condition and infested with numerous types of weeds. Immediately adjacent to the portal the area is permanently inundated, perhaps in part due to runoff from the mushroom farming in the tunnel.

The EIS indicated that there had been a number of proposals put forward over the years by the community to rehabilitate the Lapstone Hill railway reserve area to make it more accessible for recreation purposes. The potential could exist with the closure of the Glenbrook STP for a cycleway/pedestrian access through the tunnel and cutting.

SWC committed in the EIS to rehabilitating the areas that were disturbed during construction and to work with the Blue Mountains City Council and other community groups on any additional rehabilitation plans for the area.

5.2.2 Key Issues

A number of representations raised the issues that the proposal should include a comprehensive weed eradication/bush regeneration program for Lapstone Creek, Knapsack Creek and the Lapstone Hill railway reserve. Blue Mountains City Council suggested that returning Lapstone Creek to a more natural vegetation assemblage should be included as a result of the proposal and that regeneration of Knapsack Creek should be done by SWC in concert with the Urban Runoff Control Plan Degraded Lands Program as administered by Council.

SWC in the Representations Report stated that although the removal of the flows from Glenbrook STP would remove a large amount of the nutrients which currently foster weed growth, other upstream runoff had been shown to be the key influence on weed growth along the creek. SWC committed to contributing to a weed management program between the discharge point and Lennox Bridge over Lapstone Creek with monitoring and maintenance for 2-3 years.

SWC stated in the Representations Report that the establishment and growth of weeds in Knapsack Creek have been influenced more by urban runoff than by the occasional sewage overflow from Glenbrook STP (estimated at once in every five years). SWC committed to an involvement in any regeneration and rehabilitation works on Knapsack Creek, potentially as part of the investigations into rehabilitation of the Glenbrook STP site.

Blue Mountains City Council and several community groups suggested that the use of the Lapstone Hill railway reserve for the proposal was an opportunity to work with Council, landcare groups and the SRA (the owners of the land) to rehabilitate the area and plan for a future recreational use.

SWC indicated in the Representations Report that as the impact on the railway reserve area was reduced by the inclusion of the directional drill rather than laying a pipeline through the railway reserve from the south-east portal of the tunnel, the rehabilitation required would be reduced. Apart from direct rehabilitation of the areas surrounding

those disturbed during construction, SWC committed to collaborating with other stakeholders for the weed management and rehabilitation of the railway reserve. SWC committed to organise a meeting with BMCC, bushcare groups and others during the preparation of the weed management plan to discuss rehabilitation in greater detail.

5.2.3 Consideration of Key Issues and Conclusion

The Department endorses the commitments made by SWC for participation in rehabilitation and weed management activities. The decommissioning of the Glenbrook STP, the removal of treated effluent flows into Lapstone Creek and the works within the Lapstone Hill railway reserve provide an opportunity to undertake rehabilitation works.

Recommended Condition of Approval No. 44 Requires SWC to prepare a Landscape and Rehabilitation Plan for the entire construction works in liaison with BMCC and Penrith City Council. Recommended Condition of Approval No. 45 requires that SWC prepare comprehensive Weed Management and Rehabilitation Plans for the Lapstone Hill railway reserve, Skarratt Park, Knapsack and Lapstone Creeks in conjunction with BMCC and relevant bushcare/community groups and to contribute to these works where appropriate.

The weed management and rehabilitation plans are to be included as part of the Construction EMP for the project.

5.3 IMPACTS ON WATER QUALITY

5.3.1 Background

The study area is located within the Hawkesbury Nepean catchment. Glenbrook STP is located adjacent to Knapsack Creek and discharges treated effluent into an unnamed tributary of Lapstone Creek. The proposed pipeline would also cross Tunnel Gully Creek west of the Nepean, the Nepean River at Victoria Bridge and Peach Tree Creek and Boundary Creek east of the Nepean River. The Penrith STP discharges into the adjacent Boundary Creek. All of these creeks are naturally ephemeral and are highly impacted from urban runoff.

Lapstone Creek, Knapsack Creek, the unnamed tributary of Lapstone Creek and Tunnel Gully Creek are all defined under the Clean Waters Regulation as Class C – Controlled Waters. The Nepean River, Boundary Creek and Peach Tree Creek are not classified.

The EIS states that the decommissioning of Glenbrook STP and transfer to an upgraded Penrith STP would enable SWC to better meet effluent quality targets and in-stream water quality. The targets that have been set for the Penrith STP and downstream of the discharge point into Boundary Creek are based on ANZECC Guidelines, Healthy Rivers Commission Guidelines and EPA Licence Conditions. Table 5.1 indicates the SWC effluent quality targets adopted for the Penrith STP.

Table 5.1 – Effluent Quality Targets for Penrith STP

Parameter	Water Quality Target
Total Nitrogen	7.5mg/L (50th percentile) in effluent discharged
Total Phosphorus	0.1mg/L (50th percentile) in effluent discharged

The EIS indicated that based on monitoring samples Glenbrook STP significantly contributed to elevated nutrient levels (particularly Total Nitrogen) in the unnamed tributary of Lapstone Creek and Lapstone Creek. The discharge of treated effluent forms most of the flow in these creeks during dry weather.

Macroinvertebrate sampling (an indicator of the aquatic ecology health of a waterway) upstream and downstream of the Glenbrook STP indicated that there were no marked differences both in numbers of species or species density. SWC concluded in the EIS that removing the treated effluent was unlikely to have a detrimental affect on the aquatic ecology. Further downstream of the discharge point Lapstone Creek becomes a concrete channel and includes a drop at one point of approximately 0.5m. These structures inhibit passage of fish and macroinvertebrates and any potential recolonisation following the removal of effluent flows.

The EIS stated that the transfer of the Glenbrook STP catchment to Penrith and the progressively increased flows to Penrith STP from the Penrith catchment would lead to increased flows in Boundary Creek and the Nepean River (in lieu of a more substantial reuse scheme – refer to Section 5.5). However, it is anticipated that the stricter treated effluent standards for the plant means that the increased flows would not cause an overall deterioration in the receiving waters.

The EIS stated that the upgraded STP would be designed to provide full tertiary treatment to greater than three times ADWF and to at least disinfect all wet weather flows up to 220ML/d.

5.3.2 Key Issues

A number of representations raised issues related to water quality primarily in relation to potential future discharges from the Penrith STP. The Hawkesbury-Nepean Catchment Management Trust (HNCMT) and the Blue Mountains Conservation Society (BMCS) raised concerns that the proposed in-stream water quality objectives set by SWC were less stringent than those recommended by the Healthy Rivers Commission (HRC).

HNCMT, BMCS and DUAP requested clarification as to whether the treatment processes at the proposed upgraded Penrith STP would meet a 0.15mg/L or 0.1mg/L phosphorus level. The submissions also recommended that the design of the upgraded plant should include provision for increased nitrogen removal.

HNCMT, BMCS and DUAP also requested that SWC consider the option of UV disinfection rather than chlorination/dechlorination. It was suggested that SWC should provide additional justification for using the chlorination/dechlorination disinfection process.

In response SWC confirmed in the Representations Report that the phosphorus concentration target for the discharged treated effluent from the upgraded Penrith STP would be 0.1mg/L. SWC further stated that the water quality objectives for treated effluent discharged from the plant had been based on ten years of site specific water quality and flow monitoring data. SWC indicated that they would continue to monitor receiving streams to ensure water quality objectives are met and impacts minimised. If monitoring indicated that further work was required the Penrith STP could be easily augmented to include add on process units such as tertiary clarifiers to further improve treated effluent quality.

SWC indicated in the Representations Report that in the options selection stage of the proposed upgrade to Penrith STP, specific investigations into the disinfection process were undertaken. Both ozone and UV disinfection facilities were considered in comparison with chlorination/dechlorination. It was stated that the chlorination/dechlorination disinfection process was chosen for the plant because of its ability to consistently perform during storm flows. UV disinfection becomes very expensive at the larger plants with high wet weather flows because of the level of infrastructure required. It was stated that the installation of UV disinfection processes at Penrith STP could still occur in the future if required.

5.3.3 Consideration of Key Issues and Conclusion

The Department endorses SWC's commitment to improving the standard of treated effluent discharged from the Penrith STP in accordance with the EPA licence pollution reduction program and to refining processes where the need arises. The Department is satisfied that the water quality objectives have been set appropriately and that the proposed disinfection processes are adequate. Proposed Condition 27 requires SWC to periodically monitor the water quality of Lapstone Creek and report the findings in the Operation EMP and Environmental Impact Audit Reports. Monitoring of other affected waterways such as Boundary Creek and the Nepean River shall be monitored by SWC as part of its current programs.

5.4 IMPACTS ON FLORA AND FAUNA

5.4.1 Background

The EIS included specialist assessments of both terrestrial and aquatic flora and fauna. The EIS stated that no known threatened aquatic flora and fauna species occur within the study area so no Section 5A assessments (eight part tests) under the EP&A Act were required for aquatic species. The main potential impacts identified on aquatic ecology would be on the diversity and numbers of macroinvertebrates within Lapstone Creek from the reduced flows from Glenbrook STP. The predicted impacts on macroinvertebrates are discussed in Section 5.3 of this report.

The surveys conducted as part of the terrestrial flora and fauna assessments were focussed on the potentially affected areas of the Lapstone Hill railway reserve and Skarratt Park. More general habitat surveys were conducted at Lapstone and Knapsack Creeks and vegetation surrounding Glenbrook STP and the SPSs. The EIS established that the rest of proposed pipeline route and the amplification of Penrith STP would be within previously cleared or disturbed areas such as road reservations etc, so survey effort was minimal.

Targeted surveys were conducted for a number of threatened fauna in the study area. No threatened flora and fauna species or endangered ecological communities as listed in the relevant schedules of the *Threatened Species Conservation Act 1995* (TSC Act) were found within the study area. Although no threatened flora and fauna were detected during surveys the EIS stated that the habitat within the study area could be used by 14 threatened fauna and one regionally significant fauna species that have previously been detected in the region, namely:

- Powerful Owl;
- Barking Owl;
- Glossy Black Cockatoo;
- Swift Parrot;
- Black-necked Stork;
- Tiger Quoll;
- Yellow-bellied Glider;
- Koala;
- Squirrel Glider;
- Large Bentwing Bat;
- Eastern Falsistrelle;
- Greater Broad-nosed Bat;
- Green and Golden Bell Frog;
- Red-crowned Toadlet; and
- Azure Kingfisher.

