

Review of Environmental Factors Multi-program - Category B

IN.P0001803 SP0029 Drummoyne Pressure Main Renewal

Determination

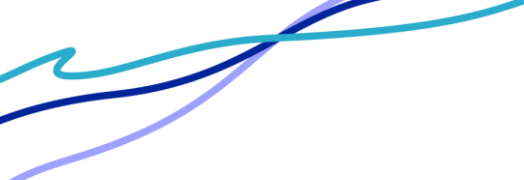
This Review of Environmental Factors Multiprogram - Category B (Category B REF) is to be read in conjunction with the Review of Environmental Factors Multi-program pipeline and related infrastructure replacement, repair and upgrades (Multi-program REF) (August 2025). Together both documents assess the potential environmental impacts of SP0029 Drummoyne Pressure Main Renewal ('the proposal'). These documents were 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 Category B REF and Multi-program REF. Additional environmental impact assessment may be required if the scope of work or work methods described in either the Multi-program REF or this Category B REF change significantly following determination.

Certification

I certify that I have reviewed and endorsed this Category B 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:
Ellen Curtis Environmental Scientist Sydney Water Date: 30 July 2026	Grace Corrigan Environment Representative Sydney Water Date: 4 August 2026	Robin Sham Project Manager Sydney Water Date: 07/08/2026



Decision Statement

The main potential construction environmental impacts of the proposal are to non-Aboriginal heritage and amenity, including from noise and vibration and traffic and access impacts. During operation, potential impacts are not anticipated, as the infrastructure will be located below ground and the area returned to pre-construction conditions. 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) and/or Biodiversity Development Assessment Report (BDAR) is not required.

Determined by:



Elissa Howie, A/Senior Manager
Environment & Heritage, Sydney
Water

Date: 20 August 2026

1 Proposal details

Table 1-1: Proposal details

Aspect	Relevance to proposal
Location and land ownership	The proposal extends along Edwin Street between Formosa Street and Ferry Lane, Drummoyne and is in the Canada Bay local government area (LGA). Land use is zoned Mixed Use MU1, Low Density Residential R2, Medium Density Residential R3 and Public Recreation RE1. The proposal will impact roadways, including verge and footpath, and a public reserve. Figure 1-1 to Figure 1-2 show the proposal alignment and environmental constraints.
Approved REF	Review of Environmental Factors Multi-program pipeline and related infrastructure replacement, repair and upgrades (Multi-program REF) (August 2025).
Proposal description and methodology	The proposal is consistent with scope detailed in the Multi-program REF (August 2025) for wastewater main renewal works. Renewal works are proposed to address asset failure and condition concerns (e.g. leaks and corrosion) along a roughly 200 m section of pressure main, originally laid in 1955 (the 'SP0029 pressure main'). Due to its degrading condition the SP0029 pressure main is at an increased risk of failure. Failure of the main would result in an environmental incident that could affect adjacent waterways, as well as Sydney Water's reputation. Methodology • complete site investigations (as required) e.g. geotechnical, contamination, CCTV • establish site - set up compound and laydown areas - install traffic management controls - install environmental management controls - conduct vegetation trimming (if required and limited to only what is needed to enable safe access for machinery/plant along Edwin Street). • establish temporary bypass hose to operate during construction to isolate and make safe the existing main - install the bypass for about 200 m between Edwin Street (pick-up point) and Renwick Street (discharge point) - excavate an entrance pit of about 4 m (l) x 0.4 m (w) x 0.4 m (d) at an existing maintenance hole (MH1290118) along Renwick Street. • establish wastewater tankering route from SP0029 (Queen Victoria Street) to MH1290118 (Renwick Street) (Figure 1-1 shows the indicative route)

Aspect

Relevance to proposal

- wastewater tankering is required to empty the pressure main before commissioning and decommissioning the pipeline (about 4 days). The bypass setup (see above) will be used during construction, between commissioning and decommissioning
- the frequency and duration of tanker movements would be defined on-site based on safety considerations.
- renew SP0029 pressure main (relining/replacement)
 - excavate launch and receival pits for relining activities at 2 locations ranging in size up to a maximum of about 3 m – 6 m (l) x 3 m (w) x 1.5 m – 1.9 m (d) (within excavated footprint for relay activities; see below)
 - exhume and re-lay 3 discrete sections of DN250 CICL pipeline. Each section will be replaced and relined before commissioning. This activity requires excavation ranging in size up to a maximum of about 3 m – 11 m (l) x 1 m (w) x 1.2 m – 1.5 m (d).
- reline entire alignment, including existing and re-laid pressure main sections.
- demobilise site
 - conduct post-installation CCTV inspection and performance testing
 - remove temporary bypass system
 - recommission pressure main
 - backfill, restore, and clean site to return to its original condition
 - demobilise from site.

Machinery and equipment

- | | |
|---|--|
| • excavator/s (up to 14 T without hammer) | • shoring boxes |
| • excavator/s (up to 13.5 T with hammer) | • road plate |
| • road saw | • intermediate bulk containers |
| • jack hammer | • site amenities/shed (e.g. lunchroom, office, portable toilets) |
| • generators | • portable lighting towers |
| • bypass hose and pump system | • portable booms |
| • light and heavy vehicles (e.g. vacuum trucks, tanker trucks, delivery trucks, utes) | • temporary traffic lights |
| | • portable winches |
| | • hand drill (for coring). |

Proposal timing

The proposal will take up to 26 weeks (about 6 months) to complete and occur in mid- to late-2027. The work will require excavation within a roadway and is located within 100 m of a State classified roadway (i.e. Victoria Road).

Most work should be completed during evening/night time to meet Road Occupancy Licence (ROL) requirements. Once installed, the bypass would

Aspect

Relevance to proposal

operate continuously for up to 2 months (day/night) to enable safe completion of construction and relining works.

Work that would occur during standard construction hours (7am to 6pm weekdays) is currently limited to the continuous use of the bypass for 2 months (generators and pumps).

The proposed construction schedule will continue to be refined as the proposal is developed, and ROL requirements are confirmed. Indicatively, out of hours work may include (from most preferred to least preferred):

- extended weekend shifts: Saturday 7am to 8am and 1pm to 6pm, Sunday and public holidays 8am to 6pm.
- evening shifts: 6pm to 10pm
- night: all other times.

Consultation

Community and stakeholder consultation – proposal

Given potential noise impacts (outlined in section 2 and Appendix D), consultation with the community is required if more than 2 nights of work per week is proposed, to determine community acceptance of additional night shifts. This will be completed about 3-4 weeks before construction starts.

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. This requirement is specified in the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (TISEPP).

Consultation was required under sections 2.10(1)(e), and 2.10(1)(f), as the proposal involves excavation of, and installing structures on, a council owned road, footpath and council managed land. City of Canada Bay Council were notified with a formal TISEPP notification letter on 15 July 2026. As of 10 August 2026, no response from council has been received.

Appendix C includes further detail.

Legislative requirements

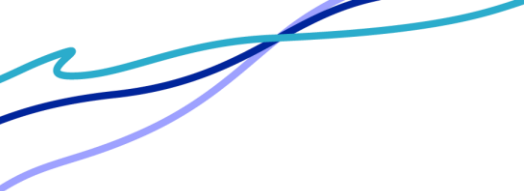
Additional legislative requirements above those already assessed in the Multi-program REF are detailed below.

Roads Act 1993

Section 138 of the *Roads Act 1993* requires consultation and concurrence from the road authority (i.e. TfNSW). Works are within 100 m of Victoria Road, a State classified road. City of Canada Bay Council is the road authority for local roads. The project team will liaise with TfNSW and City of Canada Bay Council to ensure a ROL is granted before works start.

Section 171A of the Environmental Planning and Assessment Regulation 2021.

Appendix A includes this checklist.



Aspect	Relevance to proposal
	TISEPP Chapter 2 Infrastructure Under Section 2.11(1)(a) of the TISEPP, consultation with Council is not required as the proposal is unlikely to affect the heritage significance of a heritage conservation area in a way that is more than minor or inconsequential (see Table 2-1).

