Review of Environmental Factors

Wollongong Water Resource Recovery Facility hot water heater renewal, Port Kembla, Wollongong

Determination

This Review of Environmental Factors (REF) assesses potential environmental impacts of ST0014 Wollongong Water Resource Recovery Facility hot water heaters renewal. The REF 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 for ensuring the proposal is carried out as described in this REF. Additional environmental impact assessment may be required if the scope of work or work methods described in this REF change significantly following determination.

Certification

I certify that I have reviewed and endorsed this REF 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 and endorsed by:	Endorsed by:
[redacted]	[redacted]	[redacted]
Michelle Zhong Sydney Water Date: 31/03/026	Felix Salmon Environment Representative Sydney Water Date: 01/04/2026	Mile Purdevski Project Manager Sydney Water Date: 01/04/2026

Decision Statement

The main potential construction environmental impact of the proposal is impact to heritage. The operational phase of the proposal is expected to be consistent with the current operations of the Wollongong Water Resource Recovery Facility (WRRF). 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. Therefore, a Species Impact Statement (SIS) or Biodiversity Development Assessment Report (BDAR) is not required.

Given the nature, scale and extent of impacts and implementation of the mitigation measures outlined in this REF, the proposal is unlikely to have a significant impact on the environment. Therefore, we do not require an Environmental Impact Statement (EIS) and the proposal may proceed.

Determined by:	[redacted]	Elissa Howie, Acting Senior Manager Environment and Heritage Services, Sydney Water Date: 9 April 2026

1. Proposal description

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

Aspect	Relevance to proposal
Proposal need and objectives	The proposal is part of the Wastewater Treatment Renewals program. This program is required for the continued operation of Wollongong WRRF. The existing water heaters were installed in 1985 and are at the end of their serviceable life. The existing electrical control panels are believed to be the same age as the heaters and are now at the end of their asset life. There are no electrical drawings, making fault diagnosis difficult and spare parts difficult to source. In addition, the valves on the hot water pipework are old and inefficient. Should the heaters fail, it would disrupt the operation of Wollongong WRRF and lead to Environment Protection Licence (EPL) compliance issues (No.218) with the biosolid process. The proposal objective is to renew the heaters to ensure Wollongong WRRF remains compliant to support future operations.
Proposal description and methodology	The Wollongong WRRF heaters renewal proposal includes the renewal and upgrade of the digester heating system at Wollongong WRRF. The proposal involves mechanical, electrical, structural, and control system enhancements to improve heating reliability, energy efficiency, and operational safety. The location is shown in Figure 1-1, and the proposal scope is outlined below. **Boiler Room** • Removal of existing 2 hot water heaters and installation of three new dual-fuel heaters. • Installation of new hot water pipework, pumps, dosing system, and ventilation. • Modifications to biogas and natural gas supply infrastructure. • Electrical upgrades including switchboard replacement and control panel installations. **Service Galleries** • Replacement of hot water circulation pumps. • Installation of new flow transmitters and pipework tie-ins. • Modifications to existing gallery pipework and removal of mixing leg. **Digester Area** • Replacement of six sludge heat exchangers and associated pipework. • Installation of four new sludge recirculation pumps (digesters 3 & 6). • Lagging of new and retained pipework. • Installation of modulating control valves and bypass arrangements. **New fabricated switch room** • Construction of concrete foundation and slab.

Aspect	Relevance to proposal
	• Installation of new switchboard (SCA7101), distribution boards, PLC panels, UPS, and harmonic filters. • Integration with existing transformers and SCADA systems. **Underground gallery** • Cable reticulation works including reuse and upgrade of existing cable trays, pits, and conduits. **External Areas** • Installation of biogas and natural gas pipework behind the boiler room. • Potential relocation of condensate pots for improved access. • Temporary site establishment including fencing, laydown areas, and access routes.
Consideration of alternatives/options	Two options were considered: • Option 1: 'do nothing', and • Option 2: the proposal. Option 1: 'do nothing' was considered but not adopted as the proposal is required to maintain EPL conditions. The proposal is required to continue operation of Wollongong WRRF and maintain downstream water quality. As such, Option 2 was recommended and is assessed in this REF.
Location and land ownership	The proposal is located within the Wollongong Water Resource Recovery Facility at Port Kembla Road, Wollongong and is owned by Sydney Water. Proposal location: • Lot 2 DP1115754 • Lot 2 DP620742 The laydown area is at an existing car park owned by Wollongong Council and has been leased by Sydney Water since 2023.
Site establishment and access tracks	Access to the site would be through Port Kembla Road. Redirection of traffic within the Wollongong WRRF would be required.
Ancillary facilities (compounds)	A laydown area is required for the proposal. The laydown area is located at an established car park along Port Kembla Road. The location for the laydown area is shown in Figure 1-1.
Work hours	Work and deliveries will be scheduled during standard daytime hours: • 7 am to 6 pm, Monday to Friday • 8 am to 1 pm, Saturdays.

Aspect	Relevance to proposal
	Sydney Water's Project Manager can approve work outside of standard daytime hours if required. The approval process is described in the mitigation measures in Table 4-2.
Proposal timing	Construction is expected to start early to mid 2026 and take about 15 months, including mechanical and electrical installation. This would include landing of switch room (about 2-3 months). Commissioning will be required for each heater (about 3 months).