Eight part tests were conducted for these fauna species and concluded that no likely significant impact on these species would result from the proposal and therefore no Species Impact Statement would need to be prepared. The primary reason for such a

conclusion was the low level of estimated clearing required (estimated at less than 1 hectare) and the degraded and disturbed nature of the habitats that would be impacted upon by the proposal.

The EIS proposed that revegetation would occur in disturbed areas immediately after construction to prevent weed colonisation. The EIS suggested that this revegetation work could be coordinated with rehabilitation and de-weeding works within the Lapstone Hill tunnel gully and Knapsack and Glenbrook Creeks (refer to Section 5.2).

5.4.2 Key Issues

Several representations requested that SWC provide additional details of vegetation disturbance as part of the proposal. Penrith City Council requested additional details of roadside trees that would have to be removed as part of the pipeline construction. Blue Mountains City Council suggested that SWC ensure that vegetation clearing within the Lapstone Hill tunnel gully did not disturb the regionally significant flora species *Lissanthe sapida.*

In response to these representations SWC clarified that the modified proposal would result in marginally less clearing of vegetation than the proposal described in the EIS because of the proposed directional drill to Glenbrook STP. It was estimated that approx 0.5 hectares of vegetation would be removed in total as a result of the proposal.

SWC stated that as the majority of the pipeline route would be within the roadway, the disturbance on street trees would be minimal. The exact details of which trees would need to be removed would not be known until the detailed design stage.

SWC stated in the Representations Report that although the EIS had not detected any specimens of *Lissanthe sapida* during survey work, additional survey work undertaken in response to the Department's questions revealed a community located between the Great Western Highway and the railway cutting. Although it was stated that the *Lissanthe sapida* community would not be directly impacted upon by construction works, SWC committed to closely monitoring works in the vicinity to ensure the community was protected.

In December 2000, the Department also sent a number of questions to SWC in relation to the flora and fauna assessment in the EIS. The issues raised included suitability of flora transects, whether additional survey effort was required and questions related to the conclusions of eight part tests for a number of fauna species. The Department also suggested that based on the habitat in the study area eight part tests needed to be conducted for the Broad-headed Snake, Giant Burrowing Frog and Grey-headed Flying Fox.

In response to the Department's questions, consultants on behalf of SWC completed an additional flora and fauna assessment included as part of the Representations Report. The surveys conducted as part of the additional report included additional flora searches that located a community of *Lissanthe sapida* and additional targeted fauna surveys. The additional fauna surveys did not locate any threatened species although the assessment did suggest that some of the habitat present in the study area could support

potential threatened species populations.

Additional eight part tests performed concluded that it would be unlikely that a significant impact would occur to any threatened ecological community or flora and fauna species.

5.4.3 Consideration of Key Issues and Conclusion

The Department is satisfied that the modified proposal would be unlikely to have a significant impact on endangered ecological communities or threatened flora and fauna species. To reduce potential impacts on flora and fauna the Department recommends the inclusion of conditions requiring the preparation of a Flora and Fauna Management Sub-Plan and a Weed Control Plan as part of the Construction Stage EMP. Additionally the Department recommends the inclusion of Condition of Approval No 40 requiring that the *Lissanthe sapida* community be fenced prior to construction to prevent disturbance.

5.5 POTENTIAL REUSE OF WASTE WATER

5.5.1 Background

SWC stated in Section 7.1.9 of the EIS that identifying viable opportunities to reuse effluent was an important overall SWC objective. Two types of reuse of treated effluent are possible, namely:

- Potable reuse that gives purified water that is safe for drinking, cooking and bathing; and

- Non-potable reuse yielding water that is suitable for garden watering, irrigation, toilet flushing and industrial uses.

Although there are many examples in Australia of the application of non-potable reuse, no potable reuse schemes have been implemented to date. Reuse schemes tend to work best where the potential user is in close proximity to the treatment works.

The EIS identified that the treated effluent quality to be produced from the upgraded Penrith STP would be suitable for a variety of reuse options. A small amount, less than 1ML/d is currently reused from the STP for irrigation at the nearby Hickeys Lane Reserve.

The EIS did not propose any additional reuse schemes as part of the proposal but identified that reuse options were potentially available. The viability of such options was being evaluated in a separate assessment to the EIS. Potential reuse schemes identified at the time of the EIS included:

- Penrith Panthers – cooling tower, toilet flushing;

- Penrith City Council playing fields, Mt Pleasant, football fields, Jamison Park;

- Penrith Lakes Scheme;
- Penrith Paceway – irrigation;
- Tax Department – toilet flushing; and
- Other industries in the area.

The EIS also noted that agricultural enterprises downstream of the STP on the Hawkesbury River who have existing licensed irrigation extraction in part rely on the discharge of treated effluent to meet their demands. Such demands from irrigators can come into potential conflict with options for reuse from the Penrith STP.

5.5.2 Key Issues

A number of representations including the EPA and Penrith City Council suggested that re-use options should have been considered in more detail as part of the EIS and the findings of reuse investigations incorporated with the proposal.

In response SWC stated in the Representations Report that a feasibility report was currently being prepared to assess the financial viability of various reuse schemes. Preliminary findings from this study indicated that a scheme servicing customers such as Penrith Panthers and Penrith City Council with treated effluent for use in toilets etc could be financially viable. Total reuse from such a scheme could be up to 1ML per day. SWC stated that further development of the scheme would be subject to its own environmental impact assessment. It was stated that the timeframe for these investigations would not permit inclusion as part of the proposal.

The DLWC raised in their representation the issue that any future reuse proposal should consider the impacts on downstream water users, who rely on treated effluent discharges and potential impacts on environmental flows. DLWC raised particular concerns that any reuse proposals might create additional water demands.

SWC in the Representation Report recognised the importance of discharged treated effluent to downstream irrigators and to environmental flows. It is stated that in developing any direct non-potable reuse schemes in relation to Penrith STP consideration would be given to the impacts on existing downstream irrigators that rely on river water. SWC stated that the potential reuse demand in the area would be unlikely to be more than 1.5-3ML/d and that this would be unlikely to have a significant impact on downstream users or environmental flows.

5.5.3 Consideration of Key Issues and Conclusion

Whilst endorsing the concept of direct reuse for appropriate uses within the Penrith area, the Department is cognisant of the demands of downstream irrigators relying on Hawkesbury/Nepean flows and the need to maintain environmental flows. It is therefore appropriate that SWC conduct a thorough feasibility assessment for any potential reuse.

It would have been preferable for the reuse investigations to form part of the EIS process for the proposal. The Department endorses SWC's investigations into developing potential reuse schemes from Penrith STP in the near future.

6 CONSIDERATION OF OTHER ISSUES

This section outlines the Department's consideration of issues (other than those discussed in the previous section) relating to the current proposal having regard to information presented in the EIS, representations received in response to its exhibition, and other additional information obtained by the Department.

Where considered appropriate, recommendations are made with regard to the manner in which a particular issue should be addressed during construction and/or operation. It should be noted that private individuals who made representations to the EIS have not been identified in order to maintain their privacy.

6.1 VISUAL IMPACTS

6.1.1 Background

The visual assessment conducted as part of the EIS identified that the study area was part of the eastern gateway to the Blue Mountains and therefore was visually significant. The transfer route itself passes through the undulating, low density residential areas of Glenbrook, Lapstone and Leonay. The route then extends through the residential and industrial areas in Emu Plains before crossing the Nepean River and continuing through existing commercial and industrial areas to Penrith STP. The majority of the route is through road reserves.

The EIS identified that short term visual impacts would result from construction works including the decommissioning of SPSs 801, 805 and 806, the upgrading of SPS 894, the pipeline route construction and the upgrading works at Penrith STP.

During operation the main visual impacts would result from the construction of seven new vents shafts. Three of the new vent shafts would be situated on the locations of the decommissioned SPSs, one at Glenbrook STP and the other three within Leonay and Lapstone along the proposed pipeline. The vent shafts would extend up to 18m above the ground and look similar to a light or power pole.

6.1.2 Key Issues

Penrith City Council raised concerns that the proposed vent shafts along Nepean, Napier and York Streets in Emu Plains had the potential to impact on the residential streetscape of these areas and that alternative technology to eliminate the need for vent shafts should be considered. The Department requested details of consultation with local residents located in close proximity to the proposed vent shafts.

SWC responded to these representations by clarifying that no new vent shafts were proposed along Nepean, Napier and York Streets in Emu Plains. Existing vent shafts along these streets were indicated in the EIS. SWC stated that no widely used alternatives exist to vent shafts that would provide the same level of protection for public amenity and the sewerage system assets.

SWC also stated that no targeted consultation with residents in close proximity to the proposed vent shafts had occurred to date but would be undertaken as part of detailed design.

6.1.3 Consideration of Key Issues and Conclusion

To minimise the visual impacts during construction the Department proposes the inclusion of Condition No. 44 requiring SWC prepare a detailed Landscape and Rehabilitation Sub-Plan as part of the Construction Stage EMP. The Department also proposes the inclusion of Condition No. 12 requiring SWC consult with residents in close proximity to the proposed vent shaft sites.

6.2 GEOLOGY, SOILS AND EROSION

6.2.1 Background

The geology and soils section of the EIS indicated that the proposed pipeline route and STP amplification would be constructed through soil types that display high to very high erosion susceptibility in the subsoils. The EIS recognised that the construction of the proposed pipeline would expose a limited area of subsoils to erosion. It was proposed to prepare detailed Erosion and Sediment Control Plans as part of the Construction EMP to minimise erosion. It was stated that all erosion control measures would be installed in accordance with the NSW Department of Housing's publication *Managing Urban Stormwater - Soils and Construction (1998).*

The EIS did not include investigations into the potential presence of contaminated soils although it was stated that during the construction of tertiary filters at the Penrith STP materials such as grit, screenings and other general wastes were encountered. It is known that the proposed site for the new biological unit at Penrith STP has previously been used to place fill, however the composition of the material is not known.

The EIS stated that it was unlikely that contaminated soils would be encountered along the sewage transfer route except in the vicinity of Lapstone Hill Tunnel, based on past use of the tunnel for ammunition storage. The modifications to the proposal in the Representations Report included the directional drilling from the tunnel gully to Glenbrook STP removing the need to excavate any material close to Lapstone Hill Tunnel.

6.2.2 Key Issues

BMCC in their representation raised the need for the preparation of detailed Soil and Water Management Plan over the whole of the development site and at a sub-catchment level. It was suggested that the performance of the Soil and Water Management Plan and the Erosion and Sediment Control Plans should be included in the site monitoring program. Concerns were raised that proposed pipeline creek crossings may lead to erosion problems.