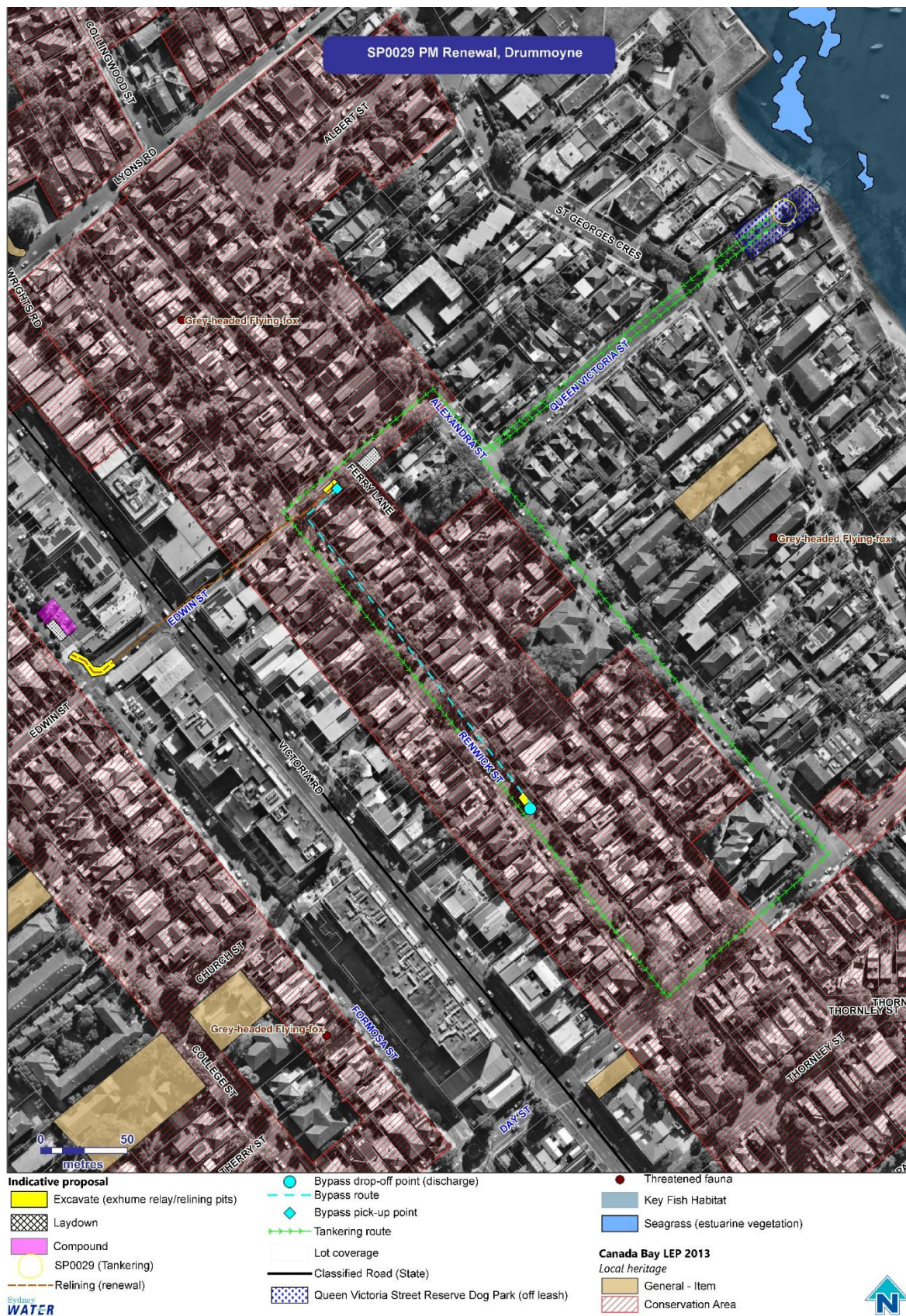


Figure 1-1 Location of proposal and key environmental constraints including bypass and tankering routes (refer to Figure 1-2 for close up of excavation sites)



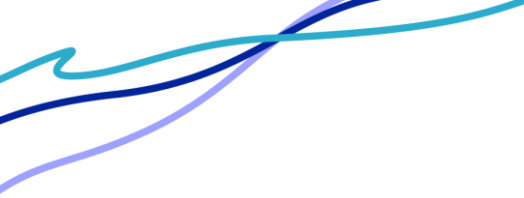
Figure 1-2 Location of proposal between Formosa Street and Ferry Lane and key environmental constraints (refer to Figure 1-1 for tankering route)

2 Additional environmental impacts and mitigation measures

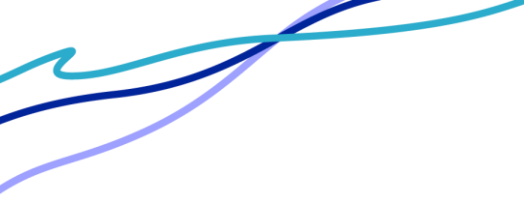
The tables below list the additional environmental impacts that could result from the proposal and the additional mitigation measures. All other environmental impacts and mitigation measures identified in the Multi-program REF remain the same and will be incorporated into the Contractor's Construction Environmental Management Plan (CEMP).

Table 2-1: Review of environmental aspects

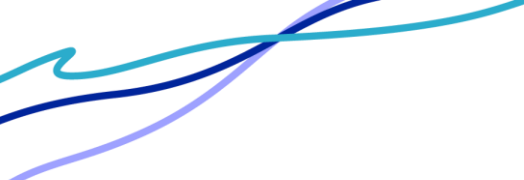
Aspect	Additional impacts	Additional mitigation measures
Topography, geology and soils	The proposal is within the road corridor, road verge, and previously cleared areas within a developed area of Drummoyne. The soil type underlying the proposal area is characterised by land extensively modified by human activity and typically comprising fill and dredged estuarine sands and muds. The nearest reported NSW EPA contaminated site is a former dry cleaner, about 280 m north-west of the proposed alignment. Due to the distance from the proposed work area, contamination from this site is unlikely to affect the proposal. No salinity hazards are mapped to occur. Acid sulfate soil (ASS) risk at the site is mapped as low probability but at very low or unknown confidence. Excavation is required at launch and receival pits, and to enable bypass installation and renewal activities. No additional excavation or installation of hardstand is required for compound/laydown areas. No new access tracks are required, as the site can be accessed using the existing road network. Given the discrete areas of ground disturbance, the existing environment, and after applying mitigation measures, impacts to topography, geology and soils are expected to be minor. Areas excavated will be restored to existing levels once excavation works are complete. Impacts to topography, geology and soils are not expected during operation. Potential impacts can be managed by the mitigation measures in the Multi-program REF.	Mitigation measures in the overarching Multi-program REF (August 2025) will be implemented to manage potential impacts.
Water and drainage	The nearest waterway is Parramatta River/Fern Bay immediately east of the SP0029 pressure main. Bypass	Mitigation measures in the overarching Multi-program



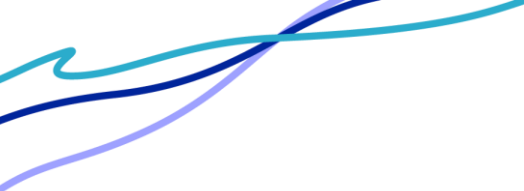
Aspect	Additional impacts	Additional mitigation measures
	and tankering of wastewater is proposed to enable works. Tankering activities (pick-up point) are adjacent to the waterway. Although the bypass setup is about 320 m west of the waterway, a council-managed stormwater network extends eastward along Edwin Street to the bay. These activities have the potential to impact on water quality due to: • poor site management • unexpected equipment failure leading to spills • discharge of wastewater to the environment, including via the stormwater network. No flood mapping or publicly accessible groundwater monitoring bore data are readily available for the proposal area. However, works are not anticipated to change flood patterns or significantly impact surface quality or water flow during construction or operation. Groundwater dewatering Geotechnical investigations along the proposed alignment indicated the potential for localised groundwater inflows at the proposed launch and receival pits. Therefore, it is expected that groundwater will be encountered, and dewatering is required. Exact groundwater volumes were unknown at the time of writing. Groundwater would be managed in accordance with the site-specific WSWA and Dewatering Management Plan. No aquatic groundwater dependent ecosystems (GDEs) were identified near the launch and receival pits where groundwater may be extracted, so impacts to GDEs are not expected. Surface water runoff/dewatering Surface water runoff that enters the excavation trenches may require dewatering. As the site will be reinstated, no impacts to water (surface or groundwater) are expected during operation. With the implementation of mitigation measures, the overall impact to water and drainage is expected to be minor.	REF (August 2025) will be implemented to manage potential impacts. • Sydney Water will obtain a groundwater Water Supply Works Approval (WSWA). The 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). • The Dewatering Management Plan should include elements such as how water quality will be protected and how extraction volumes will be monitored. • Manage dewatering in accordance with SW Guidance Standard 9.1 Excavation Dewatering.
Flora and fauna	There are no mapped terrestrial native vegetation communities with 200 m of the proposal. The nearest protected vegetation communities to the proposal include estuarine species (seagrass meadows), which are mapped offshore within Fern Bay.	• Restrict vegetation impacts along Edwin Street to only what is required. Where possible, tie back branches