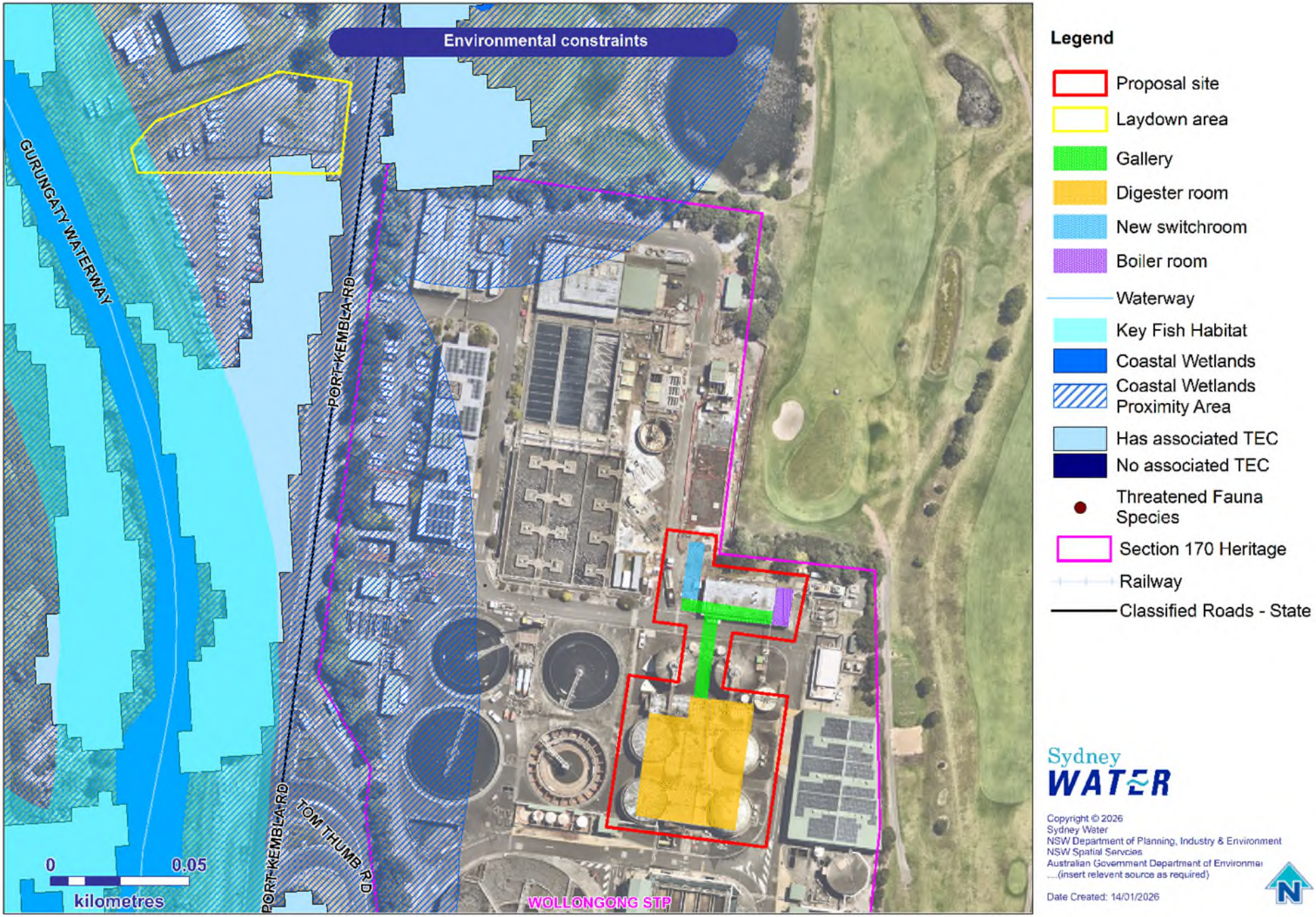

Figure 1-1 Proposal overview and environmental constraints

2. Consultation

2.1 Community and stakeholder consultation – general

Our approach to community and stakeholder consultation is guided by Sydney Water's community and stakeholder engagement guidelines.

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, proposal 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 impacts the community in some way, we will consult with affected groups throughout the proposal. This includes engaging the broader community and stakeholders during plan or strategy development or before making key decisions.

We will also provide local councils with reasonable notice when we would like to commence works. Local council(s) will be consulted about matters identified in environmental planning instruments such as public safety issues, temporary works on council land, and full or partial road closures of council managed roads.

2.2 Community and stakeholder consultation – proposal

Sydney Water must consult with council and other authorities for work in sensitive locations or where work may impact other agencies infrastructure or land. This requirement is specified in the State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP). No formal consultation was required under the TISEPP.

Consultation was undertaken with the golf course landowner north of the proposal. This landowner was notified on 2 October 2025 and again on 9 October 2025. The landowner of the golf course has confirmed they have no objections to the proposal.

3. Legislative requirements

Table 3-1 Environmental planning instruments relevant to the proposal

Environmental Planning Instrument	Relevance to proposal
Wollongong Local Environmental Plan 2009 (Wollongong LEP)	The proposal is located on land zoned SP2 Special Infrastructure. The laydown area is also zoned SP2.
State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP)	Section 2.126 (2) of the TISEPP indicates "Development for the purpose of sewage treatment plants or biosolids treatment facilities may be carried out without consent on land in a prescribed zone in the prescribed circumstances." Sydney Water is a public authority and therefore the development meets the definition of "prescribed circumstances" defined in Section 2.126 (1)(a) The heater renewal proposal meets the definition of development for the purpose of sewage treatment plants and is on land zoned SP2 which is a prescribed zone. The laydown area is also zoned SP2. Therefore, the proposal is permissible without consent.
State Environmental Planning Policy (Resilience and Hazards) 2021	The laydown area is the proximity area of a coastal wetland mapped under this SEPP. Under Section 2.8 development consent must not be granted to development on land identified as "proximity area for coastal wetlands" or "proximity area for littoral rainforest" on the *Coastal Wetlands and Littoral Rainforests Area Map* unless the consent authority is satisfied that the proposed development will not significantly impact on— (a) the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or (b) the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest. This provision does not apply to the proposal given development consent is not required. However, no excavation or vegetation clearing will be undertaken for the laydown area. The laydown area is in a previously disturbed area and within an existing carpark. As such, the proposal would not have an impact to the quality and quantity of surface and groundwater of a coastal wetland.