SWC responded in the Representations Report that it would prepare Erosion and

Sediment Control Plans for work sites at SPSs and along the transfer pipeline route during the design phase. Consideration would be given to the need for construction of sedimentation basins at the Penrith STP site. It was further stated that monitoring of erosion and sediment control structures would be incorporated into the Construction EMP.

The Department raised concerns that the lack of soil contamination investigations in the EIS could lead to the need to change the design of the proposal and subsequent environmental impacts. SWC responded in the Representations Report that from past experience if soil contamination is encountered during excavation at the Penrith STP it is likely to be localised, low risk and manageable. It is envisaged that the likely contaminants, if any, encountered would be construction waste or grit and screenings.

6.2.3 Consideration of Key Issues and Conclusion

The Department endorses SWC commitments to undertake detailed Erosion and Sediment Control Plans as part of the Construction EMP and has incorporated them in Recommended Condition of Approval No. 74.

In relation to potential soil contamination, the Department has recommended the inclusion of Condition of Approval No. 76 requiring that SWC undertake detailed investigations at Penrith STP in accordance with EPA requirements.

6.3 LANDUSE/RECREATION

6.3.1 Background

The EIS stated that the proposed development would occur within the suburbs of Glenbrook, Emu Plains and Penrith. The areas are generally urbanised and the majority of the sewage transfer pipeline follows road corridors through residential landuses to the west of the Nepean River and light industrial and residential landuses to the east of the Nepean River towards the Penrith STP.

The Penrith STP site is surrounded on the north, west and south by light industrial and sports fields. The closest residential areas to the STP are to the south-east (approx. 200m away) and to the east and north-east (approx. 300m away).

The proposed pipeline would also traverse the public recreation areas of Skarratt Park in Glenbrook and Woodriff Gardens in Penrith. Skarratt Park is a passive recreation areas consisting largely of natural bushland. Woodriff Gardens is situated to the east of the Penrith town centre and includes active recreation areas such as tennis courts and grassed areas well utilised by the local community.

6.3.2 Key Issues

The Department asked whether the proximity of sensitive surrounding land uses to Penrith STP constrained the proposed upgrades. In response SWC stated that odour emissions and noise were likely to be the main source of impacts to surrounding land

users. SWC have recently completed considerable odour control works at the STP that seem to have considerably reduced impacts. The EIS predicted that operational noise from the STP would be within criteria levels during calm conditions at the nearest residences.

Penrith City Council and the Department requested further details on the impacts upon Skarratt Park and Woodriff Gardens from the proposed pipeline construction. SWC responded in the Representations Report that the proposed pipeline would be constructed within an access road within Skarratt Park currently used by the Rail Infrastructure Corporation to gain access to the rail corridor. SWC stated that the pipeline would be constructed mostly towards the northern boundary of Woodriff Gardens which when combined with a short construction duration would minimise impacts.

6.3.3 Consideration of Key Issues and Conclusion

The odour emissions and noise impacts from the proposed upgrading of the Penrith STP are discussed in Sections 6.6 and 6.7 respectively.

In relation to impacts on Skarratt Park and Woodriff Gardens the Department recommends Condition of Approval No. 37 requiring that SWC consult with RIC and Penrith City Council prior to any construction within Skarratt Park and Woodriff Gardens.

6.4 TRAFFIC AND ACCESS

6.4.1 Background

The EIS stated that Glenbrook STP was situated in close proximity to the Great Western Highway. A narrow access road connecting to Barnet Street provides access to the STP. Barnet Street connects with the Great Western Highway allowing for left-in and left-out movements only. Penrith STP is accessed directly from the four lane Castlereagh Road that allows only left-in and left-out movements.

The proposed pipeline route would traverse a number of mainly local collector roads. The route would also be constructed through a section of the Great Western Highway in the vicinity of Emu Plains. It was estimated in the EIS that the pipeline construction would progress at a rate of approximately 70m per day over a six month period. Partial road closures and partial restrictions of access would occur during this construction period. The EIS stated that a Traffic Management Plan would be prepared prior to construction.

The pipeline would cross from west to east across the Nepean River utilising the existing services aqueduct adjacent to the heritage listed Victoria Bridge. The EIS stated that the crossing of the river would involve six full or partial night closures (11pm to 5am) of Victoria Bridge during construction. The Average Annual Daily Traffic (AADT) was estimated at the Victoria Bridge to be approximately 29,000.

The EIS stated that the proposal would generate small numbers of additional traffic movements, an average of 10 movements per day at Penrith STP and a maximum of 30 movements per day across all construction sites over a total construction period of approximately 18 months.

6.4.2 Key Issues

Penrith City Council requested in their representation additional information on the timing and duration of construction impacts on motorists and the rehabilitation of roads, kerbsides and footpaths after construction. The RTA and the Department raised concerns about the impacts of the Victoria Bridge crossing, including impacts on its structural integrity and the traffic implications of a closure.

The RTA responded in the Representations Report that a detailed Traffic Management Plan must be prepared prior to construction including restoration works and would be prepared in consultation with Penrith City Council.

In relation to Victoria Bridge, SWC indicated that a preliminary structural analysis had shown that Victoria Bridge would be structurally adequate to support another pipe. SWC also indicated that based on additional advice it was likely that construction of the pipeline would only involve one or two night-time closures of Victoria Bridge for a shortened period of time to that envisaged in the EIS (12 midnight to 5am). For safety reasons these would have to be full closures of the bridge.

SWC stated that as the Great Western Highway in this location mainly provided local access to Emu Plains it was unlikely that such closures would have a significant impact. An alternative detour route utilising regional and arterial roads and crossing the Nepean River via the M4 would be established and advertised prior to any closure.

SWC committed to additional liaison with the RTA and Penrith Council during the detailed design phase.

6.4.3 Consideration of Key Issues and Conclusion

The Department concurs with the plans by SWC to consult with Penrith City Council during the preparation of the Traffic Management Plan and has recommended Condition of Approval No. 50 requiring this consultation.

Recommended Condition of Approval No. 51 requires that SWC develop detailed procedures prior to construction to limit night-time closure at Victoria Bridge in consultation with the RTA and Penrith City Council.

6.5 EUROPEAN AND INDIGENOUS HERITAGE

6.5.1 Background

The EIS included an assessment of European and Indigenous Heritage Items. The European assessment identified that the main heritage items in close proximity or

impacted upon by the proposal included the Lapstone Hill Tunnel, the Victoria Bridge and several houses and streetscapes in Emu Plains. The Lapstone Hill Tunnel and Victoria Bridge are listed on the Register of the National Estate but not the NSW State Heritage Register.

The modified proposal as described in Section 4.1 of this report avoids the need to use Lapstone Hill Tunnel negating the potential for heritage impacts on this area as discussed in Section 5.1. The EIS stated that the proposed pipeline connection to the Victoria Bridge would utilise an existing adjacent pipe truss bridge and as such would not have a significant heritage impact.

The Indigenous heritage assessment undertaken as part of the EIS identified two NPWS registered archaeological sites at Knapsack Creek in the vicinity of Nepean Street which may be impacted upon by the proposed pipeline laying. Archaeological surveys of the Knapsack Creek area were undertaken with representatives of the Deerubbin Local Aboriginal Land Council (LALC) and failed to identify any archaeological evidence of the registered sites. SWC stated in the EIS that although the registered sites could not be located a 'consent to destroy' may be sought from NPWS.

No other potentially impacted Indigenous heritage sites were identified either on NPWS registers or during archaeological surveys. Several areas along the proposed pipeline corridor were identified as potential areas of archaeological sensitivity.

6.5.2 Key Issues

A number of representations were received with regard to potential European heritage impacts from the EIS proposed use of the Lapstone Hill tunnel for the transfer pipeline. As stated in Section 4.1, SWC have modified the proposal in the Representations Report to directional drill the section between the tunnel gully and the Glenbrook STP to avoid the need to use the Lapstone Hill tunnel. Minutes of a community meeting from December 2000 were reproduced in Appendix I of the Representations Report and indicated general acceptance of the proposed modifications.

Several representations raised questions about the extent of impacts on the registered Indigenous archaeological sites at Knapsack Creek and the need for sub-surface investigations at the potentially sensitive areas identified. In response, the Representations Report provided details of a site meeting at Knapsack Creek between SWC, NPWS and the Deerubbin LALC. It was agreed at the meeting that the route of the pipeline in the vicinity of the site would follow the route of the existing carrier and that SWC would seek a 'consent to destroy' the registered archaeological sites. It was further agreed that representatives from the Deerubbin LALC would be present during construction activities at this site.

It was stated by SWC that impacts on the sensitive areas identified in the EIS would be minimised as the proposed pipeline would be situated within previously disturbed areas. SWC stated that additional sub-surface investigations would therefore not be required in these areas.

6.5.3 Consideration of Key Issues and Conclusion

The Department endorses the proposed modifications by SWC to the transfer pipeline construction to avoid the need for use of the Lapstone Hill tunnel. To ensure that significant impacts do not occur to identified heritage items along the pipeline route, recommended Condition of Approval No 58 requires that where SWC need to undertake rock breaking within 50m of such items pre and post building condition surveys must be undertaken as well as monitoring to limit vibration to less than 3mm/s.

To minimise the potential impacts of route changes to potential Indigenous archaeological sites, recommended Condition of Approval No. 56 requires SWC to undertake additional archaeological investigations by a professional archaeologist with a representative of the Deerubbin LALC.

6.6 AIR QUALITY / ODOURS

6.6.1 Background

An assessment of air quality issues related to the proposal was included in the EIS and contained details of the odour assessment of Penrith STP by Australian Water Technologies (AWT). The assessment included a dispersion modelling study to indicate predicted odour impacts from the STP. A qualitative assessment of odour impacts from SPS 894, at vents along the proposed pipeline route and dust impacts during construction was also undertaken.

The odour assessment indicated that the main sources of odour impacts from the Penrith STP were traditionally the anaerobic inlet works and the primary sedimentation tanks. The EIS stated that the SWC had received a number of odour complaints in relation to the Penrith STP. To address these complaints, SWC had recently covered the inlet works and tanks that were the main source of odours and installed an Odour Treatment Biofilter to treat the collected odorous gases.

The assessment of odours from the augmented STP applied a performance criterion of 37 odour units (OU) per hour for the 99.5% percentile event. The performance criterion was largely based odour complaint data collected from June 1992 and July 1994. The EIS stated that residents located beyond this modelled criterion line were expected to be exposed to odour concentrations lower than those necessary to cause annoyance.