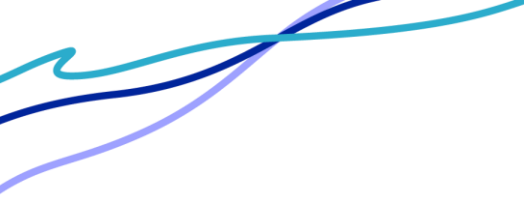
Aspect	Additional impacts	Additional mitigation measures
	GDEs are mapped within 500 m of the proposal, with the closest areas mapped about 400 m south and 340 m east of Queen Victoria Street Reserve. These GDEs have a HEVAE (High Ecological Value Aquatic Ecosystems) scoring of ‘low’ and are therefore not considered High Priority under the Water Sharing Plan. The proposal is not expected to directly or indirectly impact nearby GDEs. Vegetation trimming (i.e. overhanging branches) may be required along Edwin Street to allow access for machinery. Trimming will be restricted to only what is required, include isolated branches on individual trees, and only occur if necessary to allow machinery and equipment safe access to the construction area. There are scattered threatened fauna sightings near the proposal (Grey-headed Flying-foxes (GHFF)). However, there are no known GHFF camps near the construction site. While no direct impacts to fauna (including the GHFF) are expected, night works will require lighting and will emit noise which may impact foraging behaviour of nocturnal species. Given the mobile nature of this species and minimal habitat and feed trees in the area, impacts to threatened fauna are not expected, and potential impacts can be managed by the mitigation measures in the Multi-program REF. No impacts to flora and fauna are expected during operation. If required, any minor tree trimming would be restored in time through natural regrowth.	instead of cutting branches to enable work.
Heritage	Aboriginal heritage The proposal is in a high-risk landscape for Aboriginal heritage (< 200 m from waters). A search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 12 May 2026 (client service no. 1125328). No registered Aboriginal sites within 200 m of the proposal were identified. The proposal area constitutes ‘disturbed land’ as defined under the Due Diligence Code of Practice. Historic disturbance throughout the proposal area includes vegetation clearing, establishing existing infrastructure and earthmoving and landscaping activities for urban growth (refer to the NSW Government: Spatial Services Historical Imagery portal).	• Mitigation measures in the overarching Multi-program REF (August 2025) will be implemented to manage potential impacts.



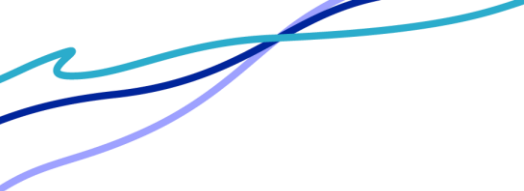
Aspect	Additional impacts	Additional mitigation measures
	Given the above, the proposal is unlikely to impact any Aboriginal objects, and unexpected finds can be managed with the mitigation measures in the Multi-program REF. Non-Aboriginal heritage The proposal overlaps or is within 6 m of 2 mapped conservation areas (Canada Bay LEP 2013). The proposal overlaps the Birkenhead and Dawson Estates Conservation Area. The significance of this area relates to the streetscapes, housing styles and street trees, which all contribute to the character of the area. The proposal is adjacent to the Bourketown Conservation Area. The significance of this area relates to the streetscape and urban buildings constructed in the early 20th century. Several buildings within 200 m of the proposal are locally listed for heritage values, including: • Former Westpac Bank (I477; 112 m north) • St Bede's Anglican Church (I90; 186 m south) • Hotel (I311; 180 m north) • Drummoyne Fire Station (I312; 200 m) • Uniting Church and Hall (I92; 115 m south-west). Above ground works include temporary activities only. Surfaces impacted by the proposal are on previously disturbed land and will be reinstated at the conclusion of activities. All new or renewed infrastructure will be below ground. The potential tree trimming along Edwin Street is in the curtilage of the Birkenhead and Dawson Estates Conservation Area. Street trees contribute to the heritage character identified in these listings. Vegetation impacts, if needed, will be restricted to minor branch trimming for machinery access. Accounting for natural regrowth, impacts to the heritage significance of the trees in these areas is considered minor. Overall, the proposal's heritage impacts are considered minor and inconsequential as there will be no direct or long-term impact on the heritage significance of listings, including the conservation areas. Indirect vibration impacts to these heritage items are assessed in the 'noise and vibration' section below.	



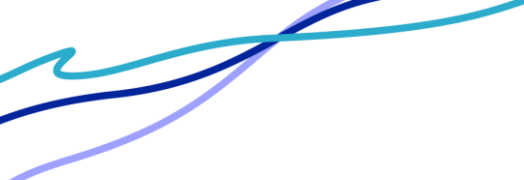
Aspect	Additional impacts	Additional mitigation measures
	No operational impacts to any known heritage items are expected.	
Noise and vibration	The proposal is in an area with low to medium density residential living and some mixed use and public recreation spaces. The methodology requires staging of work within local roadways for up to 6 months, mostly at night, which was considered as a medium – high risk of noise impacts. A noise memo was completed for the works (see Appendix D). The memo assesses the noise impacts using the Transport for NSW (TfNSW) Construction and Maintenance Noise Estimator Tool. Noise impacts The assessment modelled 2 scenarios: • Activity 1: a more holistic ‘day-to-day’ construction scenario (based on drainage infrastructure) operating at night • Activity 2: worst-case scenario: noisiest piece of equipment (an excavator with a rock hammer attachment) at night. Noisiest activities/equipment are predicted to impact receivers up to 390 m away for up to 26 weeks or 6 months (Figure 2-1 and Figure 2-2). These noise levels are for the worst-case scenario with noisiest work completed before 12am. Works include static activities (e.g. excavation and pipe renewal/relining sites, and generator and pump use) and more transient/mobile activities (e.g. tanker movements). However, the project scope is anticipated to be staged, and many noisy and annoying activities will not occur at any one site for the full duration of the proposal. Some static activities would be active and impact nearby receivers for between 2 months (bypass) and 6 months (compounds). Generally, the proposed method and scheduling of activities would limit the noise exposure of individual receivers. The relining is a linear activity along the alignment, from one pit to the other. Other activities such as excavating to access the pipeline or compound use are static. Generally, noise levels increase when work is adjacent to a receiver and decrease as the work front moves. Similarly, noise attenuation can occur with depth below ground level. However, noise fatigue may be experienced by specific	• Mitigation measures in the overarching Multi-program REF (August 2025) will be implemented to manage potential impacts. • Noisier activities (use of concrete saw, excavator with hammer) must be completed before midnight. • Additional mitigation must be applied for the sensitive receivers near the bypass and compound, e.g. shielding, quieter generators, earplugs and/or other measures as appropriate. • The Communications Representative will consider providing notification about the night works to stakeholders within a 390 m radius. • The Communications Representative will consider specific notifications (letterbox drop or phone calls) to identified stakeholders (within 110 m radius of night work). • Night-time construction noise shall be limited to 2 consecutive nights except for where there is a Duration Respite (see below). • The Communications Representative will consider engaging with affected stakeholders (within a 110 m radius) on a 4- or 5-night a week schedule (i.e. Duration Respite). This will include a ‘Have your say’ consultation letter with survey including



Aspect	Additional impacts	Additional mitigation measures
	receivers adjacent to ongoing and static activities, including compounds and bypass use. Mitigation measures would be required to manage these ongoing impacts. Predominantly, noise impacts would impact: • residents along Ferry Lane and Edwin, Renwick and Formosa Streets (Activity 1 and 2) • residents along Alexandra, Day and Queen Victoria Streets (Activity 1, including tankering route) As most nearby businesses are expected to be unoccupied during night-time hours, minimal impacts to these receivers are expected. Impacts are considered short-term and moderate, after implementation of mitigation measures contained in this REF and Appendix D. Vibration impacts Figure 2-3 shows the predicted vibration impacts from the proposal. No light framed structures were located within the recommended minimum distance of 7 m. Several heritage structures along Edwin, Formosa and Renwick Streets and Ferry Lane, in the listed conservation areas, fall within the minimum working distance of 19 m and may be temporarily impacted. Other local heritage sites are outside the minimum working distance and will not be impacted. Sensitive human receivers are within the minimum working distance (23 m) for human response. People within 23 m of the proposal may experience higher levels of vibration than other receivers, depending on their proximity to vibratory work (excavator with hammer). Vibration impacts are considered minor and can be adequately managed by applying mitigation measures. The implementation of identified mitigation measures would ensure vibration impacts are further minimised. During normal operation no noise or vibration impacts would occur.	options for night shift patterns and corresponding work duration for each option, sent out to the community about 3-4 weeks before night work starts. • For noisier night works the project team will consider if respite offers (3 hours work, one hour break) are suitable to reduce impacts on stakeholders within 70 m. • Ongoing community complaints management will be implemented and, if required, alternative accommodation may be considered on a case-by-case basis. • Daily register of planned activities to be kept on site. • Attended noise monitoring, recommended during noisier work and in the event of any complaints. • The project team is to consider if the use of smaller plant is possible where minimum working distances are breached, or if vibration monitoring is required. • Conduct a dilapidation survey / asset condition assessment prior to works which have potential to damage existing structures. • HSEQ site presence. • Portable noise barriers located at work front, e.g. around launch and receipt pits, or any other location as practical.
Waste and hazardous materials	Waste generated by the works will mainly be minor vegetation waste and surplus spoil from excavation, including ASS. Analysis of investigation samples	• Mitigation measures in the overarching Multi-program REF (August 2025) will be



