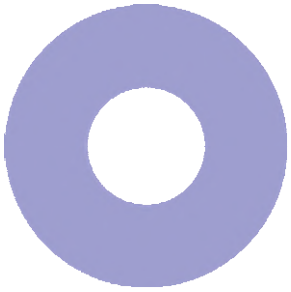
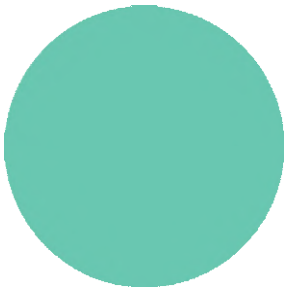
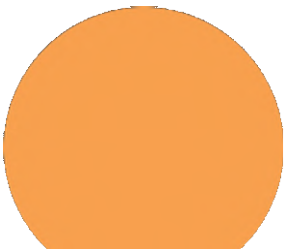
Review of Environmental Factors

Penrith CBD Drinking Water and Wastewater Package (December, 2022)

Sydney WATER



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Determination

This Review of Environmental Factors (REF) assesses potential environmental impacts of Penrith CBD Drinking Water and Wastewater Package and was prepared under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), with Sydney Water both the proponent and determining authority.

The Sydney Water Project Manager is accountable to ensure the proposal is carried out as described in this REF. If the scope of work or work methods described in this REF change significantly following determination, additional environmental impact assessment may be required.

Decision Statement

During construction, the main potential environmental impacts of the proposal are typical construction impacts such as soil and water (including likely groundwater dewatering), flora and fauna, noise and vibration, and traffic and access. During operation, no environmental impacts are expected. The proposal will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats. Accordingly, a Species Impact Statement (SIS) and/or Biodiversity Development Assessment Report (BDAR) is not required.

It is considered that, given the nature, scale and extent of impacts and implementation of the safeguards outlined in this REF, the proposed work is unlikely to have a significant impact on the environment. Accordingly, we do not require an Environmental Impact Statement (EIS) and the proposal may proceed.

Certification

I certify that I have reviewed and endorsed the contents of this REF document and, to the best of my knowledge, it is in accordance with the EP&A Act and the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation). The proposal has been considered against matters listed in section 171 (Appendix A) and the Guidelines approved under section 170 of the EP&A Regulation. The information it contains is neither false nor misleading.

Prepared by:	Reviewed by:	Endorsed by:	Approved by:
[redacted] Grace Corrigan REF author Sydney Water Date: 06/12/22	[redacted] Alice Smith Senior Environmental Scientist Sydney Water Date: 7/12/2022	[redacted] Majid Moghaddam Project Manager Sydney Water Date: 8/12/2022	[redacted] Murray Johnson Environment and Heritage Manager Sydney Water Date 22/12/2022

1 Introduction

1.1 Context

We provide water, wastewater, recycled water and some stormwater services to over five million people. We operate under the *Sydney Water Act 1994* and have three equal objectives to: protect public health, protect the environment and be a successful business.

We are a statutory State-owned corporation and are classified as a public authority, and a determining authority for the proposed work under Division 5.1 of the EP&A Act. This REF assesses the potential environmental impacts associated with:

- upgrades to two existing pump stations (SP0906 and SP1026)
- duplication of a 2.3 km pressure main (WW02)
- duplication of a 0.45 km gravity main (WW01), and
- construction of a 1.4 km new drinking water main (DW01),

and identifies safeguards that avoid or minimise potential impacts.

1.2 Proposal background and need

A summary of the proposal need, objectives and consideration of alternatives are provided in **Table 1-1** below.

Table 1-1 Proposal need, objectives and consideration of alternatives

Aspect	Relevance to proposal
Proposal need	As part of the Western Parkland City, Penrith is undergoing significant development and has been identified as a growth area due to development of the CBD, and the health and education precinct. The proposed development includes 12,000 dwellings in Penrith and an additional 16,000 dwellings in nearby suburbs (Glenmore Park, Penrith Lakes, Orchard Hills North, and Kingswood) by 2026. The existing wastewater and drinking water infrastructure will not meet this additional demand, therefore new and upgraded infrastructure is needed. The wastewater infrastructure is within the Penrith Wastewater Catchment. The wastewater pumping station upgrades, gravity main duplication, and pressure main duplication will ensure compliance with Environment Protection Licence (EPL) 1409 for the Penrith Sewage Treatment System.

Proposal objectives	The proposal objectives are to: • Develop a design that represents the lowest lifecycle cost for acceptable risk while meeting regulatory requirements • Develop a design that seeks to minimise disruption to community and stakeholders, and environment and heritage impacts as well as comply with the EPL • Expand drinking water and wastewater services for Penrith CBD and nearby suburbs to service projected growth.
Consideration of alternatives/options	Most of the proposed drinking water and wastewater infrastructure needs were developed during preliminary planning, by considering the capacity of the existing network, identifying where additional capacity was required (eg new residential development), and identifying solutions to increase capacity. A long list of five drinking water options and five wastewater options were analysed based on a range of cost and non-cost options. Preferred options were identified based on least-cost at an acceptable risk. Following this, scope validation and hydraulic assessment was performed. Alignments and locations for each option were considered in relation to a range of constraints, including cost, geotechnical, contamination, environmental, community, and network operations. The options assessment for each site is detailed in the Penrith CBD and Wider Area –Potable and Wastewater Package Options Assessment Technical Memorandum, Planning Partner, 2022. Further refinements to the designs at each site have been made during concept design workshops, such as refinement to avoid existing services.

1.3 Consideration of Ecologically Sustainable Development

The proposal has been considered against the principles of ecologically sustainable development (ESD) (refer to **Table 1-2** below)

Table 1-2 Consideration of principles of ESD

Principle	Consideration in proposal
Precautionary principle - *if there are threats of serious or irreversible environmental damage, lack of scientific uncertainty should not be a reason for postponing measures to prevent environmental degradation. Public and private decisions should be guided by careful evaluation to avoid serious or irreversible damage to the environment where practicable, and an assessment of the risk-weighted consequences of various options.*	The proposal will not result in serious or irreversible environmental damage and there is no scientific uncertainty relating to the proposal.
Inter-generational equity - *the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*	The proposal will help to meet the needs of future generations by providing a reliable wastewater and drinking water service.
Conservation of biological diversity and ecological integrity - *conservation of the biological diversity and ecological integrity should be a fundamental consideration in environmental planning and decision-making processes.*	The proposal will not significantly impact on biological diversity or impact ecological integrity. There will be no significant impact to any threatened species or communities listed under the *Biodiversity Conservation Act 2016* (BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
Improved valuation, pricing and incentive mechanisms - *environmental factors should be included in the valuation of assets and services, such as 'polluter pays', the users of goods and services should pay prices based on the full life cycle costs (including use of natural resources and ultimate disposal of waste) and environmental goals*	The proposal will provide cost efficient use of resources and provide optimum outcomes for the community and environment. The lifecycle costs, and any costs of minimising environmental impacts were factored into the proposal decision-making.

2 Proposal description

2.1 Proposal details

Table 2-1 identifies the scope of work for the proposal and **Figure 2-1** shows the location. **Figures 2-2 to 2-6** show environmental constraints of each of the five sites. Ground-truthed ecological constraints for each site are shown in Appendix C.

Table 2-1 Description of proposal

<table>
<tr><th>Scope of work</th><th>Detailed description of work/ activity</th></tr>
<tr><td>Proposal description</td><td>The proposed works are summarised below:
<table>
<tr><th>Project element</th><th>Drinking water or wastewater</th><th>Location</th><th>Scope</th></tr>
<tr><td>Compound</td><td>NA</td><td>702 High St, Penrith (access via Mulgoa Rd) within an existing hardstand area</td><td>Setup, day-to-day use, and demobilisation</td></tr>
<tr><td>DW01</td><td>Drinking water</td><td>O’Connell St and O’Connell Ln, Caddens</td><td>1.4 km DN450 lead-in main</td></tr>
<tr><td>WW01</td><td>Wastewater</td><td>Between Begonia Ct and Marcus Clarke Cres, Glenmore Park</td><td>0.45 km DN450 duplicate gravity main</td></tr>
<tr><td>WW02</td><td>Wastewater</td><td>Between Penrith Wastewater Recycling Facility (WRRF) and approximately 500 m east of Ladbury Ave Reserve</td><td>2.3 km DN600 pressure main duplication</td></tr>
<tr><td>SP0906</td><td>Wastewater</td><td>1a Glenmore Parkway, South Penrith</td><td>Upgrades to SP0906 pumping station: pump capacity, dry weather storage, electrical work</td></tr>
</table></td></tr>
</table>

Scope of work	Detailed description of work/ activity			
	SP1026	Wastewater	25 Alston St, Glenmore Park	Upgrades to SP1026 pumping station: pump capacity, dry weather storage, electrical work

Location and land ownership	The location and suburb of each project element is in **Table 3-1**. All works are in Penrith City Council Local Government Area (LGA). The lot/DP and land ownership are listed below. • Compound: Lot 10, DP717196, managed/owned by council (**Figure 2-4**) • DW01: within road verge and road corridor of local roads managed by council (**Figure 2-2**) • WW01: within road verge and road corridor of local roads managed by council, as well as council-managed parkland around School House Creek (**Figure 2-3**) • WW02: through Sydney Water land, private property, roads managed by council, roads managed by Transport for NSW (TfNSW) (**Figure 2-4**) • SP0906: Lot 1, DP839433, land owned by Sydney Water (**Figure 2-5**) • SP1026: Lot 1, DP647341, land owned by Sydney Water (**Figure 2-6**).
Site establishment and access tracks	Access to each site will be via the existing road network. The established sites at SP0906 and SP1026 already have access tracks. Access to DW01, WW01, and WW02 may require additional access where construction is not within or adjacent to the road corridor. Access tracks identified following REF approval will be managed by the safeguard in **Section 5.2.11** of this REF.
Ancillary facilities (compounds)	A site compound is proposed at 702 High Street, Penrith, with access via Mulgoa Road **(Figure 2-4)**. The compound will be used for site sheds, construction amenities, material laydown, and parking of plant. Review of Nearmap indicates that the site has been used as a compound since December 2018 for a non-Sydney Water project. As of October 2022, the compound is a flat area, with established hardstand, and left-in/left-out access from Mulgoa Road via a paved access road. No additional hardstand or access tracks will be required however typical compound features such as security fencing, portable offices, portable amenities, and any other structures will need to be installed.

Scope of work	Detailed description of work/ activity
	Additional compounds required for the work following REF approval will be managed by the safeguard in **Section 5.2.11** of this REF.
Scope of work	**Scope and methodology steps common to all sites:** • Mobilise site including installing environmental, safety, and traffic controls • Install and relocate below ground and above ground assets, which will require ground disturbance and vegetation disturbance • Store all materials and waste neatly on site prior to use or disposal • Demobilise site including environmental, safety, and traffic control removal. **Drinking water and wastewater lines:** DW01: • Duplicate 1.4 km of DN450 main within road corridor and road verge • Connect to existing DN500 pipe on Caddens Road, and existing DN100 main on O'Connell Street • Install pipe using open trench methodology (high level steps shown below) • Install pipe at about 1.5-3 m below ground level. WW01: • Duplicate 0.45 km of DN450 gravity main, downstream of SP1026, through road corridor, public reserve (Rotary Park) and waterway (School House Creek) • Connect to existing maintenance hole 1080868 on Marcus Clarke Crescent and existing DN750 wastewater line near Begonia Court • Install pipe using a mix of open trench and trenchless methodology (high level steps described below). The waterway crossing will be open trenched as the waterway at this location is an underground pipe. The trenchless section is within the public reserve and under Glenmore Parkway. • Install pipe at about 2.5-6 m below ground level. WW02: • Duplicate 2.3 km DN600 pressure main from upstream of SP0897 to Penrith WRRF through vacant land, public reserve (Woodriff Gardens), road corridor, road verge, rail, private property, waterway (Boundary Creek), and Sydney Water land

Scope of work	Detailed description of work/ activity

- Connect to DN500main within public reserve south of High Street, and within the Penrith WRRF. Connect to existing DN600 pressure mains also required along Peachtree Road
- Install pipe using a mix of open trench and trenchless methodology (high level steps shown below). Pipe installation under Boundary Creek, High Street, Castlereagh Road, and the railway line will be trenchless.
- Install pipe at about 2-6 m below ground level.

Open trench excavation for pipe installation will likely include the following steps:

- Dig to required width and depth using excavator. A disturbance footprint ten metres either side of the pipe has been assumed for trenched excavation
- Lift pipe in using crane or similar
- Stabilise, bench, batter, and/or shore excavations greater than 1.5 m depth
- Backfill, cover, or fence off any excavations at the end of each shift
- Control groundwater, eg use of sump pumps or other dewatering methodologies may be required adjacent to creeks.

The distance of pipe laid each shift for trenched installation will vary depending on a range of factors including ground conditions.

Trenchless methods, sizes, and materials to be confirmed at detailed design. Launch and receival pits would be about 10m diameter and up to 6m depth, depending on pipe depth. Trenchless crossings may be performed using the following methodologies:

1. Micro tunnelling

- Dig out for launch pit and receival pit. These pits are required to install and remove machinery, install the pipes. The only surface excavation required for micro tunnelling is for pit construction and the distance between these pits is variable
- Push forward (using hydraulic jacks) a small tunnelling or cutting machine between launch pit and receival pit
- Refill the pits once the pipe has been installed.

2. Horizontal directional drilling (HDD)

- Use a drill rig to bore a hole from the launch pit to the receival pit
- Drill further at the receival pit to increase the diameter of the hole
- Use a drill rig to pull the pipe into the bore

Scope of work	Detailed description of work/ activity

- Manage waste from drilling mud and bore cuttings displaced for the pipe installation
- Refill the pits once the pipe has been installed.

3. Auger boring

- Dig out launch and receival pits
- Install the pipe on the auger drill, which is attached to a boring machine. The tip of the drill moves ahead of the pipe to loosen and move away the material
- Jack the pipe casing into place as the drilling progresses
- Manage waste from soil displaced for the pipe installation
- Remove auger and refill pits after the pipe casing is installed.

Pumping stations:

SP0906

- Upgrade the pump capacity from 215 L/s to 559 L/s, and build an additional 288 kL dry weather storage and required electrical upgrades
- Keep the existing wet well and dry well structures
- Upgrade the wet well valve, tanker discharge, and bypass arrangements
- Replace the dry well pipework
- Install the new dry-mounted pumps, valve chamber, inlet maintenance hole, emergency storage, hardstand, mobile generator
- Relocate the maintenance hole, sewer gravity main and underground electrical cable
- Decommission and relocate electrical substations within the site
- Construct the bypass and inlet maintenance hole first to allow the bypass to be used for the remainder of the construction project and keep the pressure main online
- Collect wastewater and discharge wastewater from tankers into maintenance holes during bypass connection and when bringing the station online.