Table 3-2 Consideration of key environmental legislation

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
Protection of the Environment Operations Act 1997 (POEO Act)	The proposal is covered by EPL 218 and meets the EPL compliance requirements. Temporary relaxation of the EPL 218 is not required during construction or commissioning. A variation to EPL 218 is not required for operation.	N/A	N/A
Water Management Act 2000	Intrusive groundworks are required for the construction of the new switchroom. A 2021 geotechnical assessment adjacent to the proposal site identified groundwater at 3 m bgl. Excavation is to a depth of 0.5 m. As such the proposal is not expected to encounter groundwater. In the event groundwater is encountered, a Water Supply Work Approval (WSWA) is required under Section 90(2) for all activities that involve dewatering groundwater (e.g. dewatering an excavation such as a trench, or horizontal directional drilling), irrespective of the volume extracted.	WSWA (for <3ML)	Pre-construction, contractor
Biodiversity Conservation (*BC*) Act 2016.	The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. In determining whether the proposal is likely to significantly affect threatened species or ecological communities, or their habitats, the matters set out in s7.3 of the BC Act have been taken into account. The proposal, including the mitigation measures described in this report, is not considered likely to have a significant impact.	REF	Pre-construction, Sydney Water
Heritage Act 1979	The Heritage Act provides protection of the environmental and cultural heritage of the State which includes places, buildings, works, relics, movable objects, or precincts that are of State or local heritage significance. The proposal is within the Wollongong WRRF which is listed on Sydney Water's section 170 heritage register. The Wollongong WRRF is heritage listed for the	REF Local Heritage Assessment Form (LHAF)	N/A

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
	significance as public utility which services the Wollongong City. The proposal would have a neutral to beneficial impact on the heritage significance. Further detail is provided in the heritage section below.		
Biosecurity Act 2015	This Act outlines biosecurity risks and impacts and prescribes requirements for the management of risk to reduce the severity of impacts. Biosecurity risks can be managed through the mitigation measures in Table 4-2.	N/A	Construction, contractor

4. Environmental assessment

The environmental impacts checklist (SWEMS0019.01) was considered for the proposal. Table 4-1 includes only the potentially impacted aspects and Table 4-2 lists mitigation measures.

Table 4-1 review of environmental aspects

Aspect	Potential impacts
Topography, geology and soils	The proposal site is within the Wollongong WRRF which is considered disturbed terrain. Geological mapping indicates the proposal site is characterized with quartz and lithic fluvial sand, silt and clay. The topography is flat ranging between 4 m AHD and 6 m AHD. The proposal site is mapped as acid sulfate soil disturbed terrain. Due to the disturbed nature of the proposal site, the classification of these soils and the limited depth of excavation, impacts associated with acid sulfate soils are not anticipated. Soils will be impacted by ground disturbance for the foundation of the new switchroom, plinth and pipework. About 100m^3 of material is expected to be excavated to a depth of 0.5 m. There is the potential of soil contamination during construction due to accidental leaks or spills, oils or other chemicals from plants, equipment and vehicles used during construction. Potential impacts of erosion and sediment would be managed with the implementation of the mitigation measures in Table 4-2. Given the small scale of the proposal, the works would not permanently change the surface topography or drainage patterns of the area. No operational impacts are anticipated. Provided mitigation measures in Table 4-2 are implemented, the impacts to topography, geology and soil would be minimal.
Water and drainage	The closest waterbody is Gurungaty waterway about 180 m west of the proposal site and the Pacific Ocean is about 230 m east. Drainage of the proposal site would enter the existing stormwater system. Disturbance of soils has potential to generate indirect impact on the Pacific Ocean and Gurungaty waterway through uncontrolled sediment flow, erosion and the movement of disturbed materials and spoil into the stormwater and off-site during construction. The site is not mapped as a flood risk area. A geotechnical assessment undertaken in 2021 adjacent to the proposal site identified the groundwater level to be at 3 m bgl. Given the shallow depth of excavation, it is unlikely groundwater would be encountered. If the potential for intercepting groundwater is identified after the REF is determined, Sydney Water will obtain a groundwater Water Supply Works Approval. No operational impacts are anticipated. Provided mitigation measures in Table 4-2 are implemented, impacts to waterway and drainage lines are considered minimal.
Flora and fauna	A review of relevant literature, databases and aerial topography was undertaken including: • Protected Matter Search Tool • Biodiversity Value map • NSW State Vegetation Type Map