Aspect	Additional impacts	Additional mitigation measures
	confirmed the presence of potential/acid sulfate soils (P/ASS) at the proposed excavated pits. All excavated spoil with potential to include ASS should be managed to control generation of acid. Given space restrictions, treatment and reuse on site are not feasible, and all ASS spoil material would be disposed of offsite. The impact of waste generated by the works is expected to be minor, with all waste streams to be transported and disposed offsite. No hazardous materials will be used or stored on site and mitigation measures can adequately manage the potential impacts from unexpected contamination finds. During normal operation waste or hazardous materials impacts would not occur.	implemented to manage potential impacts. • 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).
Traffic and access	The proposal is accessible via the existing road network. Several local bus routes operate in the Drummoyne area, with stops along Lyons Road, Victoria Road and St Georges Crescent. Buses operate throughout the day and night. There are also recreational areas nearby that members of public would use (e.g. off-leash dog park on Queen Victoria Street). Timed parking is available along Formosa Street and an adjacent off-street carpark. Timed parking is also available along other local roads. ROLs will be required to enable construction activities including excavation for relining, bypass installation and use, and compound/laydown activities. Potential lane closures may temporarily impact bus routes, which may be delayed by reduced speed limits. No private property access would be required, with private property driveways remaining accessible during construction. Some footpaths e.g. along Edwin Street may be temporarily blocked during construction to maintain a safe distance between members of public and construction activities. Diversions would be put in place to ensure safe access around the work site. Tankering will take up to 4 days and may require localised traffic control during tank filling and emptying activities. Figure 1-1 shows the proposed tankering route. It extends from SP0029 (pick-up point) along Queen Victoria Street towards the proposed discharge point, in the roadway outside 22 Renwick Street. Tankers will complete a loop, returning to SP0029 via Day Street and Alexandra Street. Any potential impacts will be discussed in consultation with stakeholders and considered in a traffic management plan.	• Mitigation measures in the overarching Multi-program REF (August 2025) will be implemented to manage potential impacts. • The indicative tankering route to be confirmed at a later design stage and in line with any ROL requirements.



Aspect	Additional impacts	Additional mitigation measures
	New access tracks are not required and public access to recreational areas, including the Queen Victoria Street off-leash dog park, would not be restricted. Establishing the compound across about 10 parking spaces in the Formosa Street off- and on-street parking options for 6 months would temporarily inconvenience the public by reducing parking availability. Parking spaces along the remaining alignment, including Edwin Street, may also be unavailable during renewal and relining of the pipeline. Members of public seeking available parking would need to find alternative options on nearby streets or in nearby public carparks. However, permanent changes to the availability of parking are not proposed. The carpark and on-street parking will be returned to a preexisting condition after construction. Impacts from loss of parking during construction are considered short-term and moderate. No operational impacts from the proposal are anticipated. By implementing the mitigation measures, potential traffic and access impacts are expected to be minor. No impacts to traffic and access will occur during normal operation.	

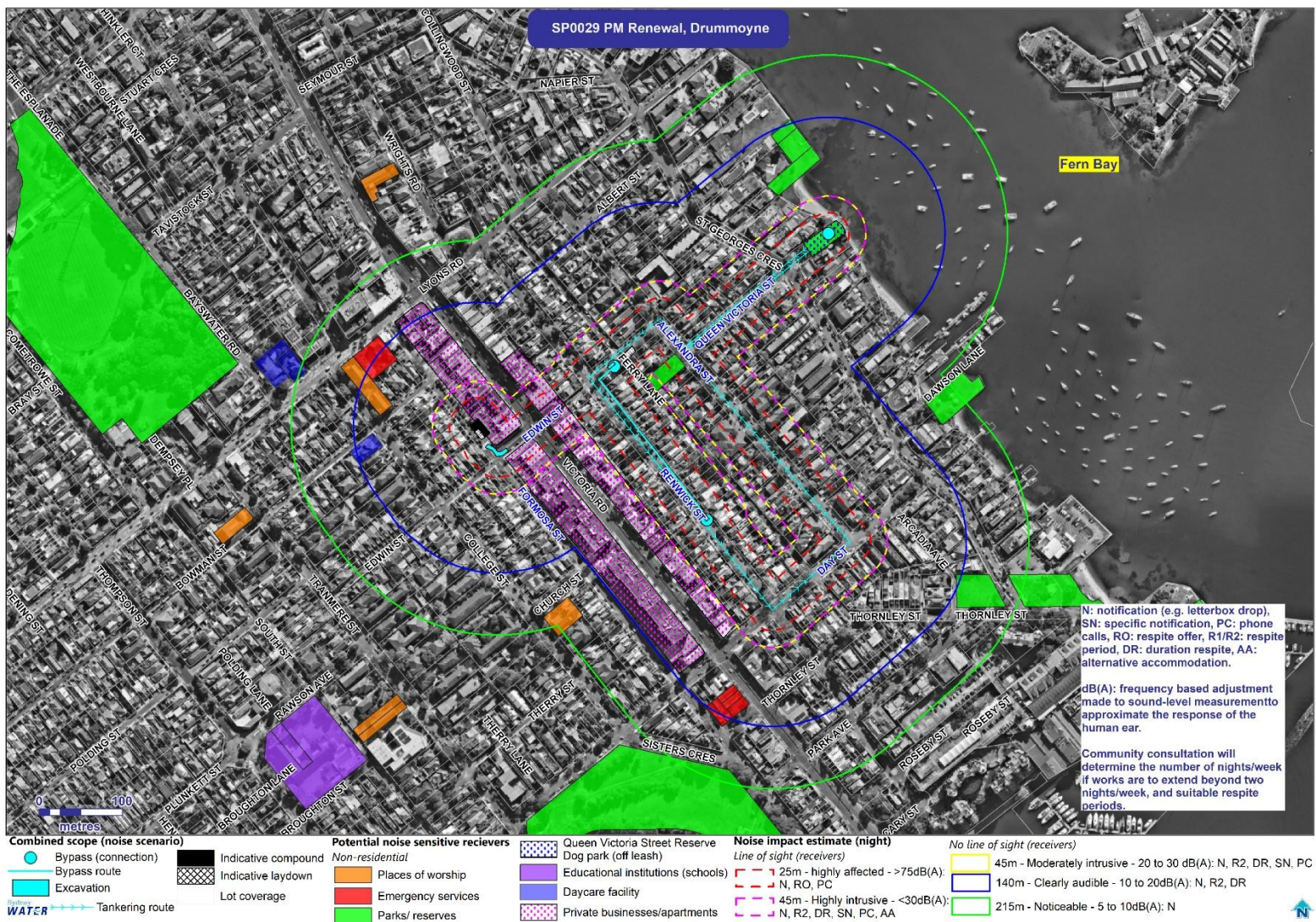


Figure 2-1 Residential receivers within affected distance during Activity 1 (OOHW scenario based)