The odour assessment indicated that the proposed augmentation of the Penrith STP would not lead to any residential areas being within the 37 OU contour. An additional modelling assessment was also undertaken as part of the Representations Report for the modified proposal as described in Section 4.2. The additional modelling indicated that the 37 OU contour wouldn't encapsulate any residential areas around the STP.

The EIS predicted that the vents along the transfer pipeline and at SPS 894 in Emu Plains would not lead to significant discharges of offensive odour due to high oxygen levels and relatively short duration times. It was stated that should odour impacts occur greater than predicted, activated carbon absorption units or other odour suppression methods could be easily retrofitted to vents.

6.6.2 Key Issues

The Department raised several concerns in relation to the odour impact assessment including the:

- potential need for chemical dosing to reduce odours from sewage within the transfer pipeline;
- ability of the existing odour control measures at Penrith STP to accommodate the increased flows from the proposal; and
- validity of the odour criterion chosen for Penrith STP in comparison with the EPA's Draft Policy – Assessment and Management of Odour from Stationary Sources in NSW.

In response SWC stated that it was not envisaged that chemical dosing would be required along the transfer pipeline. The steepness of the grade that the pipeline was to be built upon and the circulation of air from the proposed vents should ensure no significant build up of odours in the pipeline.

SWC stated in the Representations Report that the future amplification of the Penrith STP was taken into account when designing and installing the new odour control measures. It was stated that should odour increase as a result of the proposed works, the control facilities could be amplified to reduce impacts.

SWC stated that the 37 OU criterion had been chosen based on a consistent 'complaints' type methodology to that used at other STPs such as Glenfield. They stated that such a methodology had been approved by the EPA.

A meeting was held on 1 August 2001 between the EPA, SWC and the Department to further discuss potential odour issues from the upgraded Penrith STP. It was agreed at the meeting that SWC would prepare additional odour modelling assessment prior to upgraded STP operations in accordance with EPA guidelines and odour criteria. Advice from SWC and the EPA was that additional mitigation measures could be installed at the site should the odour assessment predict exceedances of the EPA criteria.

6.6.3 Consideration of Key Issues and Conclusion

The Department endorses the actions agreed to for further odour impact assessment as a result of the meeting with SWC and the EPA. Therefore, the Department recommends the inclusion of Condition No. 61 requiring the preparation of an additional odour assessment report in accordance with the EPA's criteria and detailing appropriate mitigation measures where required. Recommended Condition of Approval No. 62 requires that SWC prepare a detailed Odour Management Sub-Plan for the entire project as part of the Operation EMP.

To ensure that the dust generation is minimised during construction, recommended Condition of Approval No. 63 requires the preparation of a Dust Management Sub-Plan as part of the Construction EMP.

6.7 NOISE

6.7.1 Background

The EIS included an assessment of the noise impacts during both construction and operations. The assessment is in accordance with the EPA's Environmental Noise Control Manual (ENCM) criteria.

Short and long term monitoring of background noise conditions was undertaken as part of the assessment at residences in close proximity to Glenbrook STP, the transfer pipeline and Penrith STP. The monitoring indicated that the background noise levels ranged from 34dBA to 52dBA at these residences. The higher background noise readings were dominated by high traffic noise.

The assessment indicated that during construction there are predicted to be a number of exceedances at various locations. The highest noise level exceedances are for residences in close proximity to the proposed transfer pipeline. The EIS stated that the transient nature of the pipeline construction would mean that impacts were limited to one or two days.

Smaller but longer term exceedances of construction noise criteria were predicted for residences in close proximity to Penrith STP, SPS 894, the directional drill site and night time works at Victoria Bridge. The EIS stated that the annoyance and impacts caused by construction noise exceedances would be minimised by the adherence to EPA standard construction hours, the proper maintenance of noise generating equipment, the installation of noise control measures such as temporary barriers and regular consultation with the affected community.

The operation noise assessment was limited to impacts upon the residences in close proximity to the Penrith STP (the pipeline and SPSs are unlikely to cause any significant noise during operation). The EIS indicated that operational noise from the nearest residences to Penrith STP would be within the criteria.

The revised noise assessment as part of the Representations Report predicted that there could be a 1dBA exceedance of operational night time criteria during calm conditions for a worst case operating scenario. The revised noise assessment also looked briefly at the affects of wind and predicted that more considerable exceedances (up to 11dBA) could occur at the closest residences to the STP under prevailing wind conditions.

6.7.2 Key Issues

The Department requested that SWC provide additional details regarding temporary noise barriers at the directional drilling site during construction. The Department also requested details of what additional ameliorative measures could be utilised to minimise the impacts of operational noise from the Penrith STP.

In response SWC stated in the Representations Report that for previous directional drilling sites in close proximity to residences, shipping containers had been successfully used as temporary noise barriers. It was suggested that the use of shipping containers (or other temporary noise barriers) coupled with mufflers on drilling equipment would

reduce impacts on the nearest residences.

SWC also stated that if operational noise from the Penrith STP caused exceedances to the EPA criteria, ameliorative measures could include constructing an acoustically enclosed blower house around the proposed blowers and/or the construction of noise barriers on appropriate sides of the digester tanks.

Following the receipt of the Representations Report the Department requested that SWC provide further details of the affect of prevailing winds on the transmission of operational noise from Penrith STP in accordance with the methodology in the EPA's Industrial Noise Policy (INP). The INP came into effect in January 2000 and applies to Sewage Treatment Plants. The INP includes a modified process for determining the background noise environment from the ENCM and requires the assessment of the impacts of temperature inversions and winds where these weather conditions are a feature of the site. The EIS was finalised during the six month transition period from the application of the ENCM to the INP where the EPA allowed either assessment methodology to be used.

In response SWC stated that initial investigations of wind roses had indicated that prevailing winds from the STP site to the nearest residential receiver occurred less than 20% of the time during any season. The INP requires the consideration of winds in a noise assessment where during any season there is a greater than 30% occurrence of winds towards a sensitive receptor.

6.7.3 Consideration of Key Issues and Conclusion

To minimise the noise impacts of the proposal the Department recommends that a detailed Noise and Vibration Management Sub-Plan be prepared for both construction and operation. The Sub-Plan must provide details of all proposed noise control measures and be approved by the Director-General.

The Department is satisfied that the worst exceedances in construction noise guidelines are likely to be short term. Appropriate mitigation measures such as the use of shipping containers or other temporary noise barriers need to be carefully considered at longer term construction sites such as the drilling rig operations and SPS 894.

The Department remains concerned that the proposal may lead to noise impacts at the nearest sensitive residences during operation although it is evident that measures such as noise walls would be likely to reduce impacts to acceptable levels. The Department has therefore recommended a number of conditions requiring that additional predictive assessment of operation noise from the Penrith STP be undertaken in accordance with the INP and that monitoring be undertaken after operations to investigate actual impacts. If the additional assessment or monitoring indicates exceedances of noise criteria the proponent must install appropriate mitigation measures.

6.8 DANGEROUS GOODS STORAGE

6.8.1 Background

The EIS included an assessment of hazards in accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33).

The proposed amplification of the Penrith STP includes the construction of a new above ground tank for 30,000 litres of Sodium Hypochlorite that is classified as a Class 8 PG III material (corrosive liquid). The Sodium Hypochlorite facility would replace the existing gaseous chlorine dosing facility currently used on site. The upgrading of chlorination and dechlorination facilities on site would also lead to approx. 30 additional dangerous goods trips to the STP per annum from the existing approx. 45 per annum currently.

The EIS stated that the risks to worker health and safety are greatly reduced by removing the gaseous chlorine facility. The risks of the proposed facility would be further minimised through the suitable design, construction and operation of facilities in accordance with the relevant standards and procedures.

6.8.2 Key Issues

The Department raised concerns that the proposed Sodium Hypochlorite facility would be located in close proximity to the existing dangerous goods facilities and therefore the cumulative quantities of these products should be considered in any risk assessment screening to determine if a preliminary hazard analysis would be required.

In response SWC in the Representations Report modified the location of the proposed Sodium Hypochlorite facility away from existing dangerous goods facilities to minimise the potential for any cumulative dangerous goods risks.

6.8.3 Consideration of Key Issues and Conclusion

To ensure that the proposed Sodium Hypochlorite, other dangerous goods facilities at Penrith STP and transportation of dangerous goods operate in accordance with the Department's relevant Hazardous Industry Planning Advisory Papers (HIPAP), conditions requiring the preparation of a Safety Management System and comprehensive hazard audit are recommended for inclusion.

6.9 FUTURE OF GLENBROOK STP SITE

6.9.1 Background

The proposal involves the decommissioning only of the Glenbrook STP, ie. inlet structure blocked and diverted to the transfer pipeline and the tanks and equipment cleaned. The EIS stated that there would be no demolition or construction at the site as part of the proposal and that the future use of the site would be the subject of future investigations including environmental impact assessment. The EIS stated that in general it was SWC's intention to demolish and rehabilitate the site for some sort of

community recreational use. The STP is located on Crown Land entrusted to the management of Blue Mountains City Council.

6.9.2 Key Issues

Several representations to the EIS expressed an interest in the rehabilitation of the Glenbrook STP site and some suggested that this should be done at the same time as the proposal. Representations requested further details on potential uses and rehabilitation works at the site. Representations suggested that options to be considered for the site should include the potential for storage and treatment of stormwater and sewage overflows.

SWC in the Representations Report reiterated that the future use of the Glenbrook STP site would be the subject of a separate environmental impact assessment and approvals process. SWC stated that options for the site would include the potential for stormwater storage. All site investigations and assessment of options would be undertaken through consultation with all relevant stakeholders and interested parties. SWC committed in the Representations Report to playing a leading role in the process towards the rehabilitation of Glenbrook STP.

6.9.3 Consideration of Key Issues and Conclusion

The Department endorses SWC's commitment to driving the process for rehabilitation and determination of future uses for Glenbrook STP. To ensure that SWC meets its commitments the Department has included a recommended condition requiring that a report detailing the potential options for decommissioning and future use of the Glenbrook STP is included as part of the Operation EMP.

7 CONCLUSIONS AND RECOMMENDATIONS

Sydney Water Corporation is proposing to amplify the Penrith STP to cater for growth in the Penrith sewage catchment and to decommission Glenbrook STP. Sewage from Glenbrook would be transferred to Penrith STP via a new pipeline. The two main factors leading the proposal are predicted population growth within the Penrith STP catchment and the failure of the existing Glenbrook STP to meet the requirements of the EPA's Pollution Reduction Program and receiving water quality objectives.