SP1026

- Upgrade the pump capacity from 125 L/s to 384 L/s, and build an additional 582 kL dry weather storage and required electrical upgrades
- Install new slabs including substructure storage tank, hardstand for diesel pump, generator laydown area, concrete slab for substation

Scope of work	Detailed description of work/ activity
	• Install new access platform above 1 in 100-year flood level • Install new or relocated equipment and structures on the slabs, including substation, kiosk and canopy, load bank, generator, fuel tank, and fencing • Install new pipework including pressure main scour line, bypass line, ducts, vent shaft with activated carbon filter, valves, pipes, and pumps • Remove existing generator and concrete tank • Collect wastewater and discharge wastewater from tankers into maintenance holes during bypass connection and when bringing the station online. Shaft construction may be required at the pumping stations: • Install temporary shoring (if required) • Install rock bolting and shotcreting (may be required depending on rock quality) • Dewater if groundwater is found.
Commissioning	Commissioning involves testing and running the new equipment to ensure it works correctly and is integrated with existing plant operations. The exact commissioning steps depend on the type of the equipment, but typically include: • preparing and testing new infrastructure which may include pressure leak tests, checking of all equipment and safety devices • performance testing including sampling where required • providing site labelling (signage and labelling of equipment) • operator training and preparing maintenance manuals.
Restoration	The work site will be restored to the pre-existing condition following construction in consultation with landowners, including Penrith City Council. This may include re-planting, re-turfing, and/or re-installing hardstand.
Materials/ equipment	Plant, equipment, and materials include but are not limited to: • Light vehicles • Cranes • Trenchless equipment such as 8-wheel crane truck (12t), drilling rig, pipe ramming machine, compressor, and power pack • Dump trucks • Delivery trucks including loading cranes • Excavator • Compactor • Rock breaker (up to 13.5t)

Scope of work	Detailed description of work/ activity
	• Generators • Pumps • Portable lights • Asphalt profiler • Hand power tools • Clean fill • Asphalt • Chainsaw • Mulcher • Concrete truck • Concrete profiler • Pipework • Concrete • Cables.
Work hours	Work and deliveries will be scheduled to occur during standard daytime hours, where site constraints allow: • 7am to 6pm, Monday to Friday • 8am to 1pm, Saturdays. The proposal is expected to require work outside these hours, which has been assessed in this REF. Sometimes work is required at different times outside of the assessed hours (eg. for work in roads where Road Occupancy Licences do not allow for day works, or delivery of oversize equipment). Where this occurs, Sydney Water's Project Manager can approve work outside of standard daytime hours, following the approval process described in the safeguards in **Section 5**.
Proposal timing	Construction is expected to start in mid-late 2024. Duration of works at each site is estimated below. The staging of the proposal and whether works can be performed at more than one site at a time is currently unknown. • DW01: 4 months • WW01: 5 months • WW02: 23 months • SP0906: 15 months • SP1026: 18 months.
Operational requirements	No new or changed environmental operational risks and commitments (such as ongoing maintenance/ monitoring) were identified.

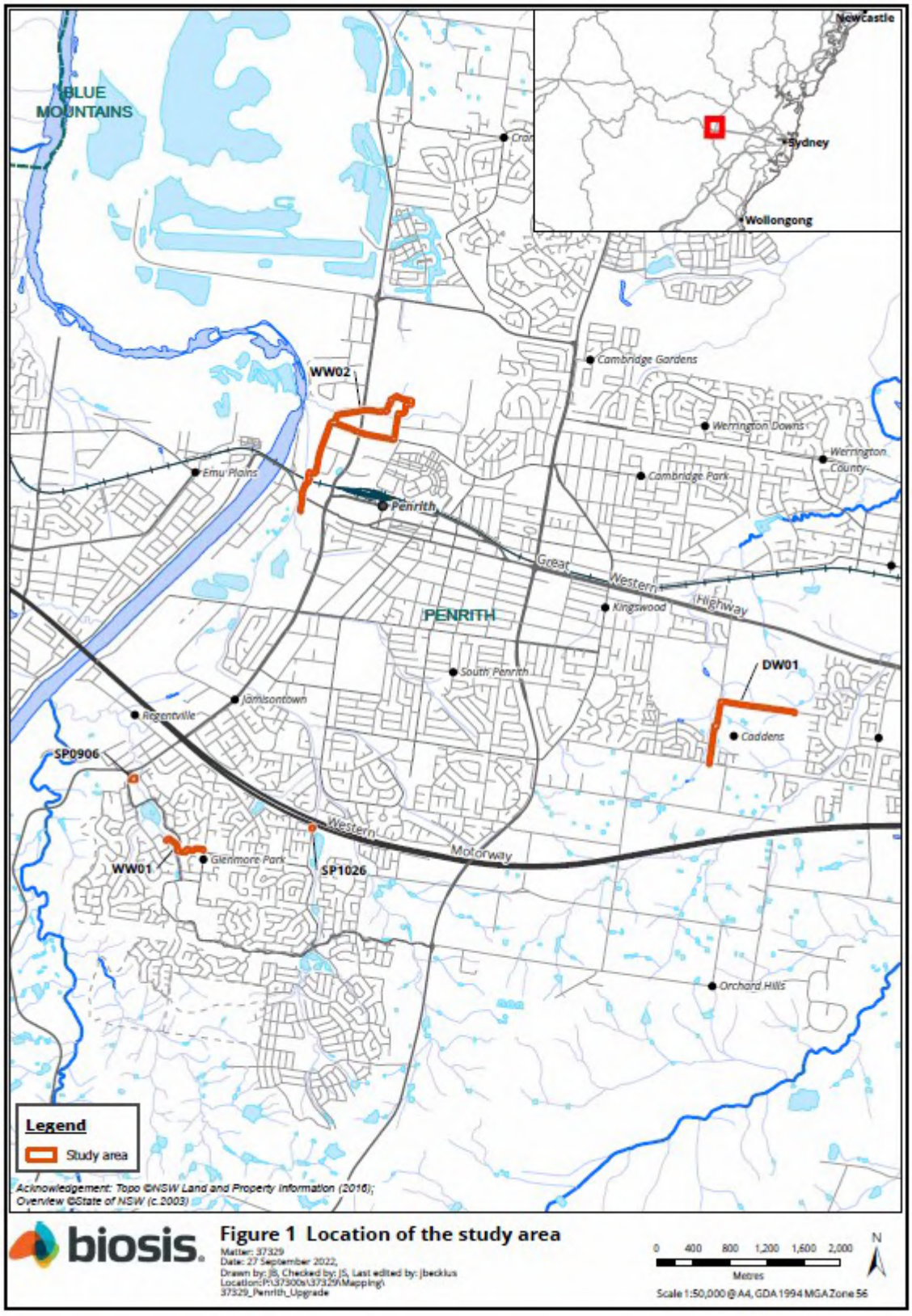

Figure 2-1 Location of the five sites assessed in this proposal (excluding the compound)

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Figure 2-2 Environmental constraints for DW01
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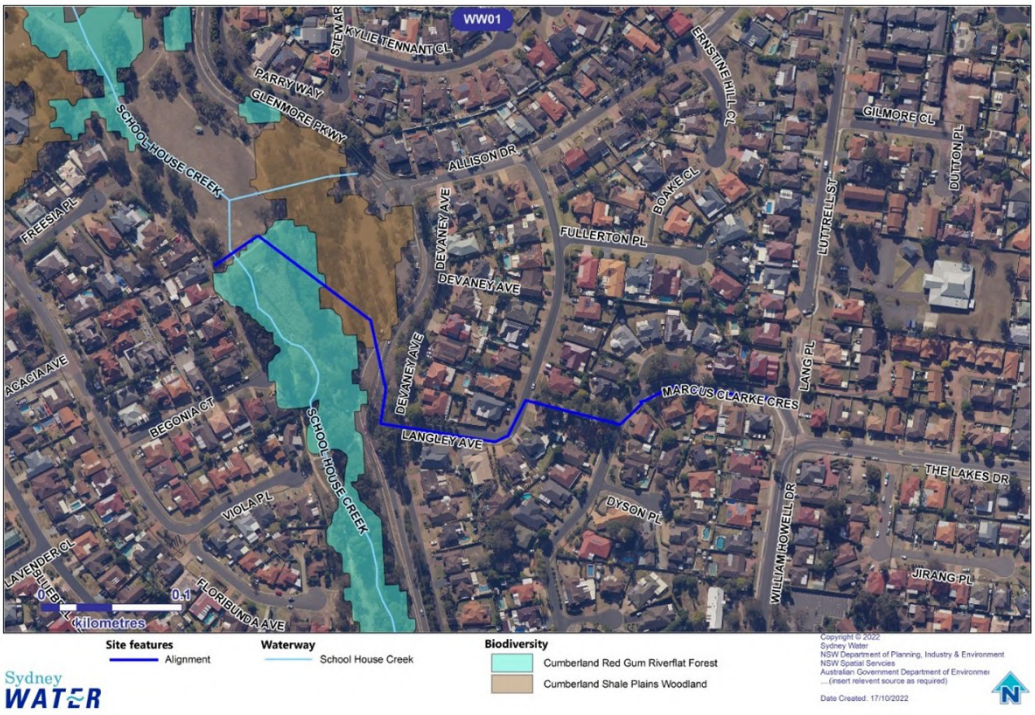

Figure 2-3 Environmental constraints for WW01

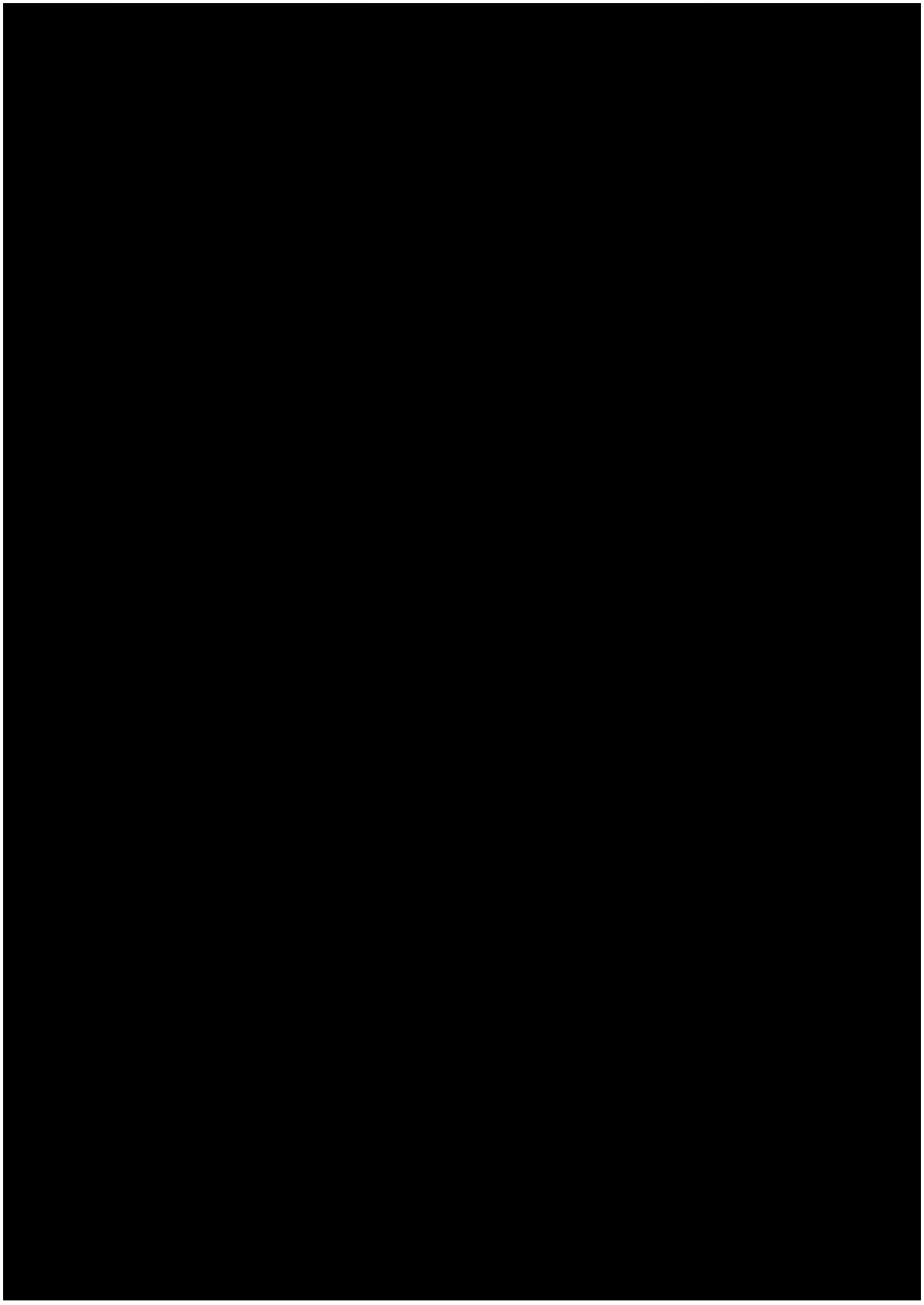

Figure 2-4 Environmental constraints for WW02 and compound
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Figure 2-5 Environmental constraints for SP0906
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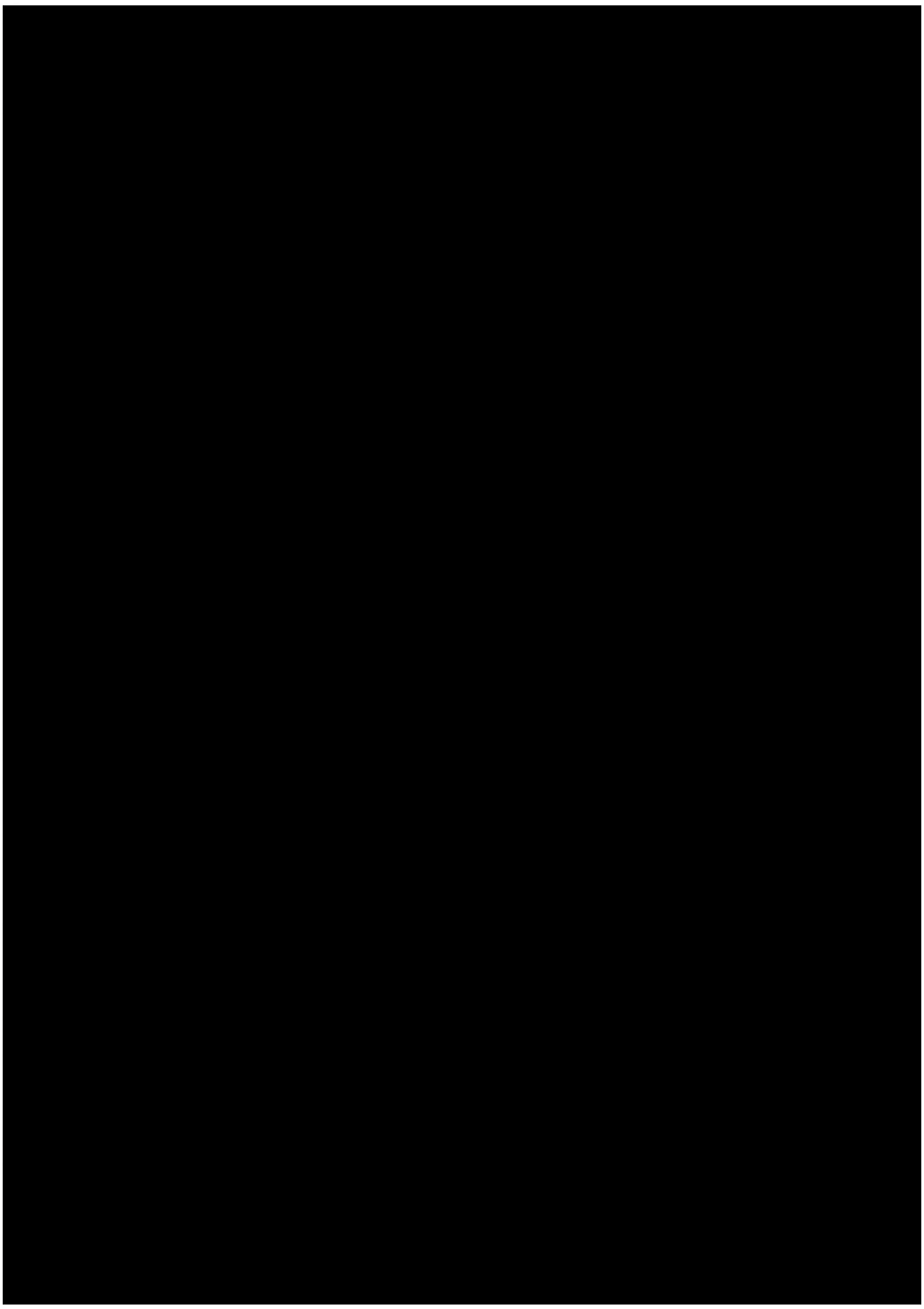

Figure 2-6 Environmental constraints for SP1026
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2.2 Field assessment area and changes to the scope of work

The alignments and design features shown in this REF are indicative and based on the latest concept design at the time of REF preparation. The final alignment may change based on detailed design and/ or construction planning. If the design/scope of work, construction methods or construction timing described in this document change significantly, supplementary environmental impact assessment must be prepared for the amended components in accordance with SWEMS0019.