Aspect	Potential impacts
	• NSW Bionet database search • Biodiversity Assessment Wollongong WRP (ST0014), Sydney Water (2018) A 2018 biodiversity assessment identified exotic vegetation and weeds were present north of the proposal site. Minor trimming may be required for the planted native trees north of the boiler room within the WRRF boundary. There are no threatened ecological communities (TECs) within the proposal site. The closest TEC to Wollongong WRRF is mapped about 15 m northeast of the proposal site. This is the Coastal Sand Littoral Scrub – Forest and is listed as endangered under the BC Act. No threatened flora or fauna species are identified within the proposal site and given the lack of suitable habitat are unlikely to be present. The closest threatened fauna species recording is the wedge-tailed shearwater (*Ardenna pacifica)* 47 m southwest of the proposal (Figure 1-1). However, impacts to this species are not anticipated due to the disturbed nature of the site, high mobility of this species, available species habitat in the general area and temporary nature of the proposal. PCT 3546 Coastal Sands Littoral Scrub-Forest is mapped within the laydown area in the adjacent carpark and includes associated TEC. Although the mapping extends within the laydown area, there is no vegetation present within the laydown area. No vegetation impacts are required at the laydown area and the proposal will not impact any TECs. The laydown area is partially mapped as key fish habitat. However, the laydown area is 10 m from the top of bank of the waterway on an existing carpark with no excavation required in this area. As such, no impact to key fish habitat is expected. No operational impacts are anticipated. Given the industrial setting of the proposal site and provided mitigation measures in Table 4-2 are implemented, potential impacts to threatened flora, fauna species and TEC is negligible.
Heritage	**Non-Aboriginal heritage** Searches of the Australian Heritage Database and State Heritage inventory were conducted on 14 January 2026 in order to determine if any places of historic archaeological significance were located within the site. The site does not contain world, commonwealth, national, state or local heritage listed items. The Wollongong WRRF is listed on Sydney Water's section 170 heritage register for its significance as a public utility which services the Wollongong City and as an example of a major treatment plant serving a significant urban area. An impact assessment was completed by Sydney Water's Principal Heritage Advisor (Appendix D). Both the existing water heaters and electrical control panels were installed in c.1985 and are at the end of their serviceable life. Maintenance, repair and replacement of fabric - including the replacement of the subject water heaters and electrical control panels in 1985 - forms an integral part of the ongoing operation of the WRRF and the heritage significance of the site. The assessment concluded the proposal will have a neutral to beneficial impact on the significance of the WRRF as the heritage significance of Wollongong WRRF relates to its function and the upgrade will ensure the

Aspect	Potential impacts
	ongoing operation of the site. The impacts are considered positive as a key part of the heritage value lies in the functioning of the asset which will be addressed through undertaking the proposal. No operational impacts are anticipated. Mitigation measures are provided in Table 4-2. **Aboriginal heritage** A search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 14 January 2026 in order to determine if any places of Aboriginal archaeological significance were located within or in proximity to the proposed site. No AHIMS sites were identified within 500 m of the proposal. The proposal site is within 200 m of a waterway, which is considered a high risk area for Aboriginal heritage. However, the land on which the proposal will be conducted has been previously disturbed in order to construct the WRRF and carpark where the laydown area is proposed. Due to the disturbed nature of the site, potential impacts to Aboriginal heritage items or places is not anticipated. No further assessment is required. No operational impacts are anticipated.
Noise and vibration	The current background noise is characterised by the operation of Wollongong WRRF and the nearby roads. The proposal is scheduled during daytime. Night work is not anticipated. The proposal would require the following plant and equipment: • Skip Bins • Concrete pumps • Storage containers • Excavators • Tip trucks • Concrete agitator trucks • Concrete saw • Backhoes • Jackhammer • Hand tools • Light vehicles • Compactor • Cranes • Vacuum trucks The likelihood of noise impacts from the proposal was reviewed against risk factors based on Table 2 of the EPA's 2020 Draft Construction Noise Guideline. The review indicated that the construction noise impacts would be a medium-low risk and therefore a quantitative noise impact assessment was undertaken. The proposal is expected to take about 15 months in total, including 3 months for site establishment, 3 months for installation of the heaters and 9 months of general mechanical electrical installation and commissioning. Use of the noisiest equipment would primarily occur during site establishment and heater installation, while noisy equipment is unlikely to be required during the general mechanical electrical installation and commissioning phase. The noise assessment assessed the predicted worst-case noise impacts. It identified recommended additional mitigation measures for impacted receivers

Aspect	Potential impacts
	at different distances from the proposal, which will guide the community engagement for the proposal. The Transport for NSW (TfNSW) Construction and Maintenance noise estimator tool (TfNSW, 2022) was used for the assessment. The proposal site is surrounded by industrial, commercial and recreational areas. The nearest residential receiver is about 630 m north of the site. Other nearby receivers include: • Users of Wollongong Golf Club • Users of Wollongong City Beach • Users of Greenhouse Park • Users of JJ Kelly Park • Residents along Swan Street. A noise management level (NML) was established using the Rating Background Level (RBL) for the R2 representative environment defined in the noise estimator. This level best reflects the surrounding traffic volumes and noise catchment. The noise propagation types were identified as residential receiver – developed settlements (Urban and suburban) The RBL for the assessment were: • Day - 45 dBA • Evening – 40 dBA • Night - 35 dBA. The assessment adopted the noisiest plant as the “concrete saw”. The assessment outcomes are summarised below. **Residential receivers** With direct line of sight (LOS): • Receivers would be highly affected within 45 m of the proposal (refer to Figure 4-1). There are no receivers that will be highly affected. • Noise would be highly intrusive for receivers within 75m of the proposal. There are no receivers that will experience highly intrusive noise. • Noise would be moderately intrusive for receivers within 185 m of the proposal. There are no receivers that will experience moderately intrusive noise. Behind a substantial barrier with no line of sight (NLOS): • Receivers would be highly affected within 20 m of the proposal (refer to Figure 4-1). There are no receivers that will experience highly intrusive noise. • Noise would be highly intrusive for receivers within 25 m of the proposal. There are no receivers that will be highly affected.