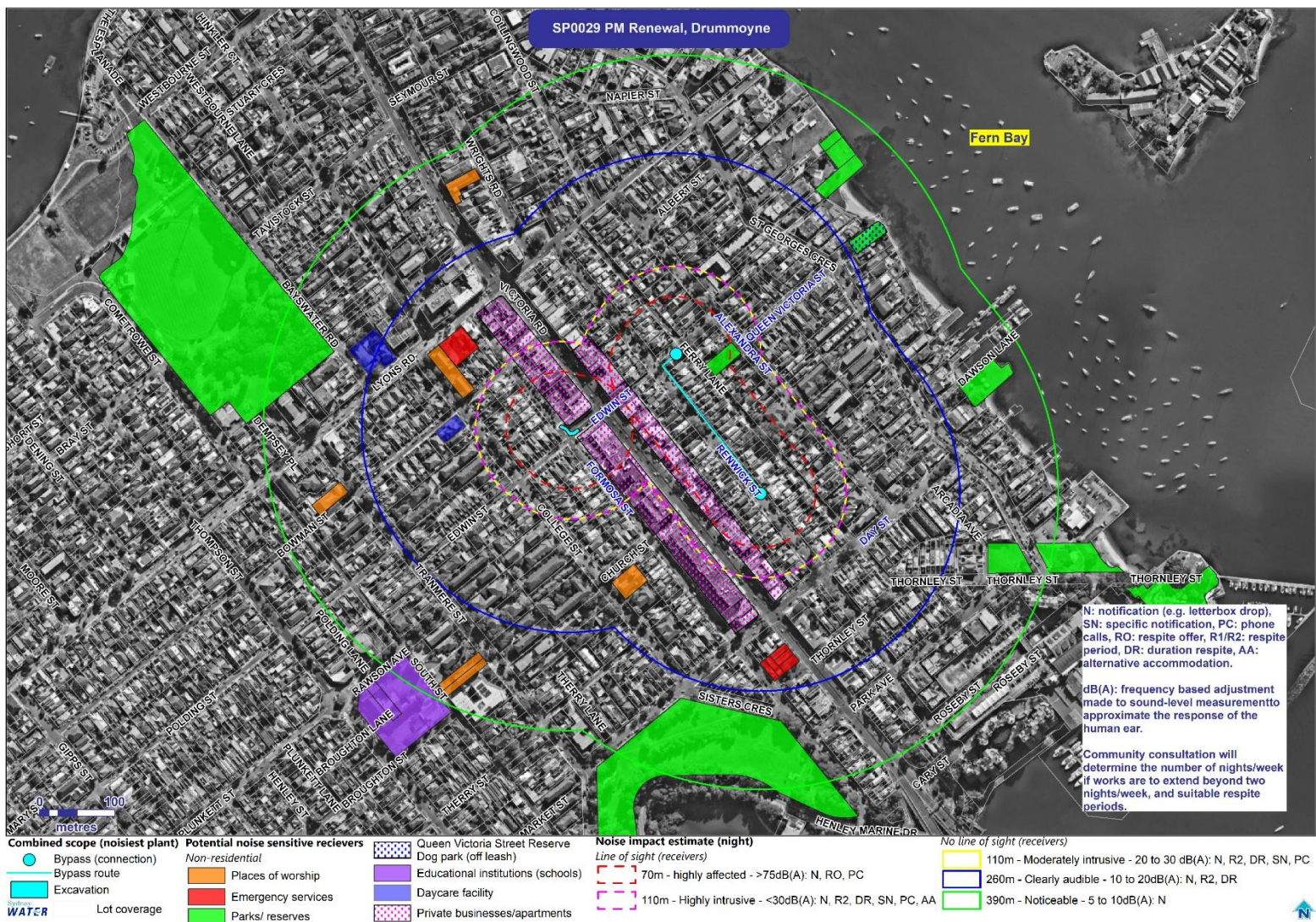


Figure 2-2 Sensitive noise receivers within affected distance during Activity 2 (OOHW noisiest plant)



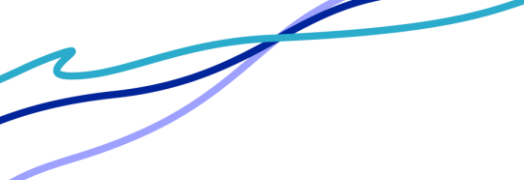
Figure 2-3 Minimum working distances for vibrationally intensive equipment (12-18 t excavator with hammer)

Appendix A – Section 171 and 171A checklist

Findings in addition to the Multi-program REF are considered in the table below.

Section 171 checklist	REF finding
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 significant and/or lasting effect upon these factors. The works are generally in previously disturbed areas and are not expected to have more than a minor or inconsequential impact on heritage listed items (i.e. potential minor branch trimming). Indirect vibration impacts may occur to heritage-listed structures if not managed appropriately. However, potential impacts would be managed by applying mitigation measures outlined in this REF.
Any endangering of any species of animal or plant or other form of life, whether living on land, in water or in the air	Minor trimming of the branches of some street trees along Edwin Street may be required. However, the proposal will not endanger any species.

Section 171A of the EP&A Regulation requires a determining authority to take into account the matters a consent authority must consider under Part 6.2 of the BCSEPP for a proposal within a ‘regulated catchment’. Sydney Water has considered the requirements of Section 171A as the proposal is within the Sydney Harbour catchment. Impacts to water quality and quantity, aquatic ecology, flooding, and recreation and public access would be negligible, minor or moderate. The proposal is not on flood-prone land and there would be no direct impacts to adjacent aquatic environments. There would be minor impacts to groundwater from extraction. However, groundwater impacts would be managed through the development of a dewatering management plan and proposed mitigation measures. Minor to moderate temporary impacts on public access are anticipated, including temporary road/lane closures and reducing availability of public parking. Section 2 details these potential impacts.



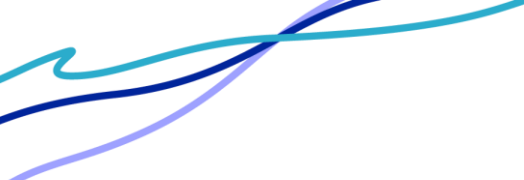
Appendix B – Consideration of Ecologically Sustainable Development

There are no ESD considerations in addition to those covered in the Multi-program REF.

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?		✓
Be likely to generate traffic that will strain the capacity of the road system in the LGA?		✓
Connect to, and have a substantial impact on, the capacity of a council owned sewerage system?		✓
Connect to, and use a substantial volume of water from a council owned water supply system?		✓
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?	✓	
Excavate a road, or a footpath adjacent to a road, for which the council is the roads authority, that is not minor or inconsequential?	✓	
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?		✓
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?		✓
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)?		
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		✓

TISEPP section	Yes	No
coastal management program?		
Section 2.15, consultation with public authorities other than councils		
Will the proposal be on land adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> or land acquired under Part 11 of that Act? <i>If so, consult with DPE (NPWS).</i>		✓
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? <i>If so, consult with DPE (NPWS).</i>		✓
Will the proposal include a fixed or floating structure in or over navigable waters? <i>If so, consult TfNSW.</i>		✓
Will the proposal be on land in a mine subsidence district within the meaning of the <i>Coal Mine Subsidence Compensation Act 2017</i> ? <i>If so, consult with Subsidence Advisory NSW.</i>		✓
Will the proposal be on land in a Western City operational area specified in the <i>Western Parkland City Authority Act 2018</i> , Schedule 2 and have a capital investment value of \$30 million or more? <i>If so, consult the Western Parkland City Authority.</i>		✓
Will the proposal clear native vegetation on land that is not subject land (ie non-certified land)? <i>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).</i>		✓



Appendix D – Noise and vibration memo

SW 224 08/26

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Construction noise and vibration memo

1 Executive summary

This memo considers the potential construction noise and vibration impacts of the SP0029 Drummoyne Pressure Main Renewal project. Construction impacts were assessed applying a worst-case scenario, e.g. all works are assumed to require non-standard construction hours to meet anticipated road occupancy licence (ROL) requirements. However, impacts are considered short-term and moderate, after implementation of mitigation measures contained in this memo.

The likelihood of noise impact for the proposal was assessed as medium-high risk using Appendix 1 from Sydney Water's [Technical Practice Note](#). This memo assesses potential noise impacts and recommends mitigation measures to minimise impacts to the surrounding community. The document uses the TfNSW Construction and Maintenance Noise Estimator Tool and aligns with EPA's draft Construction Noise Guidelines and [SWEMS0056](#).

The memo also assesses a preferred work schedule for up to 5 nights per week for the duration of the proposal (i.e. Mon – Fri, between 7pm – 5am). Noisiest activities/equipment are predicted to impact receivers up to 390 m away for up to 26 weeks or 6 months. These noise levels are for the worst-case scenario with noisiest work completed before 12am. Works include static activities (e.g. excavation and pipe renewal/ relining sites, and generator and pump use) and more transient/mobile activities (e.g. tanker movements). The relining is a linear activity along the alignment, from one pit to the other. Most of the proposal scope is anticipated to be staged. Generally, the proposed method and scheduling of activities would limit the noise exposure of individual receivers, with noise levels increasing when work is adjacent to a receiver and then decreasing as the work front moves. Similarly, noise attenuation can occur with depth below ground level. Some static activities would be active for between 2 months (bypass) and 6 months (compounds). Additional mitigation would be required where static activities have the potential to adversely impact receivers.

Project-specific mitigation measures will be implemented to manage noise impacts during construction. This would include community engagement in accordance with the Community and Stakeholder Action Plan.



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2 Proposal details

2.1 Proposed scope of works

The scope of work is as described in Section 1 of the project-specific Category B review of environmental factors (REF), with a more general scope description in Section 2 and Appendix B of the Multi-program water, wastewater and stormwater infrastructure upgrades and rehabilitation works REF (August 2025).

2.2 Existing environment

2.2.1 Noise sensitive receivers

The site is surrounded by a mix of residential, commercial and/or open space land uses. Sensitive receivers within 390 m include:

- Residential receivers including:
 - single or double storey houses along local side streets
 - some multistorey apartment blocks facing Victoria Road and above private businesses.
- Non-residential receivers including
 - Alexandra Reserve and playground
 - Queen Victoria Reserve off-leash dog park.
- Commercial properties including various restaurants, cafes and gyms facing the proposed alignment but predominantly along Victoria Road and eastern side of Formosa Street.
- Special receivers including:
 - College Street Childcare Centre
 - Learn and Laugh Children's Centre Drummoyne
 - Drummoyne Public School
 - Drummoyne Fire station (Bowman Street) and Drummoyne Ambulance Station (Victoria Road).
- Various medical clinics/specialists and dental centres along Victoria Road.
- Places of worship including:
 - St Bede's Anglican Church
 - St Marks' Catholic Church.

Community consultation will determine the number of nights/week if works are to extend beyond 2 nights a week. Consultation will include number of night shifts per week and mitigation measures to be adopted. This memo assesses a preferred work schedule for up to 5 nights per week for the duration of the proposal.

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2.2.2 Noise area category and background noise levels

The noise area category for the proposal area was identified as R3 (for evening and night), since the area:

- Most closely matches the R3 scenario examples in the construction noise estimator.
- It is likely that background noise would be influenced by road traffic noise, including noise from Victoria Road. These volumes would be highest during the day and decrease at night, meaning construction during proposed non-standard work hours would be more impactful at night.

Table 2-1 shows the noise thresholds. For work outside standard hours (OOHW), noise management levels (NMLs) are set at background + 5 dB(A) whereas for standard hours they are set at background +10 dB(A).