The direct impact area is a ten metre buffer around the sites. The study area is a 20 m buffer around each of the sites. An addendum is not required provided the change:

- remains within the study area of the REF and has no net additional environmental impact; or
- is outside the study area of the REF but reduces the overall environmental impact of the proposal (subsection 5.4(a) of the Act).

Changes to the proposal outside the field assessment area can only occur:

- to reduce impacts to biodiversity, heritage or human amenity; or
- to avoid engineering (for example, geological, topographical) constraints; and
- after consultation with any potentially affected landowners and relevant agencies.

The Contractor will demonstrate in writing how the changes meet these requirements, for approval by Sydney Water's Project Manager, in consultation with the environmental and community representatives.

3 Consultation

3.1 Community and stakeholder consultation

Our approach to community and stakeholder consultation is guided by the Guidelines for Community and Stakeholder Engagement (Sydney Water, 2021).

Stakeholder and community engagement is a planned process of initiating and maintaining relationships with external parties who have an interest in our activities. Community and stakeholder engagement:

- enables us to explain strategy, policy, proposals, projects or programs
- gives the community and stakeholders the opportunity to share their knowledge, issues and concerns
- enables us to understand community and stakeholder views in our decision-making processes alongside safety, environment, economic, technical and operational factors.

The nature, scale and extent of the proposal's potential impact has been evaluated in this REF. If our work will impact the community in some way, we will consult with affected groups through a variety of ways and through different stages of a project. This includes engaging the broader community and stakeholders during plan or strategy development or before making key decisions. Key stakeholders identified to date include:

- Penrith City Council
- Utility owners (including Western Sydney University, Endeavour Energy, Telstra, Jemena, NBN, AARNet, Optus, TfNSW)
- Property owners where easements are required
- Adjacent residential receivers, particularly at SP1026, DW01, and WW01
- Sydney Trains and Australian Rail Track Corporation (ARTC) for works under railway line at WW02
- Business operators within the industrial zone at WW02
- Shopping complex at DW01 (Caddens Corner, corner O'Connell St and O'Connell Ln).

We will also provide local council with reasonable notice when we would like to commence works, regardless of the need for development consent. Penrith City Council will be consulted about matters identified in environmental planning instruments (refer **Section 4.2** below), including public safety issues, the placement of any temporary site sheds or laydown areas on council land, or full or partial road closures of council managed roadways.

Consultation with these stakeholders will continue following REF approval, and during detailed design, pre-construction, and construction.

3.2 Consultation required under State Environmental Planning Policies and other legislation

Sydney Water must consult with councils and other authorities for work in sensitive locations or where the work may impact other agencies infrastructure or land (specified in Part 2.2 Division 1 of the State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP).

Consultation was required under s2.10(1)(e) and s2.10(1)(f) as the proposal involves temporary enclosure of council land and excavation of council road and/or footpath. Further detail is provided in **Appendix B**.

Consultation has commenced (as of 16 September 2022) with Sydney Trains, Penrith City Council, and private landowners impacted by preliminary investigation works.

Consultation with Penrith City Council is ongoing and will continue through detailed design and pre-construction. A formal meeting was held on 30 August 2022 which included Penrith City Council, Sydney Water, and Regional Delivery Contractor (RDC) representatives. Outcomes and concerns discussed during this meeting include:

- Road and landscaping restoration at DW01 to be co-ordinated with council during delivery
- Proximity of works at WW01 to upcoming road upgrades at Glenmore Parkway roundabout, and intersection of Glenmore Parkway and Mulgoa Road
- Overlap of work footprint of WW02 with upcoming road upgrade including widening of Coreen Avenue (council preference is trenchless installation), upgrade of Peachtree Road and Castlereagh Road intersection
- Overlap of work footprint of WW02 with a new tennis court building, carpark and drainage upgrade south of the railway line
- Alternative access to site SP1026 through the adjacent parkland was discussed, which may require additional vegetation removal. It was noted that the ground condition of this land may not be suitable for trucks and heavy vehicles and use of the land would require sign-off from Dam Safety NSW
- There are no plans for any road widening near SP0906.

Notification to Department of Primary Industries Fisheries (DPI Fisheries) is not required under s199 of the *Fisheries Management Act 1994* as there is no excavation within the bank of a waterway classified as Key Fish Habitat. Should there be any scope changes which require crossing or dredging (which includes excavation) within the bank of a waterway classified as 'Key Fish Habitat', further assessment and consultation will be required.

Consultation will be undertaken by the delivery team with landowners regarding easements required for the proposal. Concerns raised to date regarding easements include potential interactions with a DA lodged on 20 Peachtree Road. The proposed pipeline alignment within this property is within an existing Sydney Water easement. There will be ongoing consultation with the landowners as design progresses.

4 Legislative requirements

4.1 Strategic context

The strategic context of the proposal is discussed in the Penrith CBD and Wider Area Water and Wastewater Precinct Plan (Sydney Water, October 2020).

Growth is a primary driver as the study area is within the Greater Sydney Region, which is one of the top ten fastest growing regions in the western world, predicted to add another 1.7 million people to the population between 2016 and 2036. The NSW Government has a strong focus on this growth with plans such as the Greater Sydney Commission's 'A Metropolis of Three Cities' and the supporting document 'Western Sydney District Plan' (a guide to implementing 'A Metropolis of Three Cities' at a district level) encouraging further development.

The Penrith CBD and wider area is part of the Western Parkland City under the 'A Metropolis of Three Cities' plan. Projects in Penrith CBD and wider area identified by this plan include:

- land release and urban renewal as part of a new urban corridor from Rouse Hill to Greater Macarthur
- a future investigation area from Greater Penrith to Eastern Creek (to link existing areas and major infrastructure)
- development of health precincts and universities (existing and new), and
- improved transport connections.

There is a focus on delivering the required drinking water and wastewater infrastructure to meet short-term growth in the study area.

The strategic complexity of the region requires alignment of proposed infrastructure with other developing strategies in the surrounding area. Planning decisions need to support new infrastructure, including drinking water and wastewater infrastructure, with a balance between population growth and infrastructure investment.

4.2 Environmental Planning and Assessment Act

Sydney Water is the proponent and determining authority under the EP&A Act. The proposal does not require development consent, and is not classified as State Significant Infrastructure. We have assessed this proposal under Division 5.1 of the EP&A Act. This REF has concluded that the proposal is unlikely to have a significant impact on the environment.

The following environmental planning instruments (**Table 4-1**) and legislation (**Table 4-2**) are relevant to the proposal. **Table 4-2** also documents any licences and permits, timing and responsibility for obtaining them.

Table 4-1 Consideration of environmental planning instruments relevant to the proposal

Environmental Planning Instrument	Relevance to proposal
Penrith Local Environmental Plan 2010 (Penrith LEP)	The proposal is on land zoned: • Compound: SP3 Tourist • DW01: R2 Low Density Residential, B7 Business Park, R1 General Residential, RE1 – Public Recreation • WW01: R2 Low Density Residential and RE1 Public Recreation • WW02: SP2 Infrastructure, IN1 General Industrial, RE1 Public Recreation, and SP3 Tourist • SP0906: SP2 Infrastructure • SP1026: SP2 Infrastructure. Bushland in urban areas (formerly Chapter 6 of the BC SEPP) is now assessed under clause 5.23 of the Penrith LEP. Sydney Water has considered the matters listed in subclause 5.23(7) of the Penrith LEP (refer **Section 5.2.1** to **5.2.3** of the REF) to limit disturbance to public bushland.
State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP)	<u>Wastewater (sewerage):</u> Section 2.125 of the TISEPP permits development by or on behalf of a public authority for sewage reticulation systems without consent on any land in the prescribed circumstances. The proposal involves development related to wastewater pumping stations and wastewater pipes. Development is carried out in the prescribed circumstances if it is carried out by or on behalf of a public authority. As Sydney Water is a public authority, the proposal is permissible without consent. <u>Drinking water (water supply):</u> Section 2.158 of the TISEPP permits development by or on behalf of a public authority for water reticulation systems without consent on any land. As Sydney Water is a public authority, the proposal is permissible without consent.
SEPP (Biodiversity and Conservation) 2021 (BC SEPP)	**Vegetation in non-rural areas (Chapter 2)** Chapter 2 of this SEPP applies as it is in an area or zone listed in subsection 2.3(1) (City of Penrith LGA and listed land zones). However, subsection 2.4(1) states: '*This Policy does not affect the provisions of any other SEPP….*', and as the works are

Environmental Planning Instrument	Relevance to proposal
	permissible under the TISEPP a Council permit to clear vegetation under this SEPP is not required. **Hawkesbury-Nepean River (Chapter 6)** Chapter 6 of this SEPP applies as the proposal is on land mapped under Part 6.1 of the SEPP. Sydney Water has taken into consideration, the requirements of Division 5.2 and Division 5.3 of Part 6.2 of the SEPP (see **Section 5.2.2** of the REF). **Strategic conservation planning (Chapter 13)** Chapter 13 of this SEPP contains development controls for areas mapped under the Cumberland Plain Conservation Plan (CPCP). The CPCP is a conservation plan for Western Sydney that identifies strategically important biodiversity areas within the Cumberland subregion to offset the biodiversity impacts of future urban development to facilitate a vibrant, green and liveable city. Most of the study area is mapped as 'excluded land', which means that the land is excluded from the CPCP. However, the southern end of DW01 contains a small portion of 'certified-urban capable land' (certified land). Certified land does not require further biodiversity assessment under the BC Act or EPBC Act. No vegetation impact is required in this certified area, therefore the requirements of the CPCP do not apply.

Table 4-2 Consideration of key environmental legislation

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
Protection of the Environment Operations (POEO) Act 1997	The proposal is consistent with an existing activity under EPL 1409 and existing compliance requirements. Temporary relaxation of the EPL is not required during construction/ commissioning. A variation to EPL 1409 is not required for operation. It is expected that the upgrades to the wastewater assets will allow the system to meet its compliance requirements.	NA	NA
Biodiversity Conservation (BC) Act 2016	Overall, there will be an impact to 0.34ha of Threatened Ecological Communities (TECs) listed under the BC Act, all of which is	NA	NA

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
	identified as potential habitat for two threatened species. Tests of Significance confirmed that this project will not result in a significant effect on threatened species, populations, or communities listed under the BC Act (Biosis, 2022).		
National Parks and Wildlife (NPW) Act 1974	No works are required within or adjacent to National Park land. The works will not impact any known Aboriginal Heritage sites or objects and an Aboriginal heritage due diligence assessment confirmed that the likelihood of encountering previously unknown Aboriginal heritage items is low to negligible	NA	NA
Heritage Act 1977	There are four listed non-Aboriginal heritage items within 100 m of the proposed works. No direct impacts are expected to these items. Given the historic disturbance within and adjacent to the sites, the likelihood of encountering previously unknown non-Aboriginal heritage items is low to negligible.	NA	NA
Fisheries Management (FM) Act 1994	Notification is required to DPI Fisheries under section 199 of the FM Act prior to dredging or reclamation by a public authority. Sydney Water is required to notify DPI when these activities are performed within Key Fish Habitat. Multiple sites require work to be performed within land mapped as Key Fish Habitat, however, excavation will only take place above the top of bank. If the scope changes, further assessment and consultation will be required. Impacts to these waterways are expected to be negligible with the implementation of suitable mitigation measures.	notification, permit if required	Pre-construction, delivery team
Water Act 1912/ Water Management Act 2000	Groundwater is likely to be encountered during construction. This is based on the depth of excavation and preliminary advice	WSWA (for <3ML) and	Pre-construction, Contractor

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
	on depth of groundwater as 0-8 metres below ground level (Penrith CBD and Wider Area Geotechnical Desk Study, Planning Partner, 2022). A Water Supply Works Approval (WSWA), or Water Access Licence if dewatering >3ML groundwater (WAL), will be required to be applied for, and approved by Department of Planning and Environment (DPE Water) before any excavations commence. The application process will commence during detailed design once groundwater levels, dewatering volumes, and other construction details are known.	WAL (for >3ML)	
Roads Act 1993	Works at WW02 will cross TfNSW (State) roads (Castlereagh Rd, High St) using under-boring methodology. It is therefore unlikely that ROLs will be required for this activity. The delivery contractor will confirm ROL requirements closer to construction and apply for any ROLs needed for the work.	Road Occupancy Licence (ROL)	Pre-construction, Contractor
Environment Protection and Biodiversity Conservation (EPBC) Act 1999	Matters of National Environmental Significance (NES) relevant to the current project include nationally threatened species and ecological communities. An ecological assessment (Biosis, 2022) confirmed that: • It is unlikely that a significant impact on a Matter of NES will result from the project, and • A referral of the proposed action to the Australian Government Minister for the Environment for approval under the EPBC Act is not required.	NA	NA

5 Environmental assessment

The potential environmental aspects and direct and indirect impacts associated with construction and operation of the proposal are identified in **Section 5** as well as safeguards to minimise these. These safeguards will be incorporated into contract documents and a Construction Environmental Management Plan (or similar) to be developed by the Contractor prior to commencement of work.

5.1 Existing environment

The study area for the proposal is highly urbanised and covers a range of land uses, including residential, recreational, and industrial. Residential properties are adjacent to most of the sites. There are sensitive areas in the study area such as waterways and TECs. Historically, land use was mainly farmland, prior to the construction of residential properties, other buildings, and artificial structures such as reservoirs.