Key Issues

The principal issues of concern relate to:

Lapstone Hill Railway Tunnel

Several representations raised strong concerns with regard to the potential impacts upon the heritage values of the proposed pipeline construction on the heritage listed Lapstone Hill Tunnel. In response SWC commissioned investigations into the structural integrity of the tunnel and various construction techniques. As a result of these investigations and the heritage concerns raised in the representations, SWC have modified the proposal to include a directional drill bore that avoids the need to use the tunnel.

The Department endorses the modification to utilise a directional drill bore in preference to the tunnel and has recommended conditions that minimise the impacts of the directional drill.

Rehabilitation Works

Several representations including the Blue Mountains City Council suggested that the proposal presented an opportunity to provide a comprehensive weed eradication/bush regeneration program for the Lapstone Creek, Knapsack Creek and Lapstone Hill railway reserve areas. The Department is aware that the Lapstone Hill railway reserve area has been proposed in the past to be rehabilitated and utilised for recreation activities such as walking and bike trails.

In response, SWC committed to rehabilitate all areas disturbed during construction, contributing to a weed management program in a section of Lapstone Creek downstream of the discharge point and coordinating relevant stakeholders in developing a rehabilitation plan for the Lapstone Hill railway reserve.

The Department recognises that the proposal presents an opportunity to rehabilitate these degraded areas and generally endorses the commitments made by SWC. The Department recommends that SWC consult with BMCC and other stakeholders with regard to their current weed management and rehabilitation programs in the area and then identify targeted works that SWC can contribute towards. The Department has also recommended conditions that require SWC to monitor and maintain rehabilitation works.

Water Quality

Several representations raised concerns primarily related to the impacts on water quality from the increased discharges into Boundary Creek from the amplified Penrith STP. It was suggested that higher targets should be set for the removal of phosphorus and nitrogen in the treated effluent discharges and that the option of UV disinfection rather than chlorination/dechlorination disinfection should be further investigation.

SWC stated that the phosphorus and nitrogen concentration targets had been set for treated effluent based on ten years of site specific water quality and flow monitoring and based on EPA licence requirements. SWC also stated that UV disinfection had been considered as an alternative treatment process but that chlorination/dechlorination processes were chosen due to their more consistent disinfection performance during storm flow events.

SWC committed to continued water quality monitoring around the Penrith STP and to the retrofitting of the STP with additional phosphorus and nitrogen removal facilities and/or UV disinfection should the monitoring indicate a need. The Department endorses the SWC commitments and has recommended a condition requiring the SWC to also monitor the water quality within Lapstone Creek during construction and operation.

Flora and Fauna

In response to questions raised by the Department and other organisations about the extent and validity of the EIS flora and fauna assessment, SWC completed additional assessments including further survey work. As part of these investigations it was clarified that the total vegetation to be removed as part of the construction of the project would be approximately 0.5 hectares. The additional surveys also identified a community of the regionally significant flora species *Lissanthe sapida* in close proximity to the proposed works within Lapstone Hill railway reserve. No potentially significant impact on threatened flora and fauna species and endangered ecological communities were identified during investigations and therefore no Species Impact Statement was required.

The Department is satisfied that the modified proposal would be unlikely to have a significant impact on endangered ecological communities or threatened flora and fauna species. The Department recommends the inclusion of conditions requiring the preparation of a Flora and Fauna Management Sub-Plan, a Weed Control Plan and protecting and fencing the *Lissanthe sapida* community prior to construction to prevent disturbance.

Potential Reuse of Waste water

A number of representations suggested that the proposed amplification of the Penrith STP should present SWC with an opportunity to investigate and provide viable options for the reuse of treated effluent.

SWC responded in the Representations Report stating that a feasibility report was currently being prepared to assess the viability of various reuse schemes. Preliminary findings from this study indicated that a scheme servicing customers such as Penrith Panthers and Penrith City Council with treated effluent for use in toilets etc could be financially viable. Total reuse from such a scheme would be about 1ML per day. Additional progress of the potential scheme would be subject to separate assessment processes.

The Department endorses SWCs investigations into developing potential reuse schemes from Penrith STP.

Others

The Department has also undertaken an assessment of other likely environmental impacts of the proposal such as visual; geology, soils and erosion; landuse and recreation; traffic and access; European and Indigenous heritage; air quality and odours; noise; dangerous goods storage; and the future of Glenbrook STP site.

Need and Justification

The Department believes that the EIS and subsequent information provided by SWC has demonstrated that a reticulated sewerage scheme in the area is consistent with relevant Government policy and planning documents such as the Sydney Water *Interim Environment Plan* and the NSW Government's *Waterways Package* and Sydney Water Corporation's *Waterplan 21.* The scheme is also consistent with community expectations of a cleaner environment based upon the details of the community consultation undertaken as part of the EIS.

The Department recognises that the proposal would have the potential to benefit the local community. The proposal has the potential to accommodate predicted population growth both within the Glenbrook and Penrith STP catchments whilst improving the quality of treated effluent discharged into the receiving waters. The proposal includes the decommissioning of Glenbrook STP providing opportunities for future beneficial use of the site. The proposal reduces the number of Sewage Pumping Stations and provides opportunities for weed management and rehabilitation along Lapstone Creek and within the Lapstone Hill railway reserve.

In balancing the key environmental impacts of the proposal with the identified benefits, the Department considers that both the need and justification for the project have been adequately substantiated.

Recommendation

It is recommended that the proposal as described in the EIS and Representations Report

should proceed subject to a number of recommended conditions. These are specified in Section 8 of this report and are based on the extent of issues raised in representations and by the Department and would ensure that the project would be constructed and operated in an environmentally acceptable manner. These conditions relate to:

- construction and operational procedures to manage and resolve complaints;
- requirements for the preparation of detailed management plans to cover:
  - water quality;
  - noise and vibration;
  - air quality and odours;
  - erosion and sediment control;
  - flora and fauna;
  - landscaping and rehabilitation;
  - traffic management;
- environmental monitoring requirements; and
- environmental reporting requirements.

These conditions would ensure that unavoidable adverse environmental impacts of the proposal would be adequately mitigated within an appropriate environmental management framework.

8 RECOMMENDED CONDITIONS OF APPROVAL

This section provides the Department's recommended conditions of approval for the project under Section 115B(2) of the EP&A Act. These are based on the Department's assessment of the EIS, the representations made to the Sydney Water Corporation and advice provided by Sydney Water Corporation and the NSW Environment Protection Authority.

It is noted that the EIS contains information on 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 EIS and Representations Report. Where there is an inconsistency with the recommendations in the EIS and Representations Report, the recommendations in this report would prevail.

The following acronyms and abbreviations are used in this section:

ANZECC	Australian and New Zealand Environment and Conservation Council
BMCC	Blue Mountains City Council
dB(A)	Decibel (A-weighted scale)
Department, The	Department of Urban Affairs and Planning
Director-General, The	Director-General of the Department of Urban Affairs and Planning (or delegate)
DLWC	Department of Land and Water Conservation
DUAP	Department of Urban Affairs and Planning
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMR	Environmental Management Representative
EMS	Environmental Management System
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
HIPAP	Hazardous Industry Planning Advisory Paper
Minister, The	Minister for Urban Affairs and Planning
NPWS	National Parks and Wildlife Service
Proponent, The	Sydney Water Corporation (SWC)
RTA	NSW Roads and Traffic Authority
SPS	Sewage Pumping Station

STP	Sewage Treatment Plant
SWC	Sydney Water Corporation

General

1. The proposal shall be carried out in accordance with:

   - the proposal contained in the environmental impact statement (EIS) *Penrith Sewage Treatment Plant Amplification and Glenbrook Waste Water Transfer* prepared for the Sydney Water Corporation (SWC) by Environmental Resources Management Australia, dated May 2000;
   - all modifications, identified plans, safeguards and mitigation measures presented in the Representations Report prepared by SWC, dated April 2001 (including all measures outlined in Table 6.1 and 6.2);
   - the Penrith STP Amplification and Glenbrook Waste Water Transfer Director-General's Report (hereafter referred to as 'the Director-General's Report'); and
   - the conditions of approval granted by the Minister.

2. Despite the above, in the event of any inconsistency with the EIS and the Representations Report, the conditions of approval granted by the Minister shall prevail.

3. **It shall be the ultimate responsibility of Sydney Water Corporation to ensure compliance with the conditions of this approval.**[1]

4. **These conditions do not relieve the Proponent of the obligation to obtain all other approvals and licences from all relevant authorities required under any other Act. The Proponent shall comply with the terms and conditions of such approvals and licences**.

Compliance

5. The Proponent shall comply with all requirements of the Director-General in respect of the implementation of any measures arising from the conditions of this approval. The Proponent shall bring to the attention of the Director-General any matter that may require further investigation and the issuing of instructions from the Director-General. The Proponent must ensure that these instructions are implemented to the satisfaction of the Director-General within any time specified in the instructions.

Dispute Resolution

6. In the case of a dispute between the Proponent and any public authority, in the implementation of the conditions of this approval, the matter shall be referred to the Director-General for resolution, or if not resolved, to the Minister whose determination of the disagreement shall be final and binding on all parties.

[1] Any modification to the proposal that would be inconsistent with the conditions of approval shall only be carried out with the prior written approval of the Minister, in accordance with the relevant provisions of the EP&A Act.

Pre-Construction Compliance Report(s)

7. At least one month prior to commencement of substantial construction (or within such period as otherwise agreed by the Director-General), the Proponent shall submit for approval of the Director-General a report(s) detailing compliance with all relevant conditions that apply prior to commencement of substantial construction and shall address:

   - the dates of submissions of the various studies and/or requirements of various relevant conditions, and their approval and terms of approval; and

   - action taken or proposed to implement the recommendations made in terms of approvals and/or studies.

Pre-Operation Compliance Report(s)

8. At least one month prior to commencement of operation (or within such period as otherwise agreed by the Director-General), the Proponent shall submit for approval of the Director-General a report(s) detailing compliance with all relevant conditions that apply prior to commencement of operation and shall address:

   - the dates of submissions of the various studies and/or requirements of various relevant conditions, and their approval and terms of approval; and

   - action taken or proposed to implement the recommendations made in terms of approvals and/or studies.

Project Commencement

9. The Proponent shall notify the Director-General and all relevant authorities in writing of the project commencement date(s) prior to construction and operation as relevant.