Table 2-1 Background noise levels and noise management levels

Noise area category	R3	
RBL or LA90 Background level (dB(A))	Day	50
	Evening	45
	Night	40
LAeq(15minute) Noise Management Level (dB(A))	Day	60
	Day (OOHW)	55
	Evening	50
	Night	45

2.3 Proposed construction schedule and work hours

Construction of the proposal is expected to start mid- to late-2027 and take about 26 weeks (6 months) to complete. Based on the definitions in Table2-2, most work is expected to require non-standard work hours to complete, due to traffic constraints during daytime hours and to meet anticipated ROL conditions.

Table 2-2 Definition of different working hours (from most preferred to least preferred in terms of noise impacts)

Time of day/night	Hours
Standard hours	Monday to Friday 7am to 6pm, Saturdays 8am to 1pm
Out of hours day	Saturday 7am to 8am and 1pm to 6pm, Sunday and public holidays 8am to 6pm
Out of hours evening	Daily 6pm to 10pm
Out of hours night	All other times

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2.4 Proposed activities/ equipment (noisiest plant details)

Table 2-3 Proposed activities/equipment during construction

Location	Activity	Tasks	Noisier equipment	Frequency of noisier equipment	Duration and timing	Time of day
Compounds at carpark along Formosa St	Ongoing use	Use amenities buildings	Generators	Generators ongoing	Whole project	OOHW evening/night works ¹
Traffic control at Edwin St and Formosa St	Lights	Lighting towers	Generator for lights	Generators ongoing	Whole project	OOHW evening/night works
Edwin St	Bypass establishing/use	Excavate Install	Generators & pumps* 13T Excavator with hammer	Generator and pumps ongoing Hammer only locally for a short time to break out rock at base of excavation and any stab sand/concrete encasement	2 months	OOHW evening/night works ¹
Between SP0029 to Renwick St	Commissioning / decommissioning of bypass	Tanker movements and pumps at SP0029	Pumps at SP0029 Tanker movements	Full shift when required	2 shifts	OOHW evening/night works
Renwick St	Excavation and civil works	Excavate Core	13T Excavator	Short time into maintenance hole	One week	OOHW evening/night works ¹
Edwin St	Excavation and civil works	Excavate	13T Excavator with hammer	Hammer only locally for a short time to break out rock/stabilised sand/concrete encasement	One week – after bypass install	OOHW evening/night works

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Location	Activity	Tasks	Noisier equipment	Frequency of noisier equipment	Duration and timing	Time of day
Formosa St	Excavation and civil works	Excavate	13T Excavator with hammer	Hammer only locally for a short time to break out rock/stab sand/concrete encasement	One week – after bypass install	OOHW evening/night works
Edwin St & Formosa St	Groundwater removal works	Groundwater removal	Pumps Vac truck	Whenever required (as per WSWA)	3 months	OOHW evening/night works
Edwin St & Formosa St	Cleaning & Lining Works	Cutting into main Cleaning Lining Reinstate main	Saws cutting into main Vac truck for cleaning works	Saws for short time when cutting into main Cleaning works for one week	2 months	OOHW evening/night works
Edwin St & Formosa St	Concrete, asphalt and backfill works	Equipment and Material deliveries	Flatbed truck deliveries, hiab deliveries, agitator deliveries	Short time where required – minimal deliveries in one shift	One month	OOHW evening/night works
		Compaction works	Whacker packer vibrator	Short time where required – minimal deliveries in one shift	One month	OOHW evening/night works

* A worst-case OOHV scenario has been considered, with bypass installation and associated excavation assessed as the noisiest activity. Once bypass is established (noisiest work), continuous use of a generator and pump is expected for up to 2 months (day/night).
! Where allowed by ROL, the activity may be completed during standard daytime hours to minimise night-time noise impacts. If additional day works are required following REF determination, potential additional impacts should be assessed.

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3 Impact assessment

The [TfNSW Construction and Maintenance noise estimator tool](#) (TfNSW 2025) has been used to predict construction noise and vibration levels at different distance for different types of receivers.

3.1 Methodology

Noisier equipment is expected to include a jack hammer, concrete saw and excavators (various sizes). This equipment is required for road cutting, and excavation works at discrete locations. It is possible that a hammer attachment will be required for short durations, including for rock breaking activities at proposed excavations. Rock breaking is expected only to occur below ground level (bgl) and at the base of pits and would not occur for the full duration of the proposal. Other noisy/annoying activities include use of pumps and generators, which would run more consistently for the duration of the proposal. It is anticipated that noisier work, such as groundbreaking activities, would occur earlier during each shift and before midnight wherever possible.

Consistent with the activities shown in Table 2-3 the following worst-case scenarios were assessed using distance base scenarios.

- Activity 1, OOHW (night works):
 - Scenario: drainage infrastructure
 - Background noise: R3
 - Line of sight: Yes (for surrounding buildings), no – substantial solid barrier (for properties behind the surrounding buildings, and works below ground)
 - Reason assessed: represents likely noise impacts during the night for most shifts; work required every shift.
- Activity 2, OOHW (night works):
 - Noisiest plant: 13.5T excavator with hammer attachment
 - Background noise: R3
 - Line of sight: Yes (for surrounding buildings), no – substantial solid barrier (for properties behind the surrounding buildings, and works below ground)
 - Reason assessed: although intermittent, represents worst-case noise impacts during the night.

3.2 Construction impacts

Table 3-1 provides the results from the estimator tool including recommended mitigation measures for impacted receivers. Figure 5-1 and Figure 5-2 show the noise affected contours for Activity 1 and Activity 2, respectively.



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During the approximate 6-month period when night work is occurring, the works will impact noise sensitive receivers up to a 390 m radius. This includes residential properties, small businesses and other special receivers throughout the broader study area (refer above to section 2.2.1).

Results from Activity 1 show receivers up to 45 m from the works are predicted to be highly affected or find the works highly intrusive. Under Activity 2, noise contour sizes increase, with receivers up to 110 m from the works predicted to be most impacted.

For both activities, this mostly includes residential receivers along Ferry Lane and Edwin, Renwick and Formosa Streets, as well as residents along Alexandra, Day and Queen Victoria Streets (area accounts for the tankering route). However, the assessment considered a worst case which included general construction (Activity 1) and rock hammering (Activity 2) and assumed all work will be occurring at night. Given the sequencing of required activities, it is likely that rock hammering and other work identified as noisier or annoying will occur during the first 3 hours of each shift (i.e. the evening period) wherever possible. Quieter works would then occur throughout the night.

Several private businesses along Victoria Road are also captured within the highly affected or intrusive distances outlined above. A review of operating hours suggests that it is likely for most businesses to be closed and unoccupied during later night-time shifts, with many not operating past 8pm. Exceptions include 24-hour businesses (local gym) and emergency services. However, these are outside the worst-case impact distance of 45 m for business/ retail outlets.

The relining is a linear activity along the alignment, from one pit to the other. Other activities such as excavating to access the pipeline or compound use are static. Due to limitations of the assessment, the progressive and staged nature of much of the works is not considered. At this stage of design planning, the works can be broken down into discrete stages (refer above to Table 2-3). Not all activities occur at the same time and every shift. This staged approach helps limit the noise exposure of individual receivers to some of the noisier activities. Noise fatigue may be experienced by specific receivers adjacent to ongoing and static activities, including bypass and compound use. Generally, noise levels increase when work is adjacent to a receiver and decrease as the work front moves. Similarly, noise attenuation can occur with depth below ground level. Additional mitigation would be required where static activities have the potential to adversely impact receivers. All reasonable and feasible mitigation measures would be applied to reduce impacts to these sensitive receivers, per Table 5-1 below. In summary, it is unlikely that all properties mapped near the proposal would be equally impacted at the same time.

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Table 3-1 Affected distance (metres) for impacts to residential receivers (OOHW: night)

Activities	LAeq(15minute) noise level above background (LA90)					LAeq(15minute) 75dB or greater
	5 to 10 dB(A)	10 to 20 dB(A)	20 to 30 dB(A)	>30dB(A)		
	Noticeable	Clearly audible	Moderately intrusive	Highly intrusive		
Activity 1: scenario	215 m (NLOS)	140 m (NLOS)	45 m (NLOS)	45 m (LOS)		25 m (LOS)
Recommended additional mitigation measures (refer Section 4 for further details)	N (Notification)	N Respite Period 2 (R2) Duration Respite (DR)	N, R2, DR Specific Notification (SN) Phone Call (PC)	N, R2, DR, SN, PC Alternative Accommodation (AA)		N, PC Respite Offer (RO)
Activity 2: noisiest plant	390 m (NLOS)	260 m (NLOS)	110 m (NLOS)	110 m (LOS)		70 m (LOS)
Recommended additional mitigation measures (refer Section 4 for further details)	N	N, R2, DR	N, R2, DR, SN, PC	N, R2, DR, SN, PC, AA		N, PC, RO

3.3 Compound

Mitigation measures below will be implemented to minimise any potential impacts resulting from the increased noise emissions from additional traffic movements to and from the compound.