5.2 Environmental aspects, impacts and safeguards

5.2.1 Topography, geology and soils

Existing environment

Common topographical, geological, soil, and contamination features for each construction site are:

- Extremely low to low probability of encountering acid sulfate soil (ASS)
- Moderate to high potential of localised salinity
- Not within a mine subsidence district
- Low to moderate risk of encountering contamination, due to present and historic land use (eg industrial properties adjacent to WW02, historic pesticide use from farmlands)
- Potential to encounter groundwater during any ground disturbance (refer **Section 5.2.2** of the REF)
- Not within mapped “potentially unstable areas”
- Topography is generally flat or gently sloping
- Soil types which have poor drainage and are susceptible to erosion.

Specific topographical, geological, soil, and contamination features for each construction site have been considered below:

- DW01
    - Previous land use of farms and open fields up until the 2000s and 2010s when there was construction of an artificial reservoir, extension and upgrade of existing roads, installation of new roads, and construction of a shopping centre along with residential properties
    - Soil landscapes of Erosional – Luddenham and Alluvial – South Creek
    - Soil limitations include flood hazard, seasonal waterlogging, localised permanently

high water tables, localised water erosion hazard, and localised surface movement potential.

- WW01
    - The area was undisturbed until the 1950s. Between the 1950s and 1980s the area was used for farmland. Around the 1990s, there was significant earthworks related to construction of roads and residential properties
    - Soil landscapes of Residual – Blacktown and Erosional – Luddenham
    - Soil limitations include flood hazard, localised seasonal waterlogging, localised permanently high water tables, localised water erosion hazard, moderately reactive highly plastic subsoil, and localised surface movement potential.
- WW02
    - The area was largely cleared by 1943. Land use was mostly farmland with the existing railway line and some current roads visible. . The Penrith WRRF was constructed in the 1970s. There has been an ongoing increase in the presence and footprint of industrial and commercial uses in the area since the 1970s
    - Soil landscapes of Alluvial – Richmond and Alluvial – Freemans Reach
    - Soil limitations include high streambank erosion hazard, localised water erosion hazard on terrace edges, localised flood hazard, permanently high water tables, localised seasonal waterlogging, localised wave erosion hazard, localised non-cohesive soils.
- SP0906
    - The area was undisturbed until the 1950s. Between the 1950s and 1980s, there was minor land clearing, construction of a farm dam, and minimal residential development. Around the 1990s, there was earthworks for residential properties, road upgrades, road installation, and replacement of the farm dam with a larger reservoir
    - Soil landscapes of Alluvial – Richmond, Erosional – Luddenham, and Residual – Blacktown
    - Soil limitations include localised flood hazard, localised water erosion hazard on terrace edges, localised seasonal waterlogging, localised permanently high water tables, localised water erosion hazard, moderately reactive highly plastic subsoil, and localised surface movement potential.
- SP1026
    - Significant disturbance in the 1970s involved earthworks for the M4 Motorway and residential properties and installation of a drainage canal. Further earthworks in the late 1990s for further residential development, filling in the drainage canal, and construction of a nearby reservoir along with the pump station itself
    - Soil landscapes of Alluvial – South Creek and Residual – Blacktown
    - Soil limitations include flood hazard, localised seasonal waterlogging, localised permanently high water tables, localised water erosion hazard, localised surface movement potential, and moderately reactive highly plastic subsoil.

Potential impacts

During construction, we will need to perform activities such as:

- Excavation for open trenching and launch and receival pits
- Stockpiling of soil and other materials
- Removal or relocation of on-ground (eg concrete pavement) and below-ground (eg cabling) assets
- Installation of on-ground (eg concrete slab) and below-ground (eg pipework) assets
- Installation of temporary access tracks
- Movement of plant, vehicles, and equipment along unsealed access tracks
- Removal of mature vegetation.

These activities will cause ground disturbance that could result in potential offsite erosion and sedimentation of surrounding land and waterways.

Inappropriate management of these different soil types include potential impacts to surrounding land and waterways from off-site leaching of contaminants and/or saline soils. Soil salinity may also impact the durability of concrete or steel infrastructure and require the use of different materials.

The proposal is not expected to permanently change the surface topography and drainage patterns of the area. The area will be returned to its original topography and drainage pattern following construction. No impacts are anticipated during operation.

Potential impacts to topography, geology, and soils during construction can be managed with the safeguards below.

Safeguards
Prevent sediment moving offsite (including avoiding sedimentation of receiving waterbodies and other indirect impacts to surrounding biodiversity values) in accordance with Managing Urban Stormwater, Soils and Construction, Volume 1 and 2A (Landcom 2004 and DECC 2008), including, but not limited to: • Develop an Erosion and Sediment Control Plan (ESCP), with separate ESCPs for each of the five sites • divert surface runoff away from disturbed soil and stockpiles • install sediment and erosion controls before construction starts • reuse topsoil where possible and stockpile separately • inspect controls at least weekly and immediately after rainfall • rectify damaged controls immediately • remove controls once surfaces have been stabilised, including removing trapped sediment in drainage lines.
Minimise ground disturbance and stabilise disturbed areas progressively.
Contractor to ensure imported material is Virgin Excavated Natural Materials (VENM) or meets a relevant NSW EPA Resource Recovery Order and Resource Recovery Exemption, or is a commercially supplied material that is not waste. If using materials that are subject to a NSW EPA Resource Recovery Order/Exemption the contractor must ensure the conditions in that Order/Exemption are strictly adhered to.
Stop work in the immediate vicinity of suspected contamination. Indicators of contamination include discoloured soil, anthropogenic material within fill, asbestos, chemical or petrol odours and leachate. Contain disturbed material on an impermeable surface and cordon areas off. Notify the Sydney Water Project Manager and the Environmental Representative (who will contact Property Environmental Services) to agree on proposed management approach.

Stop work during heavy rainfall or in waterlogged conditions when there is a risk of sediment loss off site.
Sweep up any sediment/soil transferred off site at least daily, or before rainfall.
Eliminate ponding and erosion by restoring natural landforms to the pre-works condition.
Adopt appropriate soil salinity mitigation measures in accordance with Western Sydney Salinity Code of Practice (Western Sydney Regional Organisation of Councils, 2003). This may include: • treat existing salinity with gypsum • establish salt tolerant species in existing or potential salinity problem areas after construction • stabilise existing areas of erosion • minimise water use on site • avoid rotation and vertical displacement of the original soil profile • backfill excavations deeper than one metre in the same order, or treat or use this material as fill at depths more than one metre from the finished level.

5.2.2 Water and drainage

Existing environment

Our proposal is:

- Within or adjacent to the following waterways:
    - Compound: approximately 150 m east of a tributary of Peach Tree Creek which is not key fish habitat at that location. This tributary flows into Peach Tree Creek and the Nepean River (**Figure 2-4**)
    - SP0906: School House Creek, which is key fish habitat at this location, is within the impact area for these works. This creek flows into Mulgoa Creek and then the Nepean River (**Figure 2-5**)
    - SP1026: Surveyors Creek, which is key fish habitat at this location. This creek flows into Peach Tree Creek and then into the Nepean River (**Figure 2-6**)
    - DW01: Werrington Creek, which is key fish habitat, is adjacent to O'Connell Lane. This creek flows into South Creek and then the Hawkesbury River. It has been assessed by the ecologist as being in moderate condition (**Figure 2-2**)
    - WW01: School House Creek, which is not key fish habitat at this location, is within the impact area for these works. This creek flows into Mulgoa Creek and then the Nepean River. It has been assessed by the ecologist as being in poor condition (**Figure 2-3**)
    - WW02: the southern section of WW02 is adjacent to Peach Tree Creek. The northern section of WW02 passes under and adjacent to Boundary Creek, near Coombes Drive. Both creeks are key fish habitat and flow into Nepean River. Boundary Creek has been assessed by the ecologist as being in moderate condition (**Figure 2-4**).
- Partially within flood prone areas:
    - Compound: entrance may be flooded to 0.5 m depth during 1 in 100-year flood event (source: SES website)

- SP0906: potential for flooding to up to 2 m depth on the eastern side of the lot during a 1 in 100-year flood event (source: SES website)
- SP1026: within the 1in 100 local catchment overland flow path (Source: Penrith City Council)
- DW01: O'Connell Lane only (not O'Connell Street) is on flood planning land (the 1 in 100-year flood event plus an appropriate freeboard, typically 0.5m) (Source: Penrith City Council)
- WW01: not on land mapped to flood in a 1 in 100-year flood event (Source: SES website)
- WW02: all land south of Boundary Creek is within the flood planning area (the 1 in 100-year flood event plus an appropriate freeboard, typically 0.5m). The remainder of WW02 has potential for flooding to up to 1.2 m depth on the eastern side of the lot during a 1 in 100-year flood event (Source: SES website).

- In an area where groundwater may be encountered between 0-8 m below ground level (Penrith CBD and Wider Area Geotechnical Desk Study, Planning Partner, 2022). Groundwater investigations are currently underway, with outcomes that will inform detailed design.
- Is not in an area administered by Water NSW and a NorBE assessment is not required.

Potential impacts

The proposal will require:

- storage of fuels and chemicals on site
- excavation up to six metres deep and other ground disturbance which may intercept groundwater
- works in or near waterways
  - open trenching of pipe at School House Creek (an underground pipe at this location)
  - trenchless excavation of pipe at Boundary Creek
  - open trenching and trenchless excavation of pipe near Peachtree Creek
  - open trenching of pipe near Werrington Creek
  - excavation for pump station upgrades near Surveyors Creek and School House Creek
- discharge or dewatering of groundwater and/or wastewater. A WSWA and/or WAL will also likely be required. This requirement will be determined once groundwater investigations have been finalised
- temporary wastewater bypass (within the pumping station site boundaries)
- excavation and material storage within flood prone areas.

If not managed effectively, poor site management of these activities may cause the following impacts:

- soil, waste, and other materials to mobilise and lead to pollution of waterways
- increase movement of spoil offsite from flooding.

Potential impacts to water and drainage during construction and operation can be managed using the below safeguards.

Safeguards
Consider the DPI Water Guidelines for laying pipes and cables in watercourses on waterfront land during the design and construction of works within 40 m of all creeks to protect waterfront land.
Use appropriate controls to avoid potential sedimentation to waterbodies (eg flotation boom).
Bund potential contaminants and store on robust waterproof membrane, away from drainage lines.
Locate portable site amenities, chemical storage and stockpiles of erodible materials away from watercourses, drainage lines and flood prone areas.
Conduct refuelling, fuel decanting and vehicle maintenance in compounds where possible. If field refuelling is necessary, designate an area away from waterways and drainage lines with functional spill kits close by.
Keep functioning spill kit on site for clean-up of accidental chemical/fuel spills. Keep the spill kits stocked and located for easy access.
During the works, stockpiles are to be kept to a minimum to ensure that off-site disposal or adequate mitigation measures to prevent sedimentation of waterways can be established in the event of a large flood warning.
Discharge all water in accordance with Sydney Water's Water Quality Management During Operational Activities Policy (D0001667) including erosion controls, discharge rate, dechlorination, monitoring. Re-use potable / groundwater water where possible.
If the potential for intercepting groundwater is identified after the REF is determined, Sydney Water will obtain a groundwater Water Supply Works Approval and where dewatering is >3ML per water year (from 1 July) a Water Access Licence from NRAR will also be obtained. The Delivery Contractor is responsible for: • providing expert hydrogeological technical information to obtain the approvals preparing a Dewatering Management Plan • complying with the approval conditions (such as protecting water quality; minimising aquifer extraction volumes, monitoring extraction with flow meters and recording volumes).
If wastewater bypass is required: • pressure test hoses before, and monitor during bypass • monitor wastewater flows to ensure critical flows are not reached • stop bypass if leaks occur • bund access chambers • contain wastewater spills and pump back to wastewater system or disposal tanker.
Conduct any equipment wash down within a designated washout area.
Ensure equipment is leak free. Repair oil/fuel leaks immediately or remove from site and replace with a leak-free item.

5.2.3 Flora and fauna

Existing environment

A specialist ecological assessment was performed (Appendix C). A summary of the overall site features and predicted impacts are shown below. A ten-metre buffer around the proposed works (referred to as the impact area) was used to assess direct impact, where ground disturbance was likely. A 20 metre buffer (the study area) was applied around the proposed works (regardless of ground disturbance) to identify nearby constraints and other direct or indirect impacts. Along with desktop studies, site investigations were performed on 7 June, 8 June, and 9 September 2022.

Vegetation communities recorded in the study areas are shown in Table 5-1:

Table 5-1 Vegetation communities in the study area

Plant community type (PCT)	Name	Area	EPBC Act listing	BC Act listing	Sites present
835	River-flat Eucalypt Forest on Coastal Floodplains of Southern New South Wales and Eastern Victoria (under EPBC Act) River-flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (under BC Act)	0.82 ha	Critically Endangered	Endangered	SP0906, DW01, WW01
849	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (under EPBC Act) Cumberland Plain Woodland in the Sydney Basin Bioregion (under BC Act)	0.58 ha	Critically Endangered	Critically Endangered	DW01, WW01, WW02
1800	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland (under EPBC Act) Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (under BC Act)	0.40 ha	Endangered	Endangered	WW01, WW02, SP1026
781	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion	0.06 ha	NA	Endangered	WW01
NA	Urban native/exotic (including exotic grassland and planted gardens)	2.20 ha	NA	NA	SP1026, DW01,

	WW01, WW02

Other ecological features present at the study areas include:

- A small portion of 'certified-urban capable land' (certified land) zoned under the CPCP at the southern end of DW01
- Vegetation which provides diverse fauna habitats including:
    - Ephemeral creeks for frogs and other aquatic species
    - Nectar and fruit-producing canopy and mid-storey vegetation for arboreal mammals, birds, and flying foxes
    - Leaf litter and ground cover for ground-dwelling and cryptic terrestrial fauna
- Three hollow-bearing trees (present at WW01 and DW01)
- Eight priority weeds, including six Weeds of National Significance
- No threatened aquatic species are considered likely to occur within the study area
- Moderate likelihood of the following BC Act and EPBC Act listed threatened species occurring within the study area:
    - Cumberland Plain Land snail *Meridolum corneovirens* (Vulnerable, BC Act).
    - Glossy Black-Cockatoo *Calyptorhynchus lathami* (Endangered, EPBC Act and BC Act).
    - Grey-headed Flying-fox *Pteropus poliocephalus* (Vulnerable, BC Act).
    - Swift Parrot *Lathamus discolor* (Endangered, EPBC Act and EPBC Act).
    - Five Vulnerable listed BC Act microbats:
        - Eastern Coastal Free-tailed Bat *Micronomus norfolkensis*.
        - Greater Broad-nosed Bat *Scoteanax rueppellii*.
        - Southern Myotis *Myotis Macropus*.
        - Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*.
        - Large Bent-winged Bat *Miniopterus orianae oceanensis*.

Figures 2-2 to **2-6** in this REF reflect NSW Department of Planning and Environment vegetation mapping. There may be some differences between this mapping and the ground-truthed vegetation communities mapped in the ecologist report.