Contact Telephone Number

10. Prior to commencement of construction, the Proponent shall provide to the Director-General, the EPA, Penrith City Council and Blue Mountains City Council and all relevant government agencies a 24 hour contact telephone number which will reach a person who can arrange appropriate action to be taken. The contact telephone number must be published in the local area and shall allow any member of the public to contact the Proponent with respect to seeking information or making a complaint. An initial response to any complaint is to be made to the complainant within 24hrs of receipt. The Proponent shall then:

    - investigate the concerns raised by the complainant and undertake all reasonable attempts to determine the cause of concern; and

    - if adverse impacts are identified, undertake all practicable measures to modify the activity which may be causing the impacts.

Complaints Register

11. The Proponent shall maintain a Complaints Register. The register shall be used to record details of all complaints received and actions taken by the Proponent. The Complaints Register shall be available to all relevant government agencies including but not limited to the Director-General, the EPA, Penrith City Council, Blue Mountains City Council and the DLWC.

Community Notification and Liaison

12. The Proponent shall, undertake targeted consultation with residents adjacent to proposed vent shaft locations prior to construction. The consultation shall include issues of the exact location and measures to minimise the impacts of vent shafts.

13. The Proponent shall, at three-monthly intervals during the construction phase, advertise in relevant local newspapers or as otherwise directed by the Director-General, the nature of works proposed for the forthcoming three months, the areas in which these works are proposed to occur, the hours of operation and the contact telephone number.

14. During the construction phase, the Proponent shall keep the local community informed (by way of local newsletters, leaflets newspaper advertisements and community notice boards etc.) of the progress of the project including of any traffic disruptions and controls, construction of temporary detours, disruption of access and work required outside of the nominated working hours prior to such works being undertaken. Prior consultation with local bus companies for traffic detours and disruptions shall also be required.

Environmental Management Representative

15. Prior to the commencement of construction, the Director- General shall approve the appointment of the person nominated to serve as the EMR. In considering the appointment, the Director- General shall take into account:

    (i) appropriateness of the qualifications of the EMR including demonstration of general compliance with the principles of AS/NZS ISO 14012:1996 *Guidelines for Environmental Auditing : Qualification criteria for environmental auditors*;

    (ii) role and responsibility of the EMR; and,

    (iii) authority of the EMR including details of the Proponent's internal reporting structure. This shall include the authority to stop work immediately if in the view of the EMR an unacceptable impact is likely to occur or to require other reasonable steps to be taken to avoid or minimise any adverse impacts

    The EMR shall have responsibility for

    - Consideration and advice on matters specified in the conditions of approval;

- Review of compliance with these conditions, and
- Facilitation of an induction and training program for all persons involved with the construction activities.

The EMR shall immediately bring to the attention of the Director-General any major issues resulting from the construction of the project that have not been dealt with expediently or adequately by the Proponent.

The EMR shall be available during construction activities at the site and be present on-site during any critical construction activities as defined in the relevant Environmental Management Plan (EMP).

Environmental Management System

16. In the assessment of tenders for construction and operation of the proposal, the Proponent shall include as a key evaluation criterion, the tenderer's demonstrated commitment to environmental management. Demonstration should be by way of commitment to a recognised Environmental Management System (such as ISO 14000, BS7750-1994 or similar) and/or have a proven satisfactory environmental management performance record.

Environmental Management Plan(s) (Construction Stage)

17. A project specific Environmental Management Plan(s) (Construction Stage) shall be prepared by the Proponent to the satisfaction of the Director-General, following consultation with the EPA, the DLWC, Penrith City Council, Blue Mountains City Council and any other relevant government agency nominated by the Director-General, prior to commencement of construction works. The EMP(s) shall be prepared in accordance with the conditions of this approval, all relevant Acts and Regulations and accepted environmental management best practice.

18. The EMP(s) shall:

    (a) address construction activities associated with all key sites;

    (b) cover specific environmental management objectives and strategies for the main environmental management elements and include, but not be limited to: water quality; noise and vibration; air quality/odours; erosion and sedimentation; access and traffic; property acquisition and/or adjustments; heritage and archaeology; groundwater; contamination; drilling slurry management; waste/resource management; flora and fauna; weed control; hydrology and flooding; geotechnical issues such as the presence of groundwater along the directional drill lines; visual screening, landscaping and rehabilitation; bunding for fuel and maintenance sites; hazards and risks; energy use, resource use and recycling; and utilities.

    (c) address, but not be limited to:

        (i) identification of the statutory and other obligations which the Proponent is required to fulfil during project construction including all approvals and consultations/agreements required from authorities and other

stakeholders, and key legislation and policies which control the Proponent's construction of the project;

(ii) definition of the role, responsibility, authority, accountability and reporting of personnel relevant to compliance with the EMP;

(iii) measures to avoid and/or control the occurrence of environmental impacts;

(iv) measures (where practicable and cost effective) to provide positive environmental offsets to unavoidable environmental impacts;

(v) the role of the EMR;

(vi) environmental management procedures for all construction processes which are important for the quality of the environment in respect of permanent and/or temporary works;

(vii) monitoring, inspection, and test plans for activities and environmental qualities which are important to the environmental management of the project including performance criteria, specific tests, protocols (eg frequency and location) and procedures to follow;

(viii) environmental management instructions for complex environmental control processes which do not follow common practice or where the absence of such instructions could be potentially detrimental to the environment;

(ix) steps the Proponent intends to take to ensure that all plans and procedures are being complied with;

(x) consultation requirements with relevant government agencies; and

(xi) community consultation and notification strategy (including local community, Local Aboriginal Land Councils, relevant local Councils, and all relevant authorities) and the SWC customer complaints procedures.

Specific requirements for some of the main environmental management elements referred to in (b) shall be as required under the conditions of this approval and/or as required under any licence or approval.

The EMP shall be made publicly available.

19. Revisions and updates may be made to the EMPs (Construction and Operation) without further approval of the Director-General if these are:

(a) consistent with the approved EMPs; and

(b) prepared to the satisfaction of the EMR.

Environmental Monitoring - Construction

20. The Proponent shall submit to the Director-General, a report(s) in respect of the environmental performance of the construction works and compliance with the Environmental Management Plan (Construction Stage) and any other relevant

conditions of this approval. The report(s) shall be prepared at six monthly intervals or at other such periods as requested by the Director-General to ensure adequate environmental performance over the duration of the construction works.

21. The report(s) shall include, but not be limited to, information on:

    (a) applications for consents, licences and approvals, and responses from relevant authorities;

    (b) implementation and effectiveness of environmental controls and conditions relating to the work undertaken;

    (c) identification of construction impact predictions made in the EIS and any supplementary studies and details of the extent to which actual impacts reflected the predictions;

    (d) details and analysis of results of environmental monitoring;

    (e) number and details of any complaints, including summary of main areas of complaint, action taken, response given and intended strategies to reduce complaints of a similar nature; and

    (f) any other matter relating to the compliance by the Proponent with the conditions of this approval or as requested by the Director-General.

22. The report(s) shall also be submitted to the EPA, the DLWC, Penrith City Council and Blue Mountains City Council and any other relevant government agency nominated by the Director-General. The report(s) shall also be made publicly available. The report shall be certified by the EMR.

Environmental Management Plan (Operation Stage)

23. The Proponent shall prepare an Environmental Management Plan for the operation of the proposal. The EMP (Operation Stage) shall be prepared to the satisfaction of the Director-General, following consultation with the EPA, Penrith City Council and Blue Mountains City Council and any other relevant government agency nominated by the Director-General, prior to the commencement of operation. The EMP (Operation Stage) shall be prepared in accordance with the conditions of this approval, all relevant Acts and Regulations and accepted best practice management procedures. The EMP (Operation Stage) shall address each of the key sites including the treatment plant, sewage pumping stations and transfer pipelines.

24. The EMP (Operation Stage) shall address, but not be limited to:

    (a) identification of the statutory and other obligations which the Proponent is required to fulfil including all licences/approvals and consultations/ agreements required from authorities and other stakeholders, and key legislation and policies which control the Proponent's operation of the project;

    (b) requirements of and compliance with relevant EPA guidelines;

    (c) sampling strategies and protocols to ensure the quality of the monitoring program including specific requirements of the EPA;

(d) monitoring, inspection and test plans for all activities and environmental qualities which are important to the environmental performance of the project during its operation including description of potential site impacts, performance criteria, specific tests and monitoring requirements, protocols (eg frequency and location) and procedures to follow;

(e) steps the Proponent intends to take to ensure that all plans and procedures are being complied with;

(f) consultation requirements including with relevant government agencies, the local community, Blue Mountains City Council and Penrith City Council; and

(g) management strategies employed for: effluent management including monitoring at discharge points in terms of quality and quantity, biosolids disposal; noise; access and traffic; water quality (including erosion and sedimentation controls); air quality (including odours); health and public safety; landscaping and maintenance and issues relating to flora and fauna; security; waste/resource minimisation, management, removal and disposal; hydrology and flooding; hazards and risks and emergency response plans; energy use and measures for minimisation.

Specific requirements for some of the main environmental management elements referred to in (g) shall be as detailed under the conditions of this approval and/or as required under any licence or approval.

The EMP (Operation Stage) shall be made publicly available.

25. All sampling strategies and protocols undertaken as part of the EMP (Operation Stage) shall include sampling and analytical strategies in accordance with EPA approved analytical methods to ensure the effectiveness and quality of the monitoring program. Only accredited laboratories can be used for laboratory analysis.

Environmental Impact Audit Report

26. An Environmental Impact Audit Report shall be submitted to the Director-General, EPA, Blue Mountains City Council, Penrith City Council and upon request by the Director-General, to any other relevant government authority 12 months and two years after commissioning of the project, or unless otherwise agreed by the Director-General, and at any additional periods thereafter as the Director-General may require. The technical studies required as part of the report shall be prepared by appropriately qualified specialists to be approved by the Director-General.

The Report shall assess the key impact predictions made in the EIS and any supplementary studies and detail the extent to which actual impacts reflect the predictions. The suitability of implemented mitigation measures and safeguards shall also be assessed. The Report shall also assess compliance with the EMP (Operation Stage).

The Report shall discuss results of consultation with the local community in terms of feedback/complaints on the construction and operation phases of the project and

any issues of concern raised. The Proponent shall comply with all requirements of the Director-General with respect to any measure arising from, or recommendations in, the report.

The Report shall be made publicly available.