3.4 Sleep disturbance

Sleep disturbance may be experienced where the maximum predicted noise level from the work exceeds 65 dB(A). There may sleep disturbance to residential receivers from between 75 m (LOS) and up to 390 m (NLOS) of the proposal during construction. Recommended mitigation measures in section 5 of this memo should mitigate sleep disturbance impact.

3.5 Vibration

The proposal will require the use of some vibratory equipment including handheld tools such as jackhammers as well as excavators with hammers. The TfNSW noise estimator tool was used to estimate a worst-case scenario when a medium (12-18 tonne) excavator with hydraulic hammer is being used, with minimum working distances and potential vibration impacts as follows:

- Light-framed structure – 7 m minimum working distance – no receivers within this distance.

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- Heritage and other sensitive structures – 19 m minimum working distance – structures within the conservation heritage areas listed under the Canada Bay LEP (2013). With regards to the proposal, heritage structures located along Edwin, Formosa and Renwick Streets and Ferry Lane in the listed conservation areas may be impacted temporarily. Other local heritage sites in the Drummoyne area are outside the minimum working distance and will not be impacted.
- Human response/ comfort – 23 m minimum working distance –several residences and small businesses along Edwin, Formosa and Renwick Streets and Ferry Lane, may be impacted temporarily. However, the minimum working distances for human response/comfort are related to continuous vibration. Vibration impacts from this proposal are expected to be short-term and intermittent.

Figure 5-3 shows the contours and potentially impacted properties. Recommended mitigation measures in section 5 of this memo should mitigate any potential vibration impacts.

3.6 Mitigation measures

To minimise potential noise impacts all reasonable and feasible mitigation measures were considered for the project (Appendix, section 5.2).

Table 3-2 outlines the mitigation measures which will be implemented for the project, including:

- relevant mitigation measures from the Multi-Program REF/SWEMS0019.07
- recommended additional mitigation measures from the TfNSW noise estimator
- adopted reasonable and feasible measures.

Table 3-2 Proposed project-specific mitigation measures

Mitigation measure	Source
Implement all relevant mitigation measures included in the Review of Environmental Factors Multi-program pipeline and related infrastructure replacement, repair and upgrades (Multi program REF) (August 2025).	Multi-program REF
Notification within 390 m. Specific notifications are letterbox dropped (or equivalent) to identified stakeholders no later than 5 working days ahead of night works. Specific Notifications within 110 m. The specific notification provides additional information when relevant and informative to more highly affected receivers than covered in general letterbox drops. This form of communication is used to support periodic notifications, or to advertise unscheduled works.	Noise estimator, Reasonable and feasible assessment.
Respite Period 2. Night-time construction noise in out of hours period 2 (works occurring Mon Fri 10pm – 7am, Sat 10pm -8am, Sun/Public Holiday 6pm-7am) shall be limited to 2 consecutive nights except for where there is a Duration Respite. For night work these periods of work should be separated by not less than one week and no more than 6 nights per month. Where possible, high noise generating works shall be completed before 11pm (or otherwise before midnight).	Noise estimator, Reasonable and feasible assessment (if duration respite is not supported).
Duration Respite. Respite may be counterproductive in reducing the impact on the community for longer duration projects. In this instance and where it can be strongly	Noise estimator, Reasonable and feasible

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Mitigation measure	Source
justified it may be beneficial to increase the work duration, number of evenings or nights worked through Duration Respite so that the project can be completed more quickly. Sydney Water will engage with those where noise impacts are moderately intrusive or highly intrusive (within a 110m radius) to demonstrate support for Duration Respite. This will include a 'Have your say' consultation letter with survey including options for night shift patterns and corresponding work duration for each option. This would include compressed construction schedules up to 5 nights a week. Consultation letter would be sent out to the community about 3-4 weeks before night work commences.	assessment. Adopted/ partially adopted.
Phone calls. Phone calls detailing relevant information made to identified/affected stakeholders, who have provided their contact details, within seven calendar days of proposed work. Phone calls provide affected stakeholders with personalised contact and tailored advice, with the opportunity to provide comments on the proposed work and specific needs. Where the resident cannot be telephoned then an alternative form of engagement should be used.	Noise estimator, Reasonable and feasible assessment.
Respite Offer. Respite Offers should be considered where there are high noise and vibration generating activities near receivers (within a 70m radius). As a guide work should be carried out in continuous blocks that do not exceed 3 hours each, with a minimum respite period of one hour between each block. The actual duration of each block of work and respite should be flexible to accommodate the usage of and amenity at nearby receivers. The purpose of such an offer is to provide residents with respite from an ongoing impact. This measure may not be applicable when duration respite has been agreed (see above).	Noise estimator, Reasonable and feasible assessment.
Ongoing community complaints management.	Noise estimator, Reasonable and feasible assessment.
Daily register of planned activities on site.	Noise estimator, Reasonable and feasible assessment.
Attended noise monitoring, recommended during noisier work and in the event of any complaints.	Noise estimator, Reasonable and feasible assessment.
HSEQ Site Presence.	Noise estimator, Reasonable and feasible assessment.
Noise barriers located at work front, e.g. around launch and receival pits or any other location as practical.	Noise estimator, Reasonable and feasible assessment.
Noisier activities (use of concrete saw, excavator with hammer) must be completed before midnight.	Reasonable and feasible assessment

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Mitigation measure	Source
Additional mitigation must be applied for the sensitive receivers near the bypass and compound, e.g. shielding, quieter generators, earplugs and/or other measures as appropriate.	Reasonable and feasible assessment
Conduct a dilapidation survey / asset condition assessment prior to works which have potential to damage existing structures.	SWEMS0019.07
The project team is to consider if the use of smaller plant is possible where minimum working distances are breached, or if vibration monitoring is required.	SWEMS0019.07



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4 Conclusion

This assessment considers potential construction noise and vibration impacts of the SP0029 Drummoyne Pressure Main Renewal project, along several roads within Drummoyne. The work requires open trenching and rock breaking activities during evening and night periods for up to 6 months. The worst-case assessment found residential receivers with line of sight or up to 110 m from the works, will be highly impacted or find the noise highly intrusive. However, the progressive and staged nature of much of the works would reduce the magnitude of impact on each property. Additional consultation may be required where static activities, including bypass operation and compound use, remain operational for extended periods. Implementing mitigation measures would ensure impacts are further reduced. Where allowed by ROLs, some activities may be able to be completed during standard daytime hours, potentially further reducing impacts to sensitive receivers. If, following REF determination, day works are identified as feasible, the likelihood of additional impacts would be considered, and further assessment undertaken.

Prepared by: Ellen Curtis, Environmental Scientist, Sydney Water

Date: 30 July 2026

Reviewed by: Grace Corrigan, Senior Environmental Scientist, Sydney Water

Date: 4 August 2026



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5 Appendix

5.1 Figures

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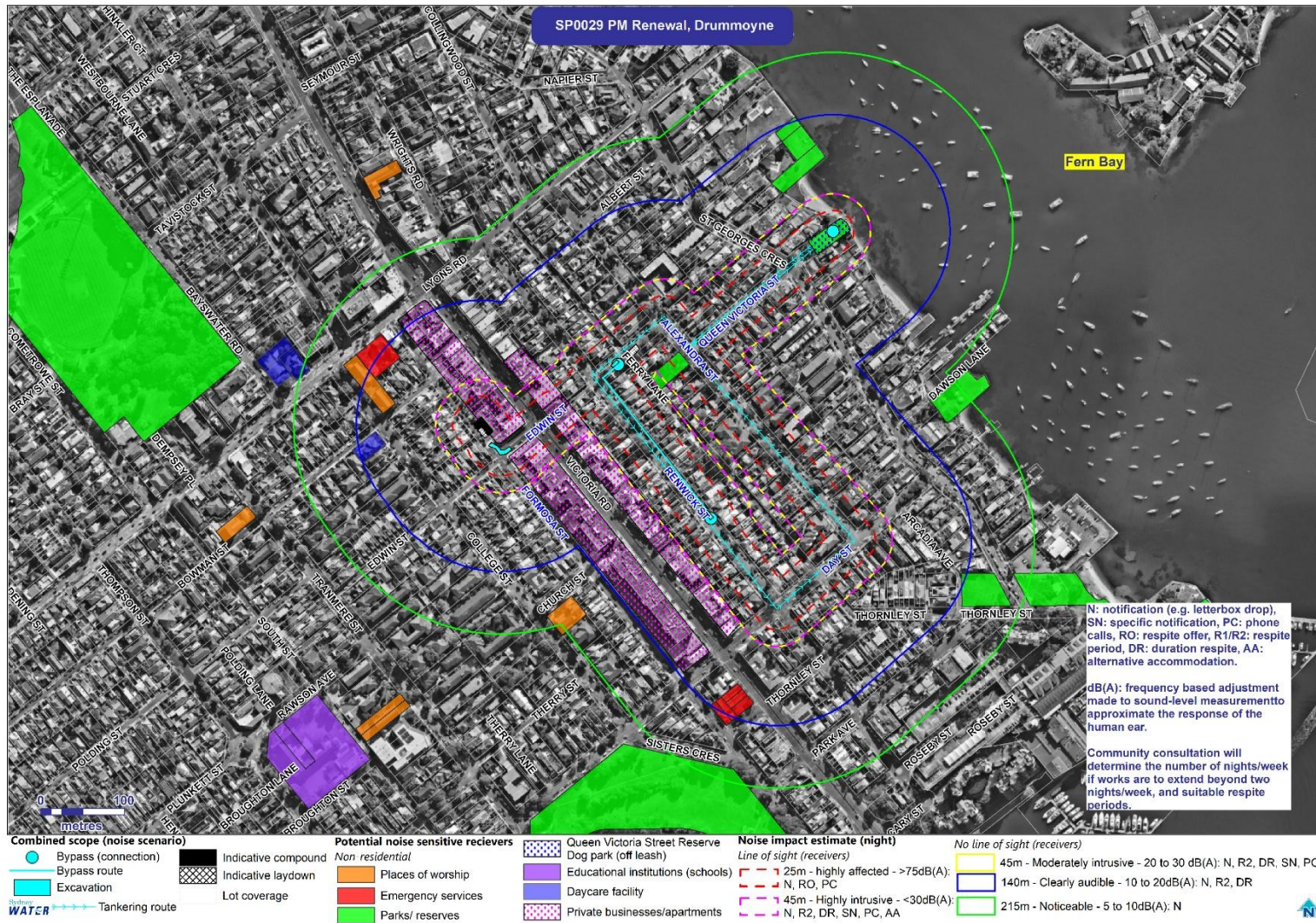