Aspect	Potential impacts
	• Noise would be moderately intrusive for receivers within 75 m of the proposal. There are no receivers that will experience moderately intrusive noise. **Non-residential receivers (active recreation)** With direct line of sight: • Receivers with LOS would be highly affected within 45 m of the proposal (refer to Figure 4-2). The only non-residential receiver within 45 m is the Wollongong Golf Course. Users of the golf course may be highly affected when within 45 m of the proposal. Behind a substantial barrier: • Receivers with NLOS would be highly affected within 20 m of the proposal. The only non-residential receiver within 20 m is the Wollongong Golf Course. Recommended noise mitigation measures at different distances non-residential receivers: • Notification (N) • Phone calls (PC) The noise impact of the additional traffic movements, including light and heavy vehicle movements would be short in duration and is not expected to impact any sensitive receivers. **Vibration** The vibration intensive equipment used during construction will include a jackhammer. The minimum working distance for human comfort is 3 m. The closest residential receiver is about 630m west of the proposal site. As such, impacts to human comfort are unlikely. The minimum working distance to prevent cosmetic damage to light framed structures is 1 m and 2 m for heritage structures. Wollongong WRRF is listed on Sydney Water's section 170 heritage register. The proposed works will have neutral and beneficial impact on the heritage significance as it is related to the function of the site. Potential impacts is not expected to be significant or long term and would be typical of urban construction and industrial areas. The proposal is not anticipated to change operational vibration. Provided mitigation measures in Table 4-2 are implemented, impacts to noise and vibration would be minor.
Air and energy	Air quality has the potential to be impacted during construction due to dust generation and greenhouse gas emissions from construction machinery. During construction, temporary reductions in air quality are likely to occur due to elevated particulate matter from dust generating activities and exhaust emissions from diesel-powered construction equipment. Potential sources of dust and pollutant generation may include: • Excavation • Transportation of materials

Aspect	Potential impacts
	• Unloading and placement of materials from trucks • Dust from exposed soil during dry and windy conditions. Dust and emissions from plant, vehicles, and equipment may cause localised changes to air quality for any sensitive receivers. Intermittent and minor air quality impacts may be experienced by nearby sensitive receivers as vehicles associated with the proposal arrive to and depart from site. However due to the distance from the proposal site to sensitive receivers it is considered unlikely that any on site changes in air quality would affect sensitive receivers. There is potential for minor, localised and short-term odour generation during the replacement of the sludge heaters. This scope will be completed indoors and the sludge heaters and associated pipework will be flushed prior to removal. Therefore off site odour impacts are not anticipated. No operational impacts are anticipated. Provided mitigation measures in Table 4-2 are implemented, impacts to air and energy are considered minimal.
Waste and hazardous materials	The proposal is not expected to generate a significant volume of waste. However, some may be produced during the construction phase, potentially including: • Existing drainage infrastructure i.e. concrete • Domestic waste • Excess spoil from excavation • Vegetation waste from the trimming of vegetation • Construction packaging materials • Decommissioned heater components To ensure that waste is minimised, a CEMP will be implemented which will detail the proper avenues for the removal of waste on-site. Where possible, excavated material should be reused and replaced from where it was removed. Synthetic mineral fibres were identified in the ceiling of the digester areas within the proposal area and are recorded in Sydney Waters HazCentral system. Given the proposal in the digester area is the replacement of components and will not impact the ceiling, this potentially hazardous material will not be disturbed. A Preliminary Site Investigation (PSI) and a Data Gap Assessment (DGA) were undertaken for Wollongong WRRF in 2020 and 2024 respectively. The proposal site was not identified as an area of concern and no sampling within the proposal site was undertaken during either of these assessments. Monitoring well MW01A from the DGA is 70 m east of the proposed excavation and provides a conservative estimate at the potential soil and groundwater conditions within the proposal area. Soil samples from the MW01A did not exceed any guideline levels. Groundwater samples from MW01A identified guideline level exceedances of the *Australian Drinking Water Guideline 2022 Health* values and *National Environment Protection Measures (NEPM) 2013 Table 1C GILs, Marine Waters* for arsenic, nickel and zinc. Although when

Aspect	Potential impacts
	samples were screened against *NHMRC (2008) The Guidelines for Managing Risks in Recreational Water* there were no exceedances. The guideline exceedances identified in groundwater at MW01A relate to conservative drinking water and marine water criteria that are not applicable to the proposed works which will also be undertaken away from the identified contamination. Screening against recreational water guidelines indicates no potential risk to human health, worker health, or the environment, and the likelihood of contaminated soils being encountered within the proposal area is considered low. No operational impacts are anticipated. Provided mitigation measures in Table 4-2 are implemented, impacts from waste and hazardous materials are considered minimal.
Traffic and access	The proposed site is located within the Wollongong WRRF and will be accessed via the existing network in Wollongong WRRF and Port Kembla Road. There will be increased traffic between the proposal site and laydown area. It is not expected that traffic control would be required. Internal traffic would need to be redirected for crane access. This would be temporary and limited to Wollongong WRRF. The proposal will involve about 100 heavy vehicle movements and 300 light vehicle movements over the duration of the proposal. Expected impacts from the construction of the proposal include: • an increase in heavy vehicle and construction traffic for the duration of the works • footpath and detours within the Wollongong WRRF The existing traffic in the area is reflective of the commercial and industrial businesses. The construction would result in a minor increase in the traffic in the area. No operational impacts are anticipated. Provided mitigation measures in Table 4-2 are implemented, impacts from traffic and access to the public is considered minor.
Social and visual	The proposal would have potential to cause a minor temporary reduction of the visual amenity of the area due to the presence of construction, additional plant and material. The proposal would use the existing laydown area within a carpark owned by Wollongong City Council. The crane may be visible during construction for about 10 days and likely reach above the tree line at about 30 m high. The closest residential receiver is about 630 m north of the proposal. This may be noticeable to some receivers however this visual impact is short term in nature. Untidy work practices, haphazard storage of machinery and areas of bare earth contribute to the reduction of the visual amenity. Given the short-term nature of the proposal confined to the Wollongong WRRF, as well as the vegetation and distance separating most sensitive receivers from the proposal, social and visual impacts are unlikely. Operation of the proposal includes a new switchroom, which is the only new above ground structure and would be similar in height or lower that the existing