Water Quality

27. A monitoring program shall be developed by the Proponent and include locations upstream and downstream of the Glenbrook STP discharge point on Lapstone Creek. Monitoring shall be undertaken at least monthly for a period of no less than 12 months prior to transfer pipeline operations and 12 months after transfer pipeline operations at which time the results shall be reviewed to determine whether additional monitoring should continue as required by the Director-General. The monitoring of water quality shall include investigations into macroinvertebrates. The monitoring program shall be detailed in the Construction EMP and prepared in consultation with the EPA. The results of the monitoring shall be reported in the Environmental Impact Audit Reports.

28. As part of the EMP (Operation Stage) specified in Condition 23, the Proponent shall prepare a detailed Water Quality Management Sub-Plan. The Sub-Plan shall provide details of pollution control measures to be undertaken during the proposal's operation and shall satisfy all relevant pollution control approval/licence requirements and shall reference environmental issues and goals set out in relevant EPA and other guidelines. A copy of the Sub-Plan shall be forwarded to the EPA and Blue Mountains City Council.

29. The Sub-Plan shall address, but not be limited to:

    (a) identification of baseline water quality monitoring locations;

    (b) design and implementation of a monitoring program(s);

    (c) emergency responses to overflows, chokes and sewage pumping station failures;

    (d) monitoring of groundwater quality beneath the Penrith STP site ; and

    (e) notification of potentially affected parties when the biological or disinfection processes at the STP are bypassed.

Overflow Management

30. As part of the EMP (Operation Stage) specified in Condition 23, the Proponent shall prepare an outline of the proposed Operation and Maintenance Plan designed to minimise the number and frequency of overflows. The Plan shall include proposed monitoring, inspection and testing, incident management and ongoing monitoring and management strategies consistent with any EPA licence requirements. A copy of the outline Plan shall be forwarded to the EPA.

31. There shall be no release of effluent into Knapsack Creek during the decommissioning of Glenbrook STP.

Safety and Hazard Management

32. No later than two months prior to the commencement of commissioning of the project, or within such further period as the Director-General may agree, the Proponent shall prepare and submit for the approval of the Director-General a Safety Management System document. Commissioning shall not commence until approval has been given by the Director-General.

    The Safety Management System document must cover all hazardous materials in operations on the Penrith STP site, and associated transport activities involving hazardous materials. The document shall clearly specify all safety related procedures, responsibilities, and policies, along with details of mechanisms for ensuring adherence to procedures. Records shall be kept on-site and shall be available for inspection by the Director-General upon request. The Safety Management System shall be developed in accordance with the Department's Hazardous Industry Planning Advisory Paper (HIPAP) No. 9, "Safety Management".

    The document shall also include a hazard review containing aspects related to the storage and use of chemicals.

33. Twelve months after the commencement of operations of the proposed development or within such further period as the Director-General may agree, the Proponent shall carry out a comprehensive hazard audit of the Penrith STP, and within one month of the audit, submit a report to the Director-General. The audit shall be carried out at the Proponent's expense by a duly qualified independent person or team approved by the Director-General prior to commencement of the audit. Further audits shall be carried out every three years or as determined by the Director-General. A report of each audit shall be submitted to the Director-General within a month of the audit. Hazard audits shall be carried out in accordance with the Department's HIPAP No. 5 *Hazard Audit Guidelines*.

    The audit shall include a review of the site safety management system and a review of all entries made in the incident register since the previous audit.

Directional Drill

34. The Proponent shall prepare a Drilling Slurry Management Plan for the directional drilling site prior to construction. The Plan shall cover monitoring of cutting fluid returns and actions to be taken in the event of losses in drilling fluid. The Plan shall be incorporated into the EMP (Construction Stage).

35. The Proponent shall conduct detailed geotechnical investigations such as core samples, along the route of the proposed direction drill boreholes to determine the soundness of the strata and the presence or absence of groundwater. Details of the geotechnical investigations shall be included as part of the EMP (Construction Stage).

36. The Proponent shall prepare a Contingency Plan prior to construction in case of groundwater ingress to the drilled pipeline. The Contingency Plan shall include

environmental management measures for the disposal and treatment of groundwater. The Contingency Plan shall incorporated as part of the EMP (Construction Stage).

Recreation

37. The Proponent shall consult with Blue Mountains City Council, Rail Infrastructure Corporation and Penrith City Council prior to construction, in relation to the proposed pipeline route and potential disturbance and rehabilitation of Skarratt Park and Woodriff Gardens.

Flora and Fauna

38. The proponent shall prepare, in consultation with Penrith City Council and Blue Mountains City Council a detailed Flora and Fauna Management Sub-Plan as part of the EMP (Construction Stage) prior to any clearing of vegetation. The Sub-Plan shall address all elements of the proposal, which are likely to affect native vegetation. The Sub-Plan shall identify requirements for:

    - seed collection;
    - strategies for minimising vegetation clearance and protection of riparian vegetation and other vegetated areas outside the direct impact zone;
    - control, spread of debris and refuse;
    - movement and storage of materials and equipment;
    - clearance of vegetation and soil for construction;
    - re-vegetation of cleared areas; and
    - weed control including aquatic species.

39. As part of the Flora and Fauna Management Sub-Plan, a Weed Control Plan shall be prepared in consultation with Blue Mountains City Council and Penrith City Council. The purpose of the Plan shall be to ensure that surrounding vegetation is not adversely affected by the introduction of weeds. The Plan shall also detail site specific weed control measures to be undertaken, such as the installation during construction of wash down bays or equivalent, to prevent the spread of noxious weeds.

40. The population of *Lissanthe sapida* found in close proximity to the proposed works in the Lapstone Hill Railway Reserve shall be surveyed and pegged and temporarily fenced prior to construction works, to avoid any adverse impact on this community.

41. The proponent shall ensure that any deviations in pipeline routes as a result of detailed design do not have a significant impact upon any threatened flora or fauna species or ecological communities. The EMP (Construction Stage) shall identify the pipeline route in relation to native vegetation and any threatened flora or fauna species or ecological community.

42. All trenches shall be covered or fenced at night to prevent animals becoming trapped. This activity shall be maintained throughout the course of construction and be in coordination with the Proponent's hazard, risk and safety policies.

43. If, during the course of construction, the Proponent becomes aware of the presence of any threatened flora and fauna, all work likely to affect the site(s) shall cease immediately and the NPWS shall be consulted to determine an appropriate course of action prior to the recommencement of work at that site. Any required permit/consent(s) shall be obtained and shall be accompanied by appropriate supporting documentation.

Landscape and Rehabilitation

44. The proponent shall prepare a Landscape and Rehabilitation Sub-Plan(s) as part of the EMP (Construction Stage) prior to any clearing of vegetation. The Sub-Plan(s) shall be prepared in consultation with Penrith City Council and Blue Mountains City Council. The Sub-Plan shall include a timetable for implementation and shall be consistent with the Flora and Fauna Management Sub-Plan.

45. The proponent shall prepare specific Weed Management and Rehabilitation Plans in consultation with landowners, BMCC and relevant bushcare/community groups, for areas of Lapstone Hill railway reserve and Skarratt Park to be disturbed by construction activities. The proponent shall also prepare Plans for collaborative work to control weeds along Knapsack and Lapstone Creek. These Plans shall include rehabilitation of impacts upon those creeks that have resulted from the Glenbrook STP operations. The Plans shall identify and be consistent with existing BMCC programs and identify the value and timetable of works and/or contributions from SWC towards these programs. The Plans shall be included as part of the EMP (Construction Stage).

46. A suitably qualified bushland regeneration specialist shall also be consulted in the development of the Sub-Plans and Plans referred to in Conditions 44 and 45, in terms of selection of flora species and specific implementation strategies.

47. Seed of locally indigenous tree and plant species or suitable tube stock shall be used for revegetation purposes to the satisfaction of the EMR. Topsoil and leaf mulch are to be stripped and stored for placement back in the vegetation zone from where it was removed, subject to Condition 48.

48. Weed infested topsoil, as identified by a qualified bush regeneration officer, shall not be used in rehabilitation works where native vegetation has been removed unless it is sterilised or treated as specified by the EMR.

49. All landscaping works undertaken and regenerating sites shall be monitored and maintained at regular intervals to ensure their effectiveness. All costs of such monitoring and maintenance shall be borne by the Proponent unless otherwise agreed to by the relevant property owner.

Traffic and Roadworks

50. A detailed Traffic Management Sub-Plan shall be prepared as part of the EMP (Construction Stage) in consultation with the RTA, Blue Mountains City Council and Penrith City Council. The Sub-Plan shall be prepared in accordance with the RTA *Traffic Control at Works Sites Manual.* The Sub-Plan shall detail the following:

    - traffic safety requirements (eg. warning and speed limit signs);
    - pedestrian/cyclist management and safety requirements;
    - the management of access;
    - actions to be carried out should partial or total road closures (including the need for any Council 'Road Closure Permits') and/or traffic detours be required (including the identification of parties to be consulted, duration of closures, detour routes and assessment of suitability of detour routes).

51. The Traffic Management Sub-Plan shall include detailed procedures for the pipeline construction works on Victoria Bridge in consultation with the RTA and Penrith City Council. The procedures shall aim to minimise closure of Victoria Bridge in accordance with RTA requirements.

52. A road dilapidation report shall be prepared for all non-arterial roads likely to be used for construction traffic and/or as determined following consultation with Penrith City Council and Blue Mountains City Council including any non-arterial roads used temporarily for detours. The report shall be prepared in consultation with Penrith City Council and Blue Mountains City Council prior to the commencement of construction activities and then finalised as soon as possible after construction is complete. Any road/footpath/driveway damage (aside from that resulting from normal wear and tear) attributable to the construction of the proposal, shall be repaired to a standard at least equivalent to that existing prior to any disturbance in consultation with Penrith City Council and Blue Mountains City Council.

53. The Proponent shall be responsible for minimising any disruption to services resulting from such work and shall be responsible for advising local residents and businesses on disruption to services.

54. Restoring of excavations within public road reserves shall be made to a reasonable standard in consultation with Blue Mountains City Council and Penrith City Council with reference to the appropriate road restoration policies.

    Nothing in Conditions 50 through 54 shall be taken as restricting the Proponent from negotiating an alternative payment for damage arrangements with the relevant council(s) subject to the agreement of the relevant council(s).