Potential impacts

The impact assessment identified the following:

- No impacts to the CPCP certified land
- No threatened aquatic species are considered likely to be impacted by the proposed works

- Direct impacts to 0.16 ha of PCT 835 (TEC BC Act and EPBC Act)
- Direct impacts to 0.16 ha of PCT 849 (TEC BC Act and EPBC Act)
- Direct impacts to 0.09 ha of PCT 1800 (TEC BC Act and EPBC Act)
- Indirect impacts to PCT 781 (TEC BC Act)
- No impact to any hollow bearing trees
- Direct impacts to 0.41 ha potential habitat for the Swift Parrot and Cumberland Land Snail
- Direct impacts to about twelve locally indigenous native trees that are not part of a vegetation community
- Direct impacts to about ten exotic street trees that may be removed
- No significant effect on threatened species, populations or communities listed under the BC Act (in accordance with the Tests of Significance)
- Unlikely that a significant impact on a Matter of National Environmental Significance (NES), such as the Swift Parrot, will result from the project (in accordance with the Significant Impact Criteria assessment)
- Overall, ecological impacts from the proposed works are considered minor and localised.

The proposed works are not within a growth centre as defined within the SEPP (Western Parklands City) 2021. The proposed works are not within or adjacent to National Parks land or a Biodiversity Stewardship site.

Although formal offsets are not required under the BC Act, Sydney Water has an internal position to deliver a 'maintained or enhanced' biodiversity outcome if projects have residual biodiversity impacts. Refer to SWEMS0019.13 for calculating offset requirements.

Potential impacts to flora and fauna during construction and operation can be managed using the below safeguards.

Safeguards
Residual impacts to native vegetation and trees will be offset in accordance with the Biodiversity Offset Guideline (SWEMS0019.13).
Minimise vegetation clearance and disturbance, including impacts to standing dead trees and riparian zones. Where possible, limit clearing to trimming rather than the removal of whole plants.
Physically delineate vegetation to be cleared and/or protected on site and install appropriate signage prior to works commencing.
Adjust methodology (eg avoid area, hand excavate, implement exclusion fencing) to protect sensitive areas where possible (such as mature trees, known threatened species, populations or ecological communities).
Protect trees in accordance with the requirements of Australian Standard 4970-2009 for the Protection of Trees on Development Sites. Do not damage tree roots unless absolutely necessary, and engage a qualified arborist where roots >50 mm are impacted within the Tree Protection Zone.

Retain dead tree trunks, bush rock or logs in-situ unless they are in the impact area and moving is unavoidable. Reposition material elsewhere on the site or approved adjacent sites. If native fauna is likely to be present, a licenced ecologist should inspect the removal and undertake fauna relocation.

Inspect vegetation for potential fauna prior to clearing or trimming. If fauna is present, or ecological assessment has determined high likelihood of native fauna presence, including removal of hollow bearing trees, engage WIRES or a licenced ecologist to inspect and relocate fauna before works.

If native fauna is encountered on site, stop work and allow the fauna to move away unharassed. Engage WIRES or a licenced ecologist if assistance is required to move fauna.

Avoid impeding/blocking fish passage. Retain snags and natural obstructions in waterways where possible.

If any threatened species (flora or fauna) is discovered during the works, stop work immediately and notify the Sydney Water Project Manager. Work will only recommence once the impact on the species has been assessed and appropriate control measures provided.

Manage biosecurity in accordance with:

- *Biosecurity Act 2015* (see NSW Weedwise), including reporting new weed infestations or invasive pests
- contemporary bush regeneration practices, including disposal of sealed bagged weeds to a licenced waste disposal facility.

Record Pesticides and Herbicides use in accordance with SWEMS0017

To prevent spread of weeds:

- clean all equipment including PPE prior to entering or leaving the work sites
- wrap straw bales in geofabric to prevent seed spread.

Minimise impacts on native vegetation in non-certified areas and native vegetation retention areas. Options to consider where feasible include:

- alternative construction methodologies (under bore vegetation and waterways, compressed construction corridors)
- avoiding impact to hollow bearing and habitat trees.

Vegetation removal must not occur until the following are complete:

- the area to be removed has been physically delineated
- the Contractor's Environmental Representative has confirmed consistency with approval documentation
- pre-clearing surveys, if relevant and
- written authorisation to commence clearing from Sydney Water Project Manager.

Pre-clearing assessments for Cumberland Plain Land Snail should be undertaken at sites containing:

- Cumberland Plain Woodland (PCT 849)
- River-flat Eucalypt Forest (PCT 835).

All staff on site to be educated on the ID characteristics of the threatened species listed in section 4.5 of the ecologist report, and advised not to handle fauna species under any circumstances during toolbox talks.

These threatened species are:

- Cumberland Plain Land Snail

- Glossy Black Cockatoo
- 5 microbat species:
    - Eastern Coastal Free-tailed Bat
    - Greater Broad-nosed Bat
    - Southern myotis
    - Yellow-Bellied Sheathtail Bat
    - Large bent-winged Bat
- Grey-headed flying fox
- Swift Parrot
- Spotted Harrier
- Square-tailed Kite
- White-bellied sea eagle.

No-go fencing to be installed for retained vegetation to ensure surrounding area remains undisturbed.

5.2.4 Heritage

Existing environment and potential impacts

Aboriginal heritage

A due diligence impact assessment based on each construction location has been performed:

- [redacted]

This information has been redacted to protect sensitive Aboriginal heritage information.

This information has been redacted to protect sensitive Aboriginal heritage information.

Non-Aboriginal heritage

The proposal is located within 100 m of the following non-Aboriginal heritage items listed under the Penrith LEP (all with local significance):

- Former teacher's residence (adjacent to DW01) – ID 670 – 56 Second Avenue, Kingswood (note: this footprint is now being used for the Western Sydney University – Kingswood Campus)
- Combewood – house, garden, trees, and original entrance drive (adjacent to WW02 footprint) – ID 163 – 234-256 Coreen Avenue, Penrith
- Bennetts Wagons (approximately 100 m from WW02 footprint) – ID 829 – 2151a Castlereagh Road, Penrith
- Peachtree Creek Bridge (within WW02 footprint) – ID 257 – Peachtree Creek, Penrith (at High Street).

The proposal will not directly impact any listed heritage items. Indirect impacts may be experienced if vibratory equipment is required to be used within or adjacent to the boundaries of these heritage items. Appropriate safeguards have been identified to minimise potential impacts and these are shown in the Noise and Vibration section (**Section 5.2.5**) of this REF.

Potential impacts to Aboriginal and non-Aboriginal heritage during construction can be managed using the below safeguards.

Safeguards
Do not make publicly available or publish, in any form, Aboriginal heritage information on sites / potential archaeological deposits, particularly regarding location.
Repeat the basic AHIMS search if it is older than 12 months. Conduct additional assessment if new sites are registered and could be impacted by the works.
If any Aboriginal object or non-Aboriginal relic is found, cease all excavation or disturbance in the area and notify Sydney Water Project Manager in accordance with SWEMS0009.

5.2.5 Noise and vibration

Existing environment – noise and vibration

The closest sensitive receivers to each site include:

- Compound: works near residential properties on John Tipping Grove, about 80 m east of the compound. The compound is surrounded by vacant grassed land owned by council. There are also residential properties about 100 m north-west of the compound (High Street) and about 120 m south of the compound (Mulgoa Road).
- DW01: works adjacent to residential properties along O'Connell Lane and O'Connell Street. Other adjacent sensitive land use includes Western Sydney University – Penrith (Kingswood and Werrington South Campus) and the Caddens Corner Shopping Centre (open 7am to 10pm daily). One non-Aboriginal heritage listing within the study area.
- WW01: works adjacent to residential properties along Marcus Clarke Crescent, Langley Avenue, Devaney Avenue, Glenmore Parkway, and Begonia Court. Other adjacent sensitive land use includes public recreation (open grassland and trees).
- WW02: works adjacent to residential properties at 686 and 688 High Street, at the southern alignment of WW02. Other adjacent sensitive receivers include public recreation (public parkland either side of High Street, and the tennis courts south of the railway line), retail/industrial properties, and the Penrith WRRF. Two heritage structures are within the study area.
- SP0906: works near residential properties along Woodbrook Grove, Mulgoa Road, and Heritage Court, Glenmore Park, between 30 and 50 metres from the property boundary of the pumping station. Adjacent sensitive land use includes public recreation (open grassland and trees) to the south and east of the pumping station.
- SP1026: works adjacent to residential properties at 1 Kukundi Drive and 22 Kuraji Close, Glenmore Park. The eastern boundaries of these residential properties are shared with the western boundary of the pumping station. SP1026 is also bordered by a footpath and a public recreational area (open grassland, reservoir, trees, sports fields).

Potential impacts – noise

The proposal will generate noise during construction from a range of activities, including excavation, trenchless pipe installation, compound use, and asset upgrades. Work will occur during and outside of standard construction hours.

The likelihood of noise impact from the proposal was reviewed against risk factors (following Table 2 of the EPA's 2020 Draft Construction Noise Guideline). The review indicated that the likelihood of noise impact will be medium-high risk and therefore a quantitative noise assessment was performed.

A quantitative assessment (refer to Appendix D) has been performed for each site using the RMS Construction and Maintenance Noise Estimator. The following assumptions were made for the inputs to the noise assessment for each site (**Table 5-2**):

Table 5-2 Noise assessment inputs

	Representative noise background^	Day or night work	Duration	Noisiest plant*
Compound	R3	Both	Use for all sites	Road truck
DW01	R2	Night	12 weeks	13.5t excavator with hammer
WW01	R2	Night	20 weeks	13.5t excavator with hammer
WW02	R3	Night	100 weeks	13.5t excavator with hammer
SP0906	R4	Day	15 months	13.5t excavator with hammer
SP1026	R3	Day	18 months	13.5t excavator with hammer

**Will be used intermittently, prior to midnight. Will not be used for the entire shift or every shift.*

^R2 – background noise typically influenced by distant road traffic noise. R3 – background noise typically influenced by road traffic noise. R4 – background noise typically influenced by road traffic noise and other infrastructure

The noise assessment outcomes (Appendix D) are preliminary based on the final design. However, there are still uncertainties regarding specific methodology, staging, duration (length of time at each site), timing (day or night works, or both) and required plant, equipment, and machinery. The proposal will have a long duration for construction (multiple years over the five different sites) and is predicted to cause noise impacts to sensitive receivers. However, works at DW01, WW01, and WW02 will be progressive and will not be in front of any one receiver for the duration of construction at each site. A 'Reasonable and Feasible' assessment will be completed closer to construction (eg during detailed design), when these details are known, and this will inform project-specific controls to minimise noise impacts to the community.

Figures showing the predicted worst-case noise impacts are shown below (**Figures 5-1** to **5-7**).