Aspect	Potential impacts
	infrastructure. It would be unlikely to be visible to receivers given the existing structures and vegetation obscuring the view of the switchroom. If the switchroom is visible to users of the golf course, impacts are considered minimal considering users are transient and the switchroom is consistent with the existing industrial landscape. Therefore, operational impacts would be minimal. Provided the mitigation measure in Table 4-2 are implemented, impacts to social and visual amenity would be minimal.
Cumulative and future trends	The existing laydown area is currently used by other projects in Wollongong WRRF. This proposal would extend the use of this laydown area and is expected to extend minor and localised traffic impacts to receivers along Port Kembla Road. Provided mitigation measures included in Table 4-2 are implemented cumulative impacts from the proposal would be minor. The proposal will improve the resilience of Sydney Water's wastewater network. The proposal will allow Wollongong WRRF to provide additional resilience to future trends for the local waterways and wastewater network.

Figure 4-1 Noise impacts to residential receivers

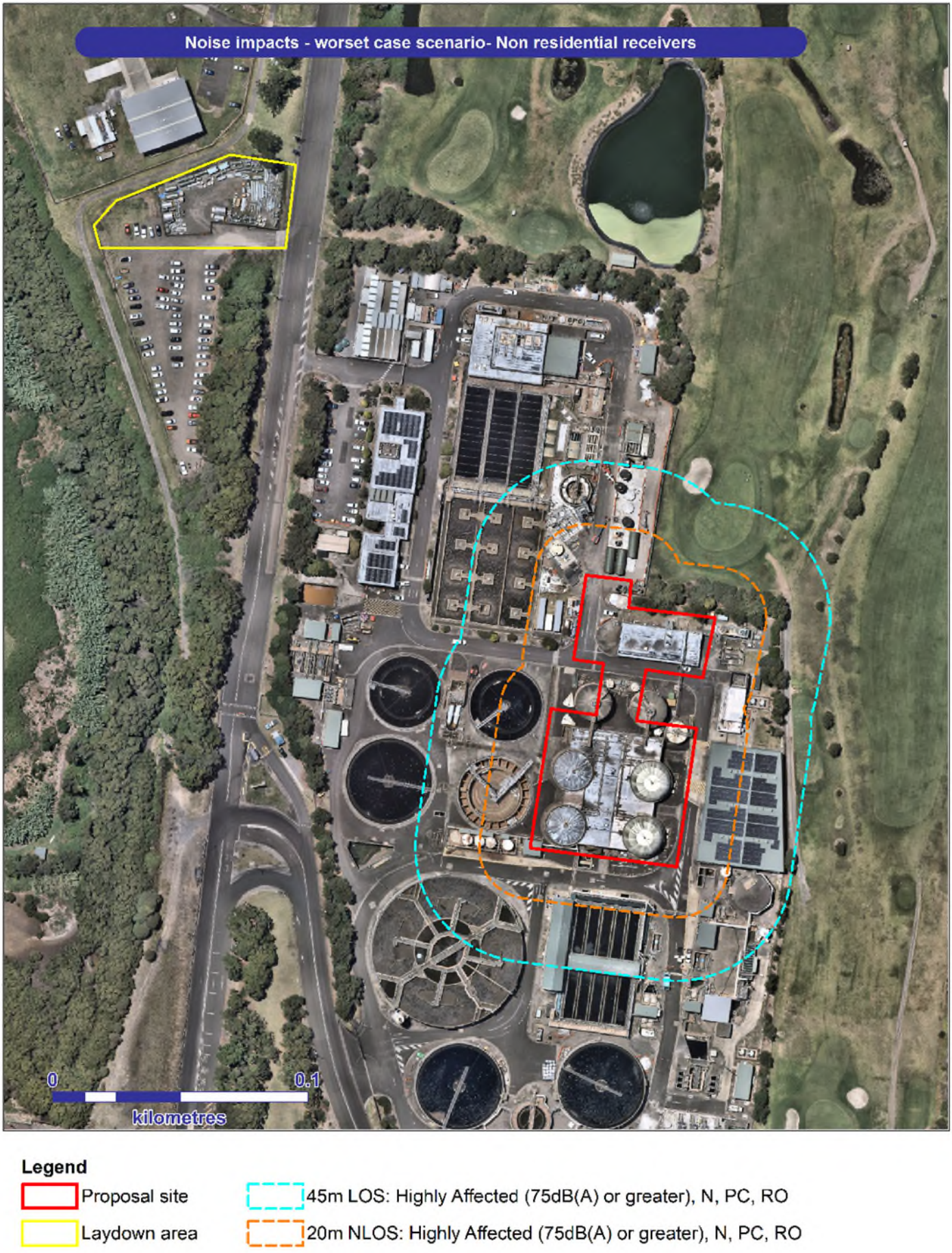

Figure 4-2 Noise impacts to non-residential receivers

Table 4-2 Mitigation measures

Mitigation measures
General
Prepare a Construction Environmental Management Plan (CEMP) addressing the requirements of this environmental assessment. The CEMP should specify 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 proposal site including locations of lay-down and storage areas for materials and equipment • location of environmental controls (such as erosion and sediment controls, fences or other measures to protect vegetation or fauna, spill kits) • location and full extent of any vegetation disturbance. Delineate the approved proposal site before construction.
To ensure compliance with legislative requirement for incident management (e.g. Protection of the Environment Operation Act 1997), Sydney Water employees and contractors will follow SWEMS0009. Attach SWEMS0009 to the CEMP.
Promptly notify the Project Manager, Community Relation Representative (Program Delivery) and Environmental Representative (Program Delivery) of any complaints.
Sydney Water's Project Manager (after consultation with the environmental 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: • limit proximity to sensitive receivers • do not disrupt property access • have no impact to known items of non-Aboriginal and Aboriginal heritage • are outside high risk areas for Aboriginal heritage • use existing cleared areas and existing access tracks • have no impacts to remnant native vegetation or key habitat features • have no disturbance to waterways • do not require additional safeguards beyond those included in the EIA • do not disturb contaminated land or acid sulfate soils • will be rehabilitated at the end of construction. The Delivery 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.