Non-Indigenous and Indigenous Archaeology

55. The Proponent shall prepare an Archaeology Management Plan, in consultation with the Deerubbin Local Aboriginal Land Council and NPWS as part of the EMP (Construction Stage). The Plan shall include:
    - details of licences/approvals to be obtained including those required under the *National Parks and Wildlife Act 1974*;
    - management measures for the fencing and protection of all identified features; and
    - procedures for monitoring of areas of potential archaeological sensitivity identified in the EIS during construction activities with the involvement of the Deerubbin LALC.

56. Where the proposed pipeline route deviates from the corridor surveyed in the EIS and described in the Representations Report, further archaeological investigations shall be undertaken by a suitably qualified person and to the satisfaction of NPWS and in consultation with the Deerubbin LALC.

57. SWC shall appoint an appropriately qualified heritage practitioner and archaeologist prior to the beginning of construction, to provide advice on construction works and in relation to the suitability of management measures.

58. Should rock breaking be required within 50m of an identified heritage item then vibration monitoring and building condition surveys shall be undertaken both before and after construction. Vibration from rock breaking shall not exceed 3mm/s at the foundation of heritage items. The Proponent shall ensure that all damages occurring as a result of construction is fully rectified at no cost to the owner.

Unexpected items

59. If, during the course of construction, the Proponent becomes aware of any heritage items or archaeological material that could be affected by the proposed works, all work likely to affect the site(s) shall cease immediately and the NPWS, the relevant LALCs or the Heritage Office shall be consulted to determine an appropriate course of action prior to the recommencement of work at that site. Any required permit/consent(s) shall be obtained and shall be accompanied by appropriate supporting documentation.

Air Quality

60. No offensive odour may be emitted from the premises, as defined in accordance with the provisions of the Protection of the Environment and Operations Act 1997.

61. The Proponent shall submit an odour assessment report to the EPA and Director-General prior to the beginning of operations. The report shall detail the results of additional odour modelling at the Penrith STP and indicate predicted performance compared to the EPA's interim odour performance criteria. Should exceedances be predicted the report shall detail proposed odour controls or additional odour mitigation measures to the satisfaction of the Director-General.

62. An Odour Management Sub-Plan as part of the EMP (Operation Stage) referred to in Condition 23, shall be developed in consultation with the EPA and Penrith City Council and Blue Mountains City Council. The Sub-Plan shall reference environmental issues and goals set out in the EPA's guidelines. The Sub-Plan shall detail all aspects of odour management including identification of odour sources, control devices, treatment, adopted criteria and implementation of additional mitigation strategies, methodology for monitoring odour emissions (including representative meteorological conditions), reporting procedures, measures for dealing with exceedances, arrangements to inform residents and contact points, complaints handling systems, reporting of complaints and response actions. The Sub-Plan shall be made publicly available.

63. A specific Dust Management Sub-Plan as part of the EMP (Construction Stage) referred to in Condition 17, shall be prepared. The Sub-Plan shall detail all dust control measures to be implemented during construction. The Sub-Plan shall include measures to reduce dust generation from stockpiles, cleared areas and other exposed surfaces, responsibilities for the implementation of controls and the reporting requirements. Measures such as temporary planting of stockpiles and progressive rehabilitation of any exposed areas shall be designed and operated with the intention of meeting EPA criteria for dust nuisance minimisation.

64. Where there is a risk of losing material, construction vehicles using public roads shall be maintained and covered to prevent any loss of load whether in the form of dust, liquid or solids. Construction vehicles shall be maintained in such a manner that they will not track mud, dirt or other material onto any street which is opened and accessible to the public. In the event of any spillage, the Proponent is required to remove the spilt material within the same working day.

Noise

Noise Management Sub-Plan

65. As part of the EMP(s) referred to in Conditions 17 and 23, the proponent shall prepare a detailed Noise and Vibration Management Sub-Plan to the satisfaction of the Director-General. The Sub-Plan shall provide details of noise standards to be met, noise control measures to be undertaken during both the construction and operation stages. A copy of the Sub-Plan shall be forwarded to the EPA, Penrith City Council and Blue Mountains City Council.

66. The Sub-Plan shall include, but not be limited to: tests for ascertaining acoustic parameters; anticipated airborne noise for all major noise generating activities and locations and duration of these activities; impacts from site compounds/construction depots; noise control equipment to be fitted to machinery; temporary noise mitigation measures such as noise barriers, shrouds around stationary plant to be installed prior to the commencement of noisy activities, predicted noise levels at any sensitive receivers (such as schools, churches, hospitals etc.); noise monitoring and reporting procedures; measures for dealing with exceedances; arrangements to inform residents of construction activities likely to affect their noise amenity, contact point for residents; and compliance with relevant EPA guidelines as far as

practicable, including the Environmental Noise Control Manual and the Industrial Noise Policy.

Construction Noise

67. The Proponent shall monitor construction noise levels to verify compliance with the requirements specified in the Noise and Vibration Management Sub-Plan. Should monitoring indicate exceedance, the Proponent shall consult the EPA and implement any additional mitigation measures to ensure that 'best practice' is being implemented. In any event, construction noise shall aim to meet the following guideline levels:

    - For a construction period of four weeks and under, the L_{10} level, measured over a period of not less than 15 minutes when the construction site is in operation, not exceed the background level by more than 20 dB(A).
    - For a construction period of greater than four weeks and not exceeding 26 weeks, the L_{10} level, measured over a period of not less than 15 minutes when the construction site is in operation, not exceed the background level by more than 10 dB(A).
    - For a construction period greater than 26 weeks, the L_{10} level, measured over a period of not less than 15 minutes when the construction site is in operation, not exceed the existing background noise level by more than 5 dB(A).

    A value of 5 dB(A) shall be added to the sound pressure levels recorded from the construction activities if the noise is substantially tonal or impulsive in character.

    Achievement of the above levels shall be sought through best practicable means. In situations where it is identified that these levels would not be achieved, then all reasonable measures shall be undertaken to reduce the level of noise impact.

Construction Hours

68. All construction activities including entry and departure of heavy vehicles shall be restricted to the hours 7:00 am to 6:00 pm (Monday to Friday); 8:00 am to 1:00 pm (Saturdays) and at no time on Sundays and public holidays.

69. Works outside these hours which may be permitted include:

    - any works which do not cause noise emissions to be audible at any nearby residential property;
    - the delivery of materials which is required outside these hours requested by police or other authorities for safety reasons;
    - emergency work to avoid the loss of lives and/or property and/or to prevent environmental harm; and
    - any other work as agreed through negotiations between SWC and potentially affected noise receivers or as otherwise agreed by the EPA.

Operational Noise

70. The Proponent shall prepare a report prior to any construction works undertaken on

the Penrith STP site, which includes a detailed predictive assessment of operational noise at the nearest sensitive receptors to the Penrith STP. The assessment shall be prepared in accordance with the EPA's Industrial Noise Policy.

71. Penrith STP shall be designed to avoid exceedances of the operational criteria specified in the report prepared in accordance with Condition 70. The noise emission limits are to be achieved under any typically existing weather conditions in the area.

72. The Proponent shall monitor the operational noise emanating from the treatment plant in order to verify that the noise levels are within the amenity criteria. If noise limits in the criteria are exceeded the Proponent shall, in consultation with the EPA, assess the adequacy of the noise mitigation measures to ensure that 'best practice' is being implemented. Should the assessment indicate a clear trend in noise levels which are inconsistent with the general predictions made, the Proponent shall implement further noise mitigation measures.

Soil and Water Management

73. As part of the EMP(s) referred to in Condition 17 and 23, the Proponent shall prepare a comprehensive Soil and Water Management Sub-Plan in accordance with the Department of Housing's guideline *Managing Urban Stormwater – Soils and Construction (1998)*, and shall include consultation with DLWC, EPA, Blue Mountains City Council and Penrith City Council. The Sub-Plan shall provide full details of all pollution control measures to be undertaken during the construction stage and satisfy all requirements for pollution control approval/licences.

74. The Soil and Water Management Sub-Plan shall incorporate a detailed Erosion and Sedimentation Control Plan which shall be prepared in consultation with DLWC, EPA, Blue Mountains City Council and Penrith City Council and shall satisfy all relevant pollution control approvals and licence conditions.

75. Regular inspections of temporary and permanent erosion and sedimentation control devices shall be undertaken to ensure that the most appropriate controls are being implemented and that they are being cleaned and maintained in an efficient condition at all times and meet the requirements of any approval/licence conditions.

Contaminated Soil

76. Prior to construction, tests shall be carried out at Penrith STP to assess the type, extent and concentration of soil contamination. Measures for handling, treatment and disposal of the contaminated material shall be approved by the EPA before any likely disturbance. The investigations and proposed measures shall be detailed in the Construction EMP.

77. Disposal of any contaminated material shall only be to a landfill approved by the EPA.

Biosolids

78. Biosolids generated by the operation of the proposal shall be used or disposed of in accordance with the EPA's guideline *Environmental Guidelines for the Use and Disposal of Biosolids (1997)* unless otherwise approved by the EPA.

Waste Disposal and/or Recycling

79. As part of the EMP(s) referred to in Conditions 17 and 23, the Proponent shall prepare a detailed Waste Management Sub-Plan to address the management of wastes during both the construction and operation stages. The Sub-Plan shall be prepared prior to construction and operation as appropriate and shall identify requirements for waste avoidance, reduction, reuse and recycling. It shall also detail requirements for handling, stockpiling and disposal of wastes specifically spoil, contaminated soil or water, demolition material, cleared vegetation, oils, greases, lubricants, sanitary wastes, timber, glass, metal, etc. It shall also identify any site for final disposal of any material and any remedial works required at the disposal site before accepting the material. Any waste material that is unable to be reused, reprocessed or recycled shall be disposed at a site that can lawfully receive the waste.

Glenbrook STP

80. The Proponent shall, in consultation with the Blue Mountains City Council and the EPA, prepare a Decommissioning and Future Use Report for the Glenbrook STP site. The Report shall detail:

    - the decommissioning activities proposed at the STP and the environmental management procedures during these activities;

    - options for the potential demolition and reuse of the site including the proposed timeframe, approvals and licences required and environmental management procedures.

    The Report shall be completed prior to the operations of the transfer pipeline and shall be made publicly available.

Utilities and Services

81. The Proponent shall, in consultation with the relevant service authority, identify all services potentially affected by construction activities to determine requirements for diversion, protection and/or support. Any alterations to utilities and services shall be carried out to the satisfaction of the relevant authority(ies). The costs of any alterations shall be borne by the Proponent unless otherwise agreed to by the affected service/utility authority.

APPENDIX A

Key Features of Transfer Pipeline

APPENDIX B

Proposed Layout of Penrith STP