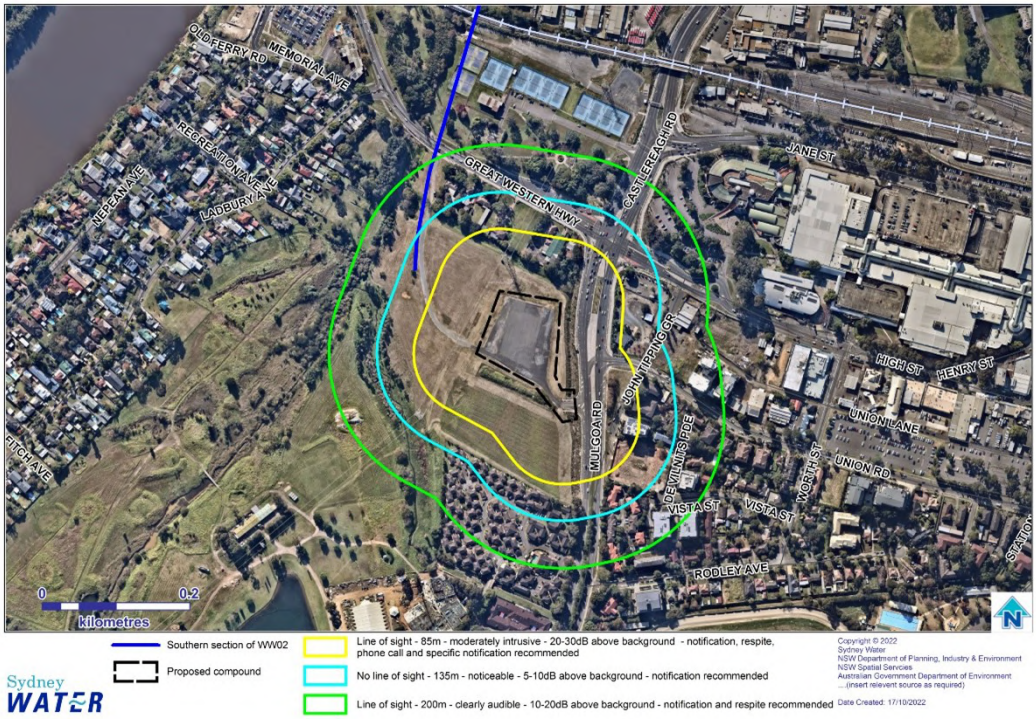

Figure 5-1 Predicted worst-case noise impacts – night works at compound

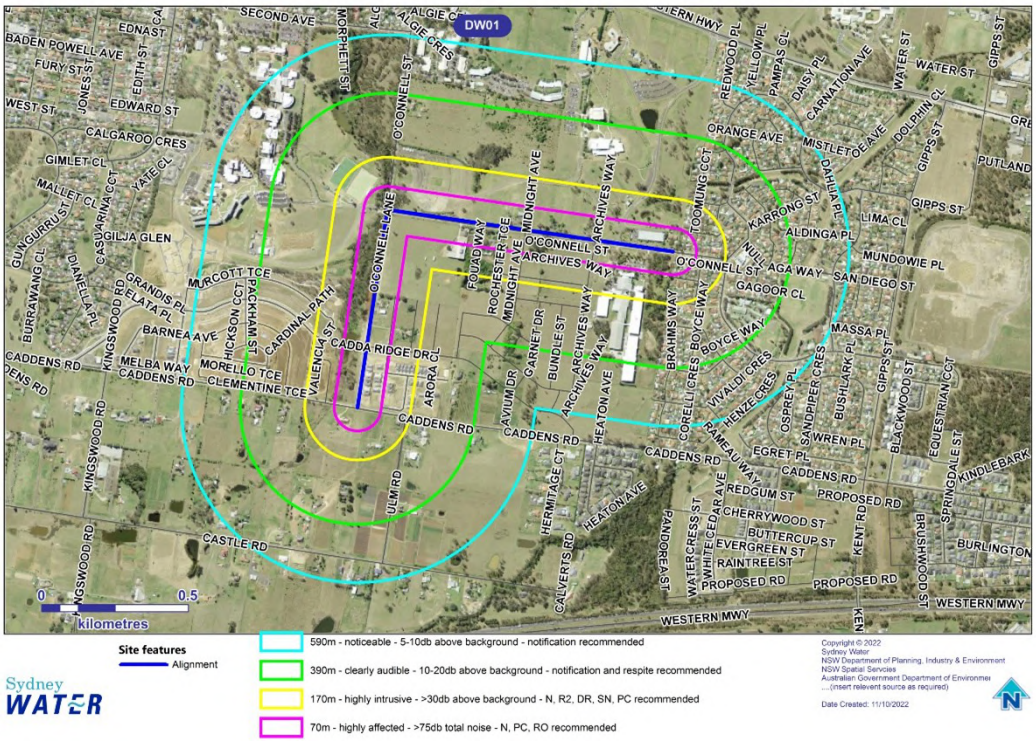

Figure 5-2 Predicted worst-case noise impacts – night works at DW01

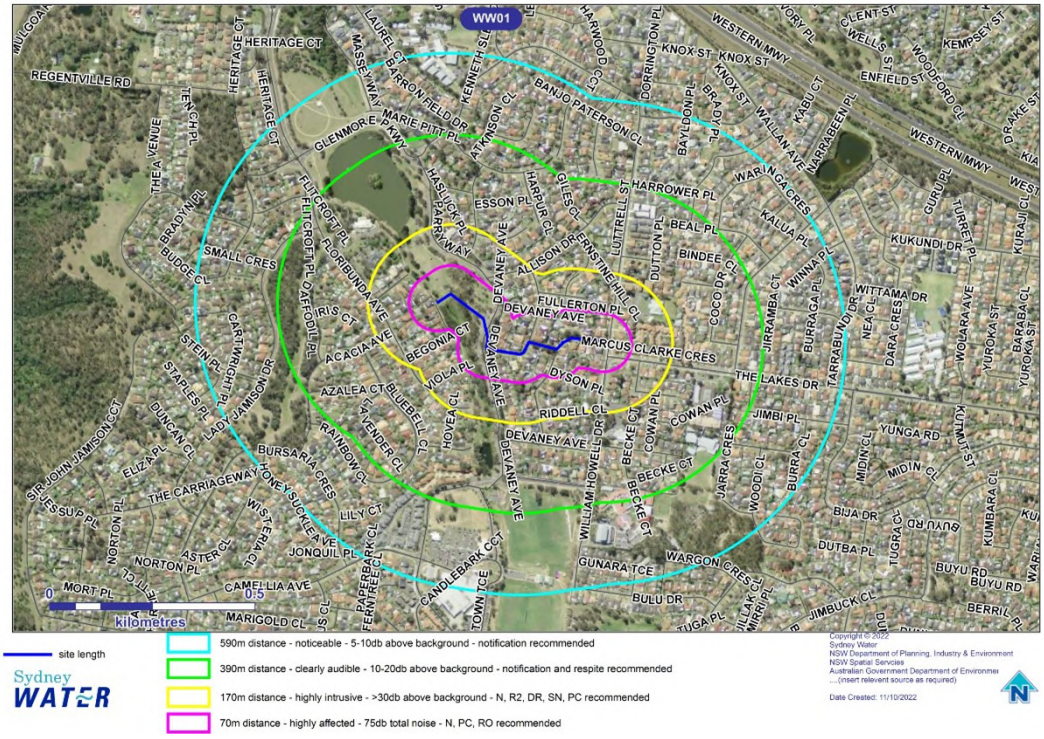

Figure 5-3 Predicted worst-case noise impacts – night works at WW01

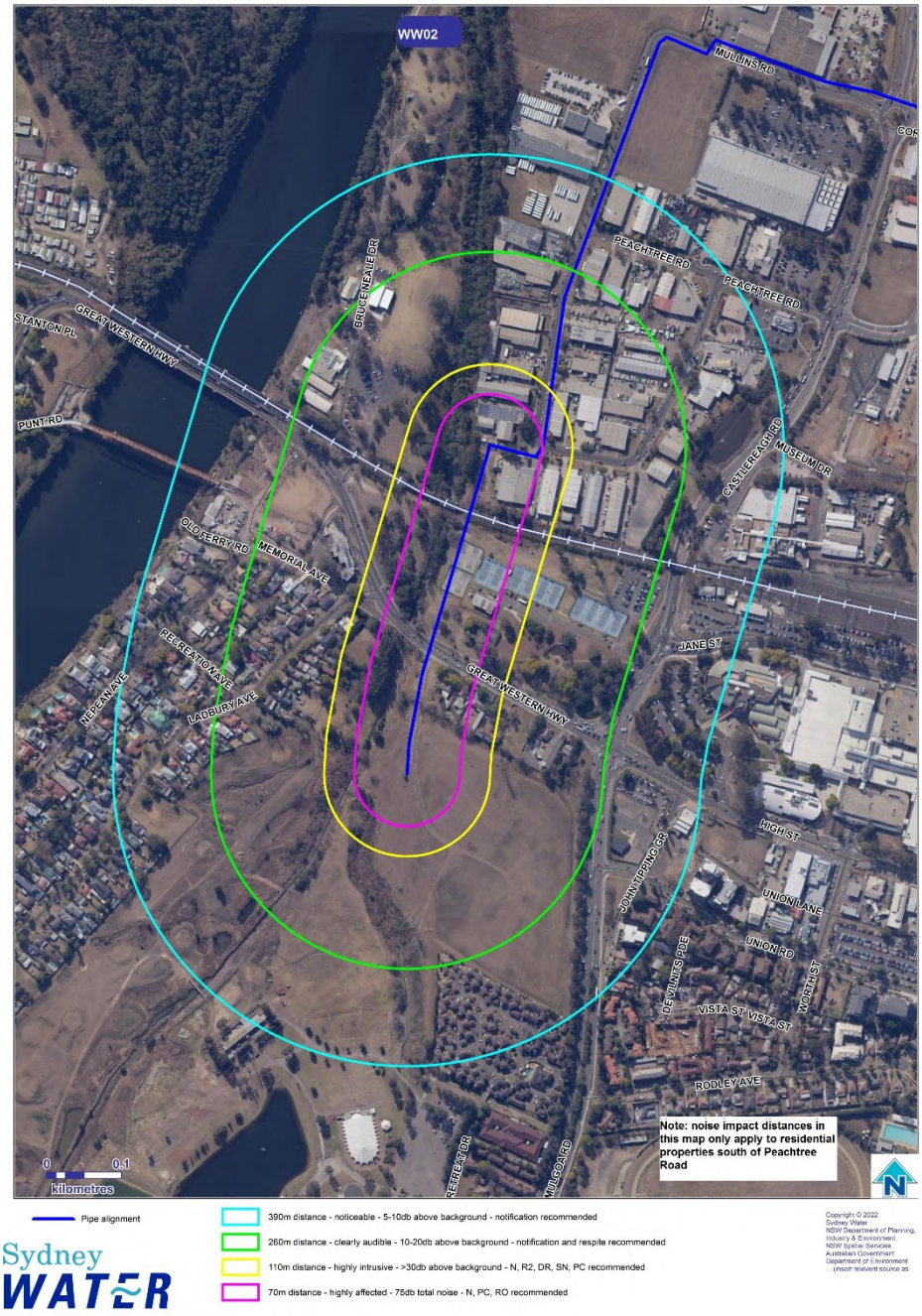

Figure 5-4 Predicted worst-case noise impacts – night works at WW02 (southern end – to Peachtree Road)

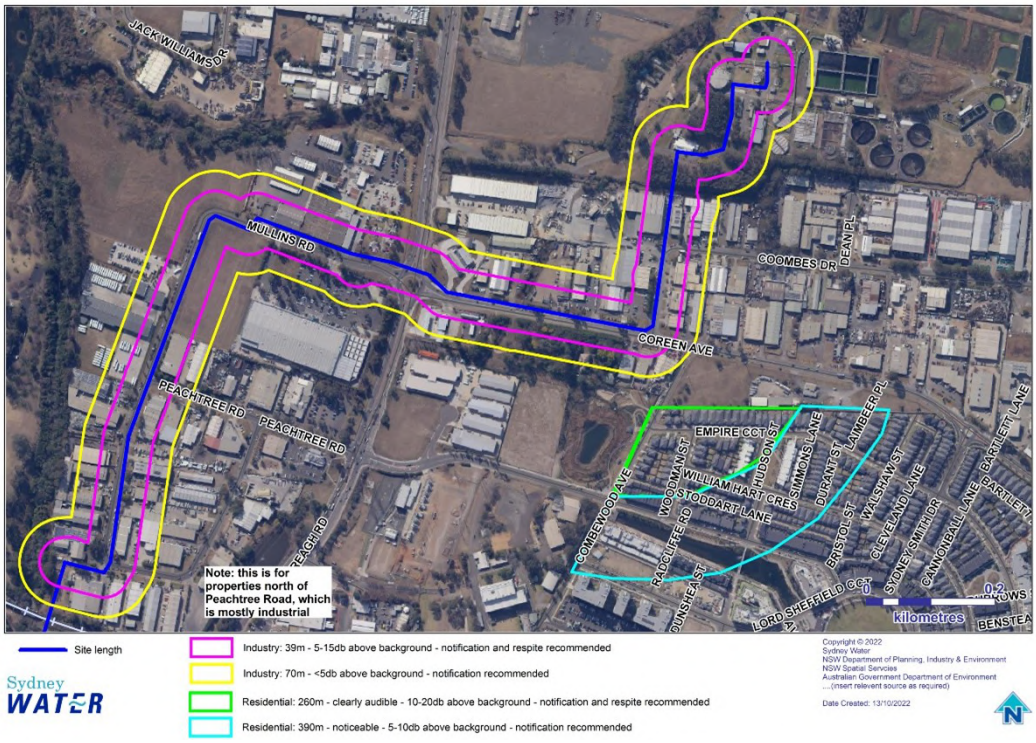

Figure 5-5 Predicted worst-case noise impacts – night works at WW02 (southern end – to Peachtree Road)

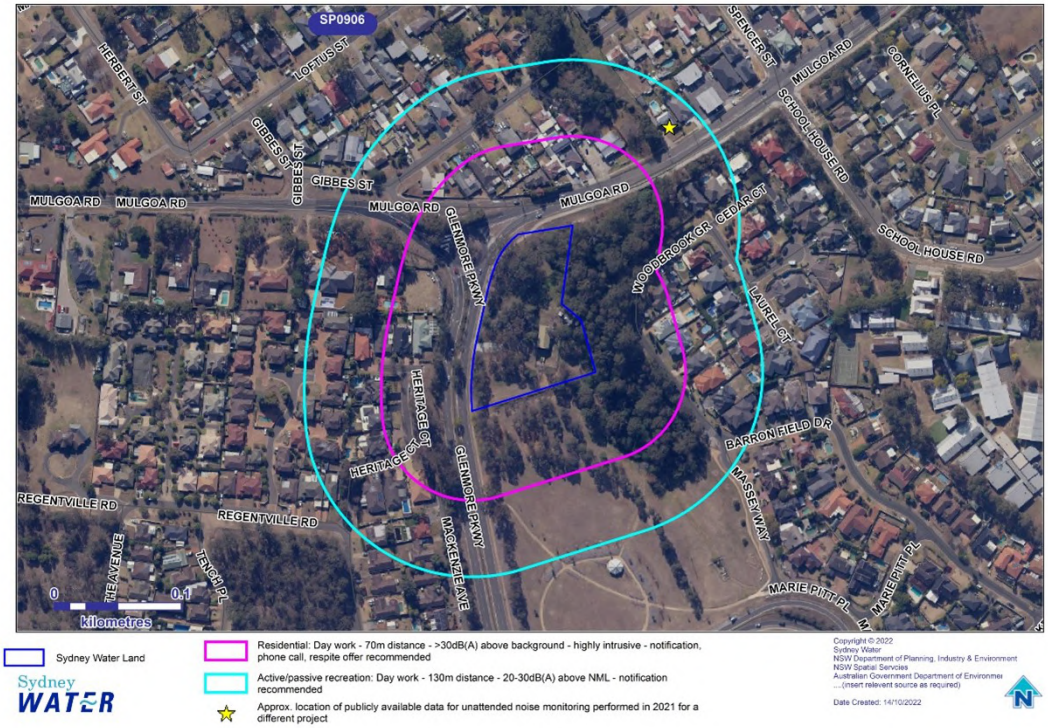

Figure 5-6 Predicted noise impacts at SP0906

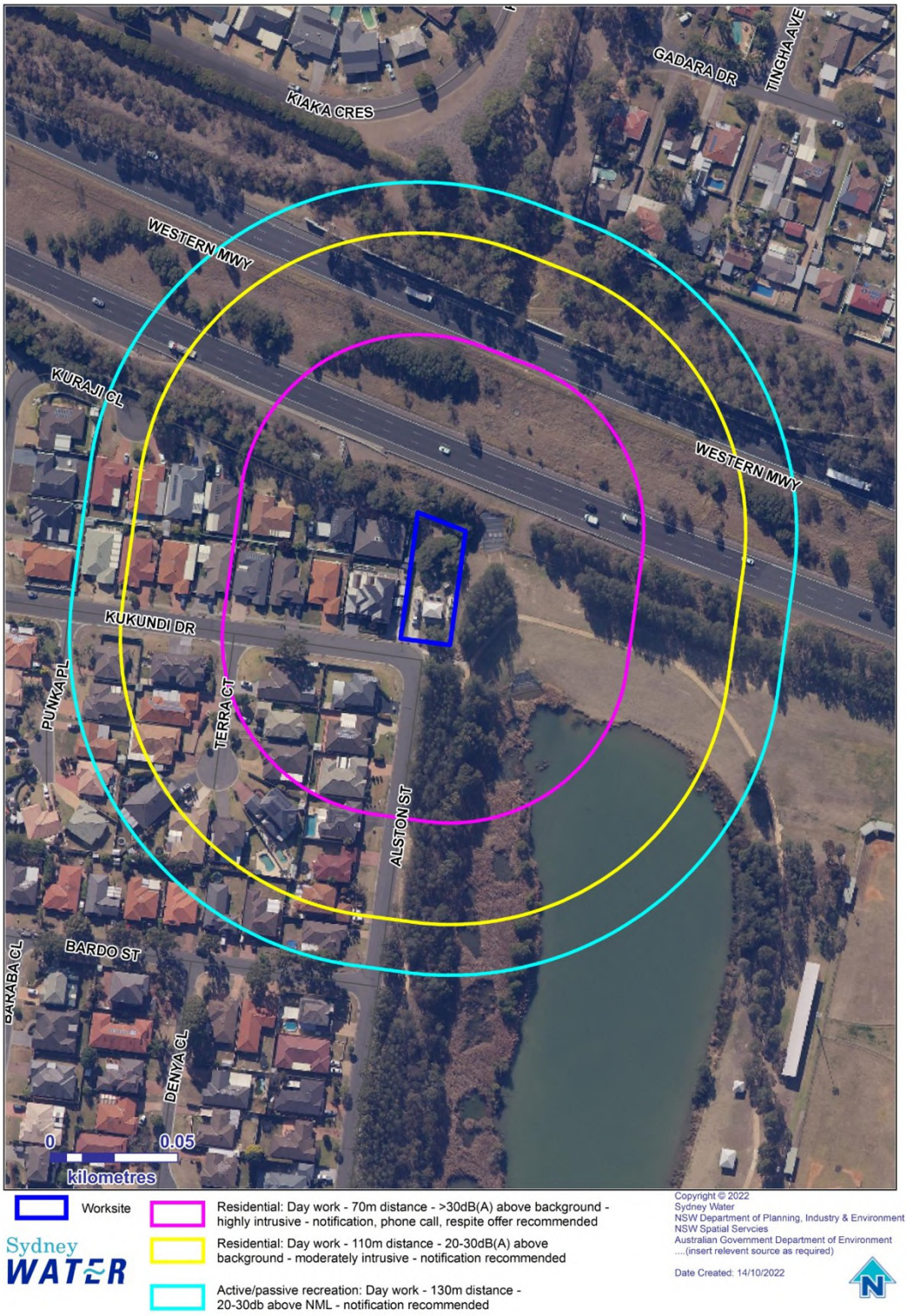

Figure 5-7 Predicted noise impacts at SP1026

Operational impacts

Generators will be installed at the pump stations. The generators are not expected to be switched on during construction or day-to-day operation, unless in the unlikely event of a loss of mains power supply. A new permanent unit, at SP1026, slightly larger than the existing one, will be installed in about the same location.