Mitigation measures

Should the proposal change from the EIA, no further environmental assessment is required provided the change:

- remains within proposal site and has no net additional environmental impact or
- is outside the proposal site 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 Delivery 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.

Topology, geology and soils

Prevent sediment moving offsite in accordance with Managing Urban Stormwater, Soils and Construction, Volume 1 and 2A (Landcom 2004 and DECC 2008), including, but not limited to:

- 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 line

Minimise ground disturbance and stabilise disturbed areas progressively.

Delivery 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.

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.

Manage acid sulfate soils in accordance with the Acid Sulfate Soils Management Advisory Committee: Acid Sulfate Soils Assessment Guidelines (ASSMAC, 1998). Prepare an Acid Sulfate Soils Management Plan (ASSMP) if required.

Water and drainage

Use appropriate controls to avoid potential sedimentation to waterbodies.

Mitigation measures

Bund potential contaminants and store on robust waterproof membrane, away from drainage lines.

Keep functioning spill kit on site for clean-up of accidental chemical/fuel spills. Keep the spill kits stocked and located for easy access.

Locate portable site amenities, chemical storage and stockpiles of erodible materials away from watercourses, drainage lines and flood prone areas.

If the potential for intercepting groundwater is identified after the REF is determined, Sydney Water will obtain a groundwater Water Supply Works Approval. The Delivery Contractor is responsible for:

- providing expert hydrogeological technical information to obtain the approvals
- preparing a Dewatering Management Plan
- complying with the conditions of the approvals (such as protecting water quality; minimising aquifer extraction volumes, monitoring extraction with flow meters and recording volumes).

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.

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 functioning spill kits close by.

Ensure equipment is leak free. Repair oil/fuel leaks immediately or remove from site and replace with a leak-free item.

Flora and Fauna

Provided it is essential for delivering the project, Sydney Water's Project Manager can approve the following vegetation removal and tree trimming, without additional environmental assessment (but only after consultation with the Environmental and Community Representatives and affected landowners). Sydney Water considers vegetation removal in these circumstances has minimal environmental impact.

- Any minor:
  - vegetation trimming or
  - removal of exotic vegetation or
  - removal of planted native vegetation
  - where the vegetation is not a threatened species (including a characteristic species of a threatened community or population), heritage listed, in declared critical habitat or in a declared area of outstanding biodiversity value.
- Any removal of remnant vegetation where there is no net change to environmental impact (e.g. a different area of vegetation is removed but the total area is the same or less than assessed in the EIA).

Mitigation measures

Written explanation of the application of this clause (including justification of the need for trimming or removal and any proposed revegetation) should be provided when seeking Project Manager approval. Any impacts to native vegetation and trees must 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.

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 implemented.

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.

In TOBAN period:

- check specific TOBAN notice to confirm whether the work can be carried out under standard exemptions (Govt Gazette No18 Feb 2018)
- if the work is not covered by a standard exemption, apply to RFS for specific exemption.

Air and energy

Use alternatives to fossil fuels where practical and cost-effective.

Track energy use as per SWEMS0015.28 Contractor NGER template.

Minimise the potential for odours (e.g. minimise the number of open access chambers, close maintenance holes overnight.)

Ensure odour control measures are available and ready to use during the works.

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:

Mitigation measures

- 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.

Heritage

Toolbox training around the significance of the heritage item.

Carry out a photographic record of the parts of the asset to be removed/replaced and forward it to the Sydney Water Principal Heritage Advisor prior to replacement.

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.

Noise and vibration

Works must comply with the EPA Construction Noise Guideline (Draft, 2021), 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.

If works beyond standard daytime hours are needed (beyond those identified in this REF), the Delivery 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, follow 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

Mitigation measures

- seek approval from the Sydney Water Project Manager in consultation with the environment and communications representatives.

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.

Notification (N) (letterbox drop or equivalent) are an advance warning of works and potential disruptions can assist in reducing the impact on the community. The notification may consist of using variable message sign, letterbox drop (or equivalent), web site / social media or a combination to distribute information detailing work activities, time periods over which these will occur, impacts and mitigation measures. Notification should be a minimum of five working days prior to the start of works. The approval conditions for projects may also specify requirements for notification to the community about works that may impact on them.

Phone calls (PCs) detailing relevant information made to identified/affected stakeholders, who have provided their contact details, within seven calendar days of construction start. Phone calls provide affected stakeholders with personalised contact and tailored advice, with the opportunity to provide comments on the proposal and specific needs. Where the resident cannot be telephoned then an alternative form of engagement should be used.

Waste generation and hazardous materials

Manage waste in accordance with relevant legislation and maintain records to show compliance e.g. waste register, transport and disposal records. Record and submit SWEMS0015.27 Contractor Waste Report.

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 the Contamination and Hazardous Materials team) to agree on proposed management approach.

Provide adequate bins for general waste, hazardous waste and recyclable materials.

Minimise stockpile size and ensure delineation between different stockpiled materials.

Minimise the generation of waste and sort waste streams to maximise reuse/recycling in accordance with the legislative requirements.

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 where appropriate. Recycle soils at a licensed soil recycling facility or dispose at an appropriately licenced landfill facility.

Prevent pollutants from escaping including by covering skip bins.

Mitigation measures

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 the Contamination and Hazardous Materials team [redacted].

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.

If asbestos containing material or other HBM is identified, restrict access and follow:

- Asbestos Works Procedure v 6.0, Document Number 746607;
- Hazardous Building Materials Management Plan (HBMMP)
- Safety Minimum Requirements; and
- SafeWork NSW requirements.

Traffic

Manage sites to allow people to move safely past the works, including alternative pedestrian, bicycle, pram and wheelchair access.

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.

Social and visual

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.
- Treat community enquiries appropriately.

Restore work sites to pre-existing condition or better.

Minimise visual impacts (e.g. 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.

5. Conclusion

Sydney Water has prepared this REF to assess the potential environmental impacts of Wollongong WRRF hot water heater renewal. The proposal is required to maintain the operation of Wollongong WRRF and ensure Wollongong WRRF maintains compliance with the EPL.

The main potential construction environmental impact of the proposal is impact to heritage. During operation, the impacts would be consistent with the current operation of Wollongong WRRF. Given the nature, scale and extent of impacts and implementation of the mitigation measures outlined in this REF, the proposal is unlikely to have a significant impact on the environment. Therefore, an environmental impact statement is not required under Division 5.1 of the EP&A Act.

The REF considers how the proposal aligns with the principles of Ecologically Sustainable Development (ESD) (Appendix B). 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.

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 noise and vibration and impacts to visual amenity. There will be environmental improvements by providing a reliable wastewater service to the local community.
Any transformation of a locality	The proposal will not result in the transformation of a locality as it is limited to Wollongong WRRF and existing hardstand areas outside the WRRF for laydown.
Any environmental impact on the ecosystems of the locality	The proposal will not result in environmental impacts to ecosystems of the locality. The proposal will lead to environmental improvements by ensuring a reliable wastewater service to collect and treat wastewater, minimising any impacts on the ecosystem.
Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	The proposal is confined within the boundary of Wollongong WRRF and the existing carpark. Given the proposal is short term and temporary, the proposal will not reduce these factors.
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 these factors. The proposal will prevent the degradation of the heritage significance of Wollongong WRRF.
Any impact on the habitat of any protected animals (within the meaning of the *Biodiversity Conservation Act 2016*)	The proposal may have a negligible impact on the habitat of protected animals given the proposal may require the trimming of planted native trees at Wollongong WRRF. Given the industrial setting of the site, impacts to protected animals are unlikely.
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 endanger any species. Given the industrial setting of the site, impact to habitat is unlikely.
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 wastewater service for the area.
Any degradation of the quality of the environment	The proposal will maintain the quality of the environment.

Section 171 checklist	REF finding
Any risk to the safety of the environment	The proposal will ensure the safety of the environment.
Any reduction in the range of beneficial uses of the environment	The proposal will maintain the range of beneficial uses of the environment.
Any pollution of the environment	Environmental mitigation measures will mitigate the potential for the proposal to pollute the environment.
Any environmental problems associated with the disposal of waste	Waste disposal will be in accordance with the environmental mitigation measures 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 affect demand on resources.
Any cumulative environmental effect with other existing or likely future activities	The proposal will not have any cumulative environmental effect with other existing or likely future activities.
Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	The proposal will not have any impact on these factors.
Any applicable local strategic planning statements, regional strategic plans or district strategic plans made under the EP&A Act, Division 3.1	There are no applicable strategic planning statements or plans, as the proposal forms part of a maintenance program.
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 Ecologically Sustainable Development

Principle	Proposal alignment
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 mitigation measures have been designed to reduce 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 service. The proposal will ensure the continued operation of Wollongong WRRF.
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. The proposal would take place in highly disturbed area with minimal vegetation clearing.
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. This is evident through the use of existing infrastructure, using existing cleared area and using techniques to minimise disturbance and timeframes.

Appendix C – 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?		X
Be likely to generate traffic that will strain the capacity of the road system in the LGA?		X
Connect to, and have a substantial impact on, the capacity of a council owned sewerage system?		X
Connect to, and use a substantial volume of water from a council owned water supply system?		X
Require temporary structures on, or enclose, a public space under council's control that will disrupt pedestrian or vehicular traffic that is not minor or inconsequential?		X
Excavate a road, or a footpath adjacent to a road, for which the council is the roads authority, that is not minor or inconsequential?		X
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?		X
Section 2.12, flood liable land – consultation with council		
Will the work be on flood liable land (land that is susceptible to flooding by the probable maximum flood event) and will works alter flood patterns other than to a minor extent?		X
Section 2.13, flood liable land – consultation with State Emergency Services		
Will the work be on flood liable land (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)?		X
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?		X
Section 2.15, consultation with public authorities other than councils		

TISEPP section	Yes	No
Will the proposal be on land adjacent to land reserved under the *National Parks and Wildlife Act 1974* or land acquired under Part 11 of that Act*? If so, consult with DPE (NPWS).*		X
Will the proposal be on land in Zone C1 National Parks and Nature Reserves or on a land use zone that is equivalent to that zone? *If so, consult with DPE (NPWS).*		X
Will the proposal include a fixed or floating structure in or over navigable waters? *If so, consult TfNSW.*		X
Will the proposal be 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.*		X
Will the proposal be on land in a Western City operational area specified in *the Western Parkland City Authority Act 2018,* Schedule 2 and have a capital investment value of $30 million or more? *If so, consult the Western Parkland City Authority*.		X
Will the proposal clear native vegetation on land that is not subject land (ie non-certified land)? *If so, notify DPE 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).*		X