During operation, no additional noise impacts are expected. Most new infrastructure will be installed underground or within existing structures (eg inside the existing wet well at SP0906). Noise generated during operation will not exceed the noise criteria in the Noise Policy for Industry (EPA, 2017).

Potential impacts to noise during construction and operation can be managed using the below safeguards.

Potential impacts – vibration

The proposal will generate vibration during construction. This proposal will involve use of vibratory equipment and there are sensitive receivers nearby which may be impacted, depending on factors which are still to be confirmed, including:

- preferred methodology
- size of equipment
- other factors such as ground conditions.

Use of vibratory equipment at the compound is not expected. Sites with highest risk of vibration impacts are those with adjacent residential receivers (DW01, WW01, WW02, SP1026) and heritage structures (DW01, WW02).

No vibration impacts are expected during operation.

Potential vibration impacts during construction can be managed using the below safeguards.

Safeguards **Noise**
Works must comply with the Construction Noise Guideline (Draft, 2020), including scheduling work and deliveries during standard daytime working hours of 7am to 6pm Monday to Friday and 8am to 1pm Saturday. No work to be scheduled on Sunday nights or public holidays. Any proposed work outside of these hours must be justified. The Proposal will also be carried out in accordance with: • Sydney Water's Noise Management Procedure SWEMS0056 • Noise Policy for Industry (EPA, 2017) All reasonable and feasible noise mitigation measures should be justified, documented and implemented on-site to mitigate noise impacts.
Incorporate **standard daytime hours noise management safeguards** into the CEMP, including but not limited to: • identify and consult with the potentially affected residents prior to the commencement: o describe the nature of works; the expected noise impacts; approved hours of work; duration, complaints handling and contact details.

- determine need for, and appropriate timing of respite periods (eg times identified by the community that are less sensitive to noise such as mid-morning or mid-afternoon for works near residences)

- implement a noise complaints handling procedure
- plant or machinery will not be permitted to warm-up near residential dwellings before the nominated working hours.
- appropriate plant will be selected for each task, to minimise the noise impact (eg all stationary and mobile plant will be fitted with residential type silencers)
- engine brakes will not be used when entering or leaving the work site(s) or within work areas.
- regularly inspect and maintain equipment in good working order
- arrange work sites where possible to minimise noise (eg generators away from sensitive receivers, site set up to minimise use of vehicle reversing alarms, site amenities and/ or entrances away from noise sensitive receivers).
- use natural landforms/ mounds or site sheds as noise barriers
- schedule noisy activities around times of surrounding high background noise (local road traffic or when other noise sources are active).

If works **beyond standard daytime hours are needed**, the Contractor would:

- justify the need for out of hours work (OOHW) and why it is not possible to carry out the works during standard daytime hours
- consider potential noise impacts and: implement the relevant standard daytime hours safeguards; Sydney Water's Noise Management Code of Behaviour (SWEMS0056.01) and document all reasonable and feasible management measures to be implemented
- identify additional community notification requirements and outcomes of targeted community consultation
- seek approval from the Sydney Water Project Manager in consultation with the environment and communications representatives.

If **night works are needed,** the Contractor would:

- justify the need for night works
- consider potential noise impacts and implement the relevant standard daytime and out of hours safeguards and document consideration of all reasonable and feasible management measures
- identify community notification requirements (ie for scheduled night work (not emergency works)),
- notify all potentially impacted residents and sensitive noise receivers not less than one week prior to commencing night work.
- seek approval from the Sydney Water Project Manager in consultation with the environment and communications representatives.

If works on **Sundays or public holidays are required**, the Contractor would:

- justify why all other times are not feasible
- consider potential noise impacts and, implement relevant standard daytime, out of hours and night-time safeguards and other reasonable and feasible management measures
- identify community notification requirements
- seek approval from the Sydney Water Project Manager in consultation with the environment and communications representatives.

All noisier work (eg use of rock breaker of any size, concrete saw, mulcher, chainsaw, jackhammer) would all be completed before 12am midnight

Delivery team review noise impacts during detailed design/pre-construction. If the worst-case assessment in this REF is exceeded, re-assess and implement reasonable and feasible additional mitigation measures (complete Appendix 2 and Appendix 3 of the noise and vibration assessments in Appendix D).

Delivery team review noise impacts during detailed design/pre-construction. If the worst-case assessment in this REF is not exceeded, implement reasonable and feasible additional mitigation measures (complete Appendix 2 and Appendix 3 of the noise and vibration assessments in Appendix D).

A Noise and Vibration Management Plan (NVMP) to be prepared for the project, that must include at a minimum: • Considers potential noise impacts and implement the relevant standard daytime and out-of-hours safeguards, Sydney Water's Noise Management Code of Behaviour (SWEMS0056.01) and document all reasonable and feasible management measures to be implemented • mitigation measures described in the safeguards of this REF
Prepare an Out of Hours Work Approval (OOHWA) for each site with night works. It is recommended that the OOHWA's be reviewed at each site every month (or at a reasonable interval), or a change in project activity / methodology / timeframe.
Plan to minimise potential for cumulative noise impacts when using compound (at 702 High Street) and performing work on the southern alignment of WW02 (south of Peachtree Road)
Vibration
Once the equipment has been confirmed and the locations requiring use of vibratory equipment have been confirmed, appropriate offset distances and other mitigation measures will be implemented.
Conduct a dilapidation survey / asset condition assessment prior to works which have potential to damage existing structures.
Monitor compliance with the recommended vibration levels in DIN 4150-3 1999: Structural Vibration – Part 3; Effects of vibration on structures.
Consider less vibration intensive methodologies where practicable and use only the necessary sized and powered equipment.

5.2.6 Air and energy

Existing environment and potential impacts

The proposal is in an area with arrange of land uses, including residential, recreational, and industrial. Potential sensitive receivers include residential properties and users of nearby public parkland.

The proposal will potentially result in odour/ dust/ pollution from:

- dust generated during ground disturbance such as excavation
- dust generated by construction vehicles travelling on disturbed/ unsealed access routes
- emissions from machinery, equipment and vehicles used during construction
- odour generated construction activities including:
    - installation and operation of the bypass setups at the pumping station
    - cut over to the existing networks at WW01 and WW02. This will be mostly mitigated by the lines not being live when the connection is made.
- odour generated during operation of the new pump stations due to the increased volume of stored wastewater:
    - at SP1026, however the new vent stack (about 14 m high) is taller than the existing (8-10 m high) which should dissipate the odour effectively. The activated carbon filter

can also remove chemicals from water that generate odour
- there are no known odour issues at SP0906, however, space has been allocated for a future odour control unit as part of a separate project if required.

Potential impacts to air and energy during construction and operation can be managed using the below safeguards.

Safeguards
Use alternatives to fossil fuels where practical and cost-effective.
Maintain equipment in good working order, comply with the clean air regulations of the *Protection of the Environment Operations Act 1997*, have appropriate exhaust pollution controls, and meet Australian Standards for exhaust emissions.
Switch off vehicles/machinery when not in use.
Implement measures to prevent offsite dust impacts, for example: • water exposed areas (using non-potable water source where possible such as water from excavation pits) • cover exposed areas with tarpaulins or geotextile fabric • modify or cease work in windy conditions • modify site layout (place stockpiles away from sensitive receivers) • vegetate exposed areas using appropriate seeding.
Cover all transported waste.
Minimise the potential for odours (eg minimise the number of open access chambers, close maintenance holes overnight.)
Ensure odour control measures are available and ready to use during the works, such as such as deodoriser sprays or temporary installation of ventilation fans to draw odours away from heavily trafficked or odour sensitive areas.

5.2.7 Waste and hazardous materials

Existing environment and potential environmental impacts

The following hazardous building materials (HBM) have been identified on Sydney Water sites within the study area:

- SP0906: low-risk lead paint, inside the pumping station (green paint)
- SP1026: low risk lead paint, on the outside of the pump station (vent pipe, green paint)
- ST0046 (Penrith WRRF, as part of the WW02 alignment): low to moderate risk of lead paint, synthetic mineral fibres, ozone depleting substances, and asbestos-containing material.

Our corporate objectives include to be a resource recovery business with an increasing portfolio of circular economy products and services. This includes reducing waste through recycling and re-use, and encouraging our suppliers to minimise waste. The proposal will require the disturbance and/or disposal of soil, road pavement, fill material, concrete, green waste, redundant assets, and other general construction and demolition waste streams. Known HBM may be disturbed at sites SP0906, SP1026, and WW02. Opportunities to reduce, recycle and reuse on this project will be

sought with the Contractor and documented in the Waste Management Plan or CEMP.

Waste may be stored within site compounds or taken directly off site to a facility licenced to accept the waste. Re-use or recycling of waste streams such as concrete and non-weedy green waste will be encouraged.

The proposal is unlikely to involve the transport and disposal of asbestos waste (including soil containing asbestos)/sheeting, unless unexpected asbestos is encountered on site.

Potential impacts to waste and hazardous materials during construction can be managed using the below safeguards.

Safeguards
Manage waste in accordance with relevant legislation and maintain records to show compliance eg waste register, transport and disposal records. Record and submit SWEMS0015.27 Contractor Waste Report.
Provide adequate bins for general waste, hazardous waste and recyclable materials.
Minimise stockpile size and ensure delineation between different stockpiled materials.
Manage waste and excess spoil in accordance with the NSW EPA Resource Recovery Orders and Exemptions (if applicable) and / or Waste Classification Guidelines. Where materials are not suitable or cannot be reused onsite or offsite, recycle soils at a licensed soil recycling facility or dispose at an appropriately licenced landfill facility.
Prevent pollutants from escaping including covering skip bins.
Dispose excess vegetation (non-weed) that cannot be used for site stabilisation at an appropriate green waste disposal facility.
If fibro or other asbestos containing material is identified, restrict access and follow Sydney Water's Asbestos Management – Minor Works procedure, Document Number 746607 and SafeWork NSW requirements. Contact Sydney Water Project Manager (who will consult with Property Environmental Services propertyenvironmental@sydneywater.com.au).
Manage lead paint in accordance with the WHS Regulation (2017) Part 7.2 and the Australian Standard Lead Paint Management Guidelines. Consult with Property Environmental Services where works involve removal of lead-based paint. Develop a Lead Management plan if required.
Review existing hazardous building materials (HBM) report and implement relevant safeguards. Conduct hazardous materials survey prior to commencement where works could impact hazardous materials not surveyed in previous HBM assessments.
Re-use or recycling of waste streams such as concrete and non-weedy green waste to be encouraged.

5.2.8 Traffic and access

Existing environment

The proposal is on or adjacent to the following roads at each location:

- Compound: driveway access via Mulgoa Road, which is a State Road (MR155) and has traffic volumes of between 31,000-48,000 vehicles daily (Mulgoa Road/Castlereagh Road Corridor Upgrade, Traffic and Transport Assessment Study, Arcadis, 2015)
- DW01: along parts of Cadda Ridge Drive, O'Connell Lane and O'Connell Street, which are council-managed roads
- WW01: along or under parts of Marcus Clarke Crescent, Langley Avenue, Devaney Avenue, and Glenmore Parkway, which are council-managed roads
- WW02: along or under parts of High Street, Peachtree Road, Mullins Road, Castlereagh Road, Coreen Avenue and Coombes Drive. Part of WW02 also passes under the North Shore and Western Railway Line. High Street (HW5) and Castlereagh Road (MR630) are State Roads and Coreen Avenue (7289) is an Unclassified Regional Road, all other roads are council-managed.
- SP0906: driveway access via Glenmore Parkway which is a council-managed road
- SP1026: driveway access via Kukundi Drive/Alston Street, which are council-managed roads.

Works at WW02, SP0906, and SP1026 are fully or partially on Sydney Water land. Public footpaths are also present within or near to each of the five sites. Kerbside parking is also available in or near each of the sites.

There are multiple bus routes and/or bus stops within or adjacent to the proposal (**Table 5-3**).

Table 5-3 Bus routes within or adjacent to the proposal (active times as of December 2022)

	Route numbers	Active times weekdays	Active times Saturdays	Active times Sunday/ public holiday
DW01	University shuttle bus, 770, 774, 781	5:15am to midnight	5:40am to 11:50pm	7:40am to 11pm
WW01	781, 799	6:10am to 7:10pm	7am to 8pm	8:30am to 8:10pm
WW02	673, 783, 784	5am to 9:30pm	7:10am to 9:10pm	8:10am to 7:10pm
SP0906	797	4:30am to 10:50pm	7:10am to 5:00pm	8:45am to 8:45pm
SP1026	797	4:30am to 10:50pm	7:10am to 5pm	8:45am to 8:45pm

Potential impacts

Lane and/or road closures will be required. Sydney Water will consult with Council as required by the TISEPP. Also, as the proposal involves work partly on a TfNSW (State) road, within 100 m of a TfNSW (State) road, and/or is within 100 m of a traffic signal, a road occupancy licence and notification to TfNSW will be required. Consultation with TfNSW and/or council will be required at DW01, WW01, and WW02.

Access to private properties will likely be required to complete works at parts of WW01 and WW02.

The work footprints at DW01, WW01 and WW02 overlap with public footpaths and driveways. The availability of street parking and footpaths will be temporarily impacted during construction. Works along O'Connell Street (DW01) will remove access to the dedicated parking lane. Works along Peachtree Road and Mullins Road (WW02) will remove access to the kerbside parking lane within the industrial area. This was observed to be a popular area for vehicle parking during site visits in standard construction hours, with few available parking spaces visible.

Impacts to bus routes during construction from lane and/or road closures may include temporary relocation or closure of bus stops, and timetable delays due to reduced speed limits and reduced lane availability.

The proposal is expected to require up to 20 heavy vehicle and 20 light vehicle movements during construction per shift. Plant, equipment, and vehicle movements between the compound and construction sites will be via the existing road network. The traffic volumes are relatively minor compared to volumes across the whole road network, particularly on State Roads such as Mulgoa Road, and are unlikely to result in any significant traffic impacts to the road network.

Additional tanker movements will be required at the pump stations during construction, to collect and discharge wastewater during bypass connection and when bringing the system online. These additional movements would be infrequent and would not significantly impact traffic. Other equipment movement includes cranes, concrete pump trucks, and drill rigs.

At this stage, it is not expected that there will be any additional vehicle movements at any of the sites during operation.

Potential impacts to traffic and access during construction and operation can be managed using the below safeguards.

Safeguards
Prepare a Traffic Management Plan (TMP) in consultation with the relevant traffic authority.
Meet NSW Roads and Maritime Service's Traffic Control at Worksites Manual v6.1 requirements for TfNSW (State) roads. The Contractor will obtain a Road Occupancy Licence (ROL) from TfNSW, including if works are within 100 m of traffic signals when construction commences.
Minimise traffic impacts near residential properties, schools and businesses by consulting with them (eg no major materials deliveries at school drop off or pick up times etc.).
Night works should be considered in industrial areas which are active during the day and quieter (more parking available and most businesses closed) at night.
Manage sites to allow people to move safely past the works, including alternative pedestrian, bicycles, pram and wheelchair access.
Consult with the relevant traffic authority about managing impacts to pedestrian traffic, signposting, meters, parking, line-marking or if traffic control or pavement restoration is required.
Erect signs to inform road users of the proposed works and any temporary road closures.

Ensure work vehicles do not obstruct vehicular or pedestrian traffic, or private driveway, public facility or business access unless necessary and only if appropriate notification has been provided.
Consult with bus authorities if any bus stops require temporary closure or relocation.
Consultation will be undertaken by the delivery team with landowners regarding easements required for the proposal.
Heavy vehicles will need to comply with vehicle length and load limits on council roads.

5.2.9 Social and visual

Existing environment and potential impacts

The surrounding land use and nearby sensitive receivers have been identified in previous sections of this REF, including **Section 5.1**, **Section 5.2.5**, **Section 5.2.6**, and **Section 5.2.8**. There is a mix of residential, recreational, and industrial land use surrounding the sites as well as overlap with the council (local) and TfNSW (State) road networks.

Construction impacts

There will be some temporary visual impacts associated with the establishment of site compounds, access tracks, and temporary work footprints during construction (including temporary traffic control). These temporary visual impacts will be mitigated in consultation with stakeholders, such as Council and residents and the safeguards listed below.

Operational impacts

There will be no operational visual impacts at DW01, WW01, and WW02. It is not expected that any intrusive visual changes will be visible, as the new duplicated pipes will be below ground. Additional maintenance holes may be visible at the surface. These maintenance holes will look consistent to other nearby maintenance holes already installed for the original pipe alignments.

There will be no operational visual impacts at SP0906. It is expected that most of the new assets on site will be installed within the existing wet well, or underground. Other assets to be installed elsewhere within the site, eg switch room, hardstand areas, will have a consistent 'look and feel' to existing assets including the same or similar height.

There will be operational visual impacts at SP1026. The new vent stack (at about 14 m high) will be taller than the existing (8-10 m high). Other new above ground assets such as the kiosk (at about 3 m high) will also be visible. There are noise walls about 3-5 metres high along the western boundary of SP1026, which is the eastern property boundary of the adjacent houses. These noise walls will provide a visual buffer to the adjacent properties where the new assets are shorter than the noise wall. The visual impacts will be minor due to the presence of existing similar assets.

Generally, at all sites, the removal of vegetation to complete the work will have a visual impact. The provision for offset planting should reduce this impact.

Potential social and visual impacts during construction and operation can be managed using the below safeguards.

Safeguards
Undertake works in accordance with Sydney Water Communications policies and requirements including: • notify impacted residents and businesses • erect signs to inform the public on nature of work • personnel treat community enquiries appropriately.
Work sites will be restored to pre-existing condition or better.
Minimise visual impacts (eg retain existing vegetation where possible).
Direct artificial light away from sensitive receivers where possible (ie residents, fauna or roadways).
Maintain work areas in a clean and tidy condition.
Site restoration including roads and verges to be performed in consultation with council, where council requirements apply.

5.2.10 Cumulative and future trends

Potential environmental impacts

Sydney Water has identified the following projects which may be in planning or construction at a similar time to this project:

- Remediation works at Boundary Creek (west of Castlereagh Road) – Construction expected 2022/23.
- Major projects – modification to waste recycling and transfer facility at 46-48 Peachtree Road (about 80 m west of WW02 alignment) – determined in May 2021. Construction date unknown.
- Installation of a new Chemical Dosing Unit (CDU) and delivery bund at SP1026 as part of a separate project (by a different team within Sydney Water) prior to the works described in this REF commencing (ie mid-late 2024).

There may be some minor cumulative amenity impacts (eg noise, traffic) were any of these projects to be in construction at a similar time to the works in this proposal.

There may be other, smaller, local development occurring in the area (eg development applications to Penrith City Council, nearby road projects flagged by council in Section 3 of the REF) but it is not anticipated that a cumulative impact will result. The Contractor will work with local developments to reduce impacts as required.

The proposal is unlikely to further exacerbate future trends as it is providing additional network capacity for future population growth in the area. The design specifications for the pump stations also indicate that there is provision for future installation and integration of a rooftop solar photovoltaic system.

Future trends such as bushfires, increased flooding, extreme heat and extreme storm events associated with climate change that could impact the proposal were considered (eg Resilient

Penrith Action Plan 2021-2030, Penrith City Council, 2021). Most of the sites in this proposal (apart from WW01) are fully or partly on existing flood-prone land, within the Hawkesbury-Nepean catchment. The catchment has experienced multiple recent flood events. Assets are placed outside the 1:100 flood zone wherever possible.

Mains power outages may increase in frequency and duration. The predicted increase in extreme heat and extreme storm events may result in infrastructure failure or damage, increased demand on existing infrastructure, and reduced ability to treat and process water and debris. The ability to retrofit solar systems to the pump stations and provide an alternative power source will increase resilience of the stations and improve their likelihood of continued operation during extreme weather.

Potential impacts to cumulative and future trends during construction and operation can be managed using the below safeguards.

Safeguards
Engage with the community to minimise ongoing amenity impacts (eg noise, traffic, air quality) and construction fatigue for residents near SP1026 as a result of the earlier CDU project.
Consider performing a climate risk assessment where there is a risk of being impacted by extreme weather events such as flood and bushfire.
Ensure provision is made at the pumping stations for future installation and integration of a rooftop solar photovoltaic system.

5.2.11 General Environmental Management

Safeguards
Prepare a Construction Environmental Management Plan (CEMP) addressing the requirements of this environmental assessment. The CEMP should identify licence, approval and notification requirements. Prior to the start of work, all project staff and contractors will be inducted in the CEMP. The CEMP must be readily available on site and include a site plan which shows: • go/ no go areas and boundaries of the work area • location of environmental controls (including erosion and sediment controls, any fences or other measures to protect vegetation or fauna, spill kits, stockpile areas) • location and full extent of any vegetation disturbance.
Should the proposal change from the EIA, no further environmental assessment is required provided the change: • remains within the study area for the EIA and has no net additional environmental impact; or • is outside the study area for the EIA but: - reduces impacts to biodiversity, heritage or human amenity; or - avoids engineering (for example, geological, topographical) constraints; and - after consultation with any potentially affected landowners and relevant agencies.

The Contractor must demonstrate in writing how the changes meet these requirements, for approval by Sydney Water's Project Manager in consultation with the environmental and community representatives.

Sydney Water's Project Manager (after consultation with the Project's environment and community representatives and affected landowners) can approve temporary ancillary construction facilities (such as compounds and access tracks), without additional environmental assessment or approval if the facilities meet the following principles:

- limit proximity to sensitive receivers
- no disruption to property access
- no impact to known items of non-Aboriginal and Aboriginal heritage
- outside high-risk areas for Aboriginal heritage
- use existing cleared areas and existing access tracks
- no impacts to remnant native vegetation or key habitat features
- no disturbance to waterways
- potential environmental impacts can be managed using the safeguards in this REF
- no disturbance of contaminated land or acid sulfate soils
- will be rehabilitated at the end of construction.

The Contractor must demonstrate in writing how the proposed ancillary facilities meet these principles. Any facilities that do not meet these principles will require additional environmental impact assessment.

The agreed location of these facilities must be shown on the CEMP site plan and appropriate environmental controls installed.

Prepare an Incident Management Plan (IMP) outlining actions and responsibilities during:

- predicted/ onset of heavy rain during works
- spills
- unexpected finds (eg. heritage and contamination)
- other potential incidents relevant to the scope of works

All site personnel should be inducted into the IMP.

To ensure compliance with legislative requirements for incident notification (eg. *Protection of the Environment Operations Act 1997*), Sydney Water's employees and contractors will follow SWEMS0009. Attach SWEMS0009 to the CEMP.

Promptly notify the Project Manager, Community Relations Representative (Program Delivery) and Environmental Representative (Program Delivery) of any complaints.

6 Conclusion

Sydney Water has prepared this REF to assess the potential environmental impacts of Penrith CBD Drinking Water and Wastewater Package. The proposal is required to meet the additional demand on services due to predicted population growth in the area.

During construction, the main potential environmental impacts of the proposal are typical construction impacts such as soil and water (including likely groundwater dewatering), flora and fauna, noise and vibration, and traffic and access. During operation, no environmental impacts are likely. It is considered that, given the nature, scale and extent of impacts and implementation of the safeguards outlined in this REF, the proposed work is unlikely to have a significant impact on the environment and an environmental impact statement is not required under Division 5.1 of the EP&A Act.

The proposal has been considered in accordance with the principles of ESD. The proposal will result in positive long-term environmental improvements. The proposal will not result in the degradation of the quality of the environment and will not pose a risk to the safety of the environment.

7 Appendices

Appendix A – Section 171 checklist

Section 171 checklist	REF finding
Any environmental impact on a community	There may be short-term impacts on the community from amenity impacts during construction related to air quality, visual impacts, noise and vibration, and traffic and access. There will be environmental improvements by providing a reliable wastewater and drinking water service to the local community.
Any transformation of a locality	The proposal will not result in the transformation of a locality. Land use would not change once works are completed.
Any environmental impact on the ecosystems of the locality	The proposal will have environmental impacts during construction which can be minimised, mitigated, and managed through the safeguards in this REF. There will be environmental improvements by ensuring a reliable drinking water and wastewater service for a growing population, minimising any impacts on the ecosystem.
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	The proposal will not result in a reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality. There will be a minor visual amenity impact through increasing the height of an existing vent stack.
Any effect upon a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or any other special value for present or future generations	The proposal will not have any effect upon a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or any other special value for present or future generations. No impacts to known heritage items are expected.
Any impact on the habitat of any protected animals (within the meaning of the *Biodiversity Conservation Act 2016*)	The proposal will not have any impact on the habitat requirements of protected animals. Potential impacts can be managed through implementation of appropriate safeguards.
Any endangering of any species of animal or plant or other form of life, whether living on land, in water or in the air	The proposal will not be endangering any species of animal, plant or other form of life, whether living on land, in water or in the air.
Any long-term effects on the environment	The proposal will not have any long-term impacts on the environment but will have a long-term benefit by providing a reliable and modern drinking water and wastewater service for the area.

Any degradation of the quality of the environment	The proposal will not cause the degradation of the quality of the environment. Potential biodiversity impacts during construction will be offset by rehabilitation.
Any risk to the safety of the environment	The proposal will not increase risk to the safety of the environment.
Any reduction in the range of beneficial uses of the environment	The proposal will not have any reduction in the range of beneficial uses of the environment during operation. Temporary enclosures set up during construction would reduce the beneficial uses of the environment in the short-term.
Any pollution of the environment	Environmental safeguards will mitigate the potential for the proposal to pollute the environment. No pollution of the environment is expected and the proposal will operate in accordance with EPL 1409.
Any environmental problems associated with the disposal of waste	The disposal of wastes will be conducted in accordance with the environmental safeguards, and no environmental problems associated with the disposal of waste are expected.
Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	The proposal will not increase demand on resources, that are, or are likely to become, in short supply.
Any cumulative environmental effect with other existing or likely future activities	The proposal may have minor cumulative environmental impacts with other existing or likely future activities, which would be managed with appropriate safeguards.
Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	The proposal will not have any impact on coastal processes or hazards, and coastal processes and coastal hazards will not have any impact on the proposed activity.
Any applicable local strategic planning statements, regional strategic plans or district strategic plans made under the EP&A Act, Division 3.1	The proposal is required to service growth and the applicable strategic planning statements or plans have been considered in the system planning and options selection process (refer **Section 4.1** of this REF).
Any other relevant environmental factors.	The proposal has been assessed against the factors listed above, and there are no other relevant environmental factors to consider.

Appendix B – Consideration of TISEPP consultation

TISEPP section	Yes	No
Section 2.10, council related infrastructure or services – consultation with council		
Will the work:		
Potentially have a substantial impact on stormwater management services provided by council?		N
Be likely to generate traffic that will strain the capacity of the road system in the LGA?		N
Involve connection to, and have a substantial impact on, the capacity of a council owned sewerage system?		N
Involve connection to, and use of a substantial volume of water from a council owned water supply system?		N
Involve installation of a temporary structure on, or enclosing, a public space under council's control that will cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential?	Y	
Involve excavation of the surface of, or a footpath adjacent to, a road for which the council is the roads authority that is not minor or inconsequential?	Y	
Section 2.11, local heritage – consultation with council		
Is the work likely to affect the heritage significance of a local heritage item, or of a heritage conservation area (not also a State heritage item) more than a minor or inconsequential amount?		N
Section 2.12, flood liable land – consultation with council		
Will the work be located on flood liable land (that is land that is susceptible to flooding by the probable maximum flood event) and will they alter flood patterns other than to a minor extent?		N
Section 2.13, flood liable land – consultation with State Emergency Services		
Will the work be located on flood liable land (ie. land that is susceptible to flooding by the probable maximum flood event) and undertaken under a relevant provision*, but not the carrying out of minor alterations or additions to, or the demolition of, a building, emergency works or routine maintenance? * (e) Div.14 (Public admin buildings), (g) Div. 16 (Research/ monitoring stations), (i) Div. 20 (Stormwater systems)?		N
Section 2.14, development with impacts on certain land within the coastal zone– council consultation		
Is the work on land mapped as coastal vulnerability area and inconsistent with a certified coastal management program?		N
Section 2.15, consultation with public authorities other than councils		
Will the proposal be located on land adjacent to land reserved under the *National Parks and Wildlife Act 1974* or to land acquired under Part 11 of that Act*? If so, consult with DPIE (NPWS).*		N
Will the proposal be located on land in Zone E1 National Parks and Nature Reserves or in a land use zone that is equivalent to that zone? *If so, consult with DPIE (NPWS)*		N
Will the proposal comprise a fixed or floating structure in or over navigable waters? If so, consult *TfNSW*		N
Will the proposal be located on land in a mine subsidence district within the meaning of the *Coal Mine Subsidence Compensation Act 2017*? *If so, consult with Subsidence Advisory NSW.*		N
Will the proposal involve clearing of native vegetation on land that is not subject land (ie non-certified land)? *If so, notify DPIE at least 21 days prior to work commencing. (Requirement under s3.24 Chapter 3 Sydney Region Growth Centres - of the SEPP (Precincts – Central River City) 2021.*		N

Appendix C – Specialist studies (ecology)

Appendix D – Preliminary noise assessments