Figure 5-1 Residential receivers within affected distance during Activity 1 (OOHW scenario based)

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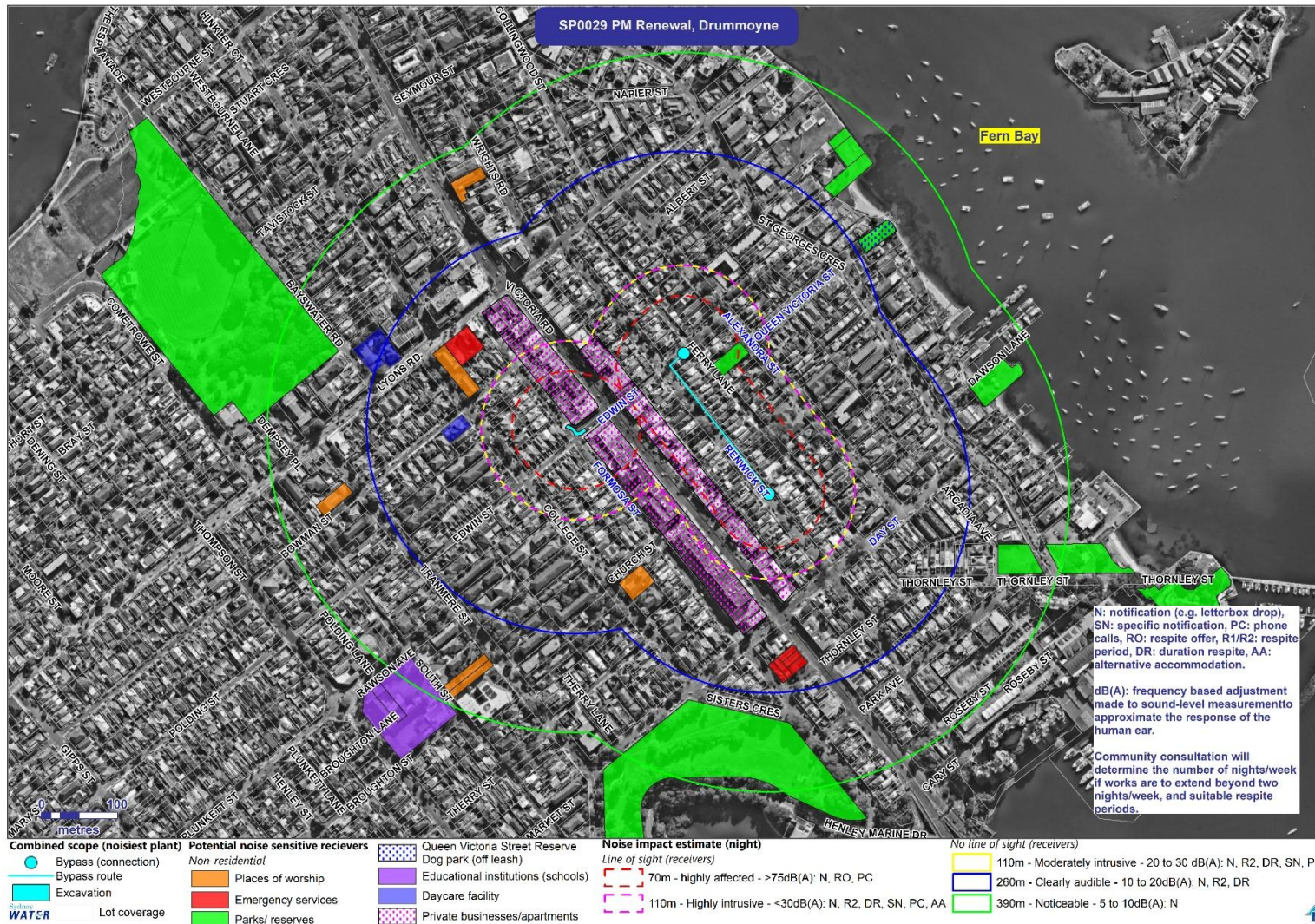


Figure 5-2 Sensitive noise receivers within affected distance during Activity 2 (OOHW noisiest plant).

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Figure 5-3 Minimum working distances for works requiring vibratory equipment (12 – 18 t excavator with hammer)

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5.2 Reasonable and Feasible assessment

A Reasonable and Feasible Assessment has been completed to determine the appropriate additional mitigation measures. Additional measures recognised in this assessment has been included in Table 5-1 below.

The adopted mitigation measures from the Reasonable and Feasible Assessment should form part of the CEMP and/or NVMP, and any changes to the mitigation option from the assessment would be documented with sufficient justification as to why changes are required.

Table 5-1 Reasonable and feasible table (this table has been completed in consultation with the project manager)

Mitigation option	Feasible (can it be done)	Reasonable (should it be done)	Adopted/ partially adopted/ not adopted	Justification or comment	Mitigation measure adopted (Y/N)
Planning the work					
Consideration of alternatives / options	Yes	No	Not Adopted	The option chosen is seen as the least disruptive.	N
Do nothing	No	No	Not Adopted	Not feasible. Work must be undertaken to ensure service reliability.	N
Conduct the works during standard daytime hours	No	Yes	Not Adopted	Due to proximity to Victoria Road, proposed activities, e.g. excavation within a road, require OOHW (night).	N
Conduct the works during the evening and night	Yes	Yes	Adopted	Due to proximity to Victoria Road, proposed activities, e.g. excavation within a road, require OOHW (night).	Y
Consultation/ notifications/ complaints management					
Community consultation prior to works	Yes	Yes	Adopted	The preferred work schedule includes work for up to five nights per week for the duration of the project (i.e. Mon – Fri, 7pm – 5am). Community preference will determine if shifts can extend to more than 2-night shifts per week and the appropriate respite periods. Specifically, a ‘Have your say’ consultation letter with survey will be sent out to the community about 3-4 weeks before night work commences. Consultation letter	Y

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Mitigation option	Feasible (can it be done)	Reasonable (should it be done)	Adopted/ partially adopted/ not adopted	Justification or comment	Mitigation measure adopted (Y/N)
				will include different options for night shift patterns and corresponding work duration for each option. Community feedback will be accounted for, with feedback from residents weighted according to their proximity to the work. Community will be notified of the results of the survey and informed of the night shift pattern outcome.	
Consultation with residents during works	Yes	Yes	Adopted	Required. Ongoing engagement will continue during construction. During construction, community will be provided with a community contact number so they can provide feedback on night shift impacts.	Y
Project updates	Yes	Yes	Adopted	Required.	Y
Notification to residents prior to out of hours work	Yes	Yes	Adopted	Required. As above.	Y
Ongoing community complaints management	Yes	Yes	Adopted	During construction, community will be provided with a community contact number so they can provide feedback on night shift impacts. Night shift patterns will be re-considered if multiple complaints occur.	Y
Daily register of planned activities on site	Yes	Yes	Adopted	Required.	Y
Selection of construction methodology/ plant and equipment					
Underbore the total alignment	Partial	Yes	Partially adopted	Partially adopted. A launch and receival pit will still be needed. However, about 80% of relining works is trenchless.	Y
Two work fronts	Yes	Yes	Adopted	Where possible, both work fronts will remain open throughout	Y

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Mitigation option	Feasible (can it be done)	Reasonable (should it be done)	Adopted/ partially adopted/ not adopted	Justification or comment	Mitigation measure adopted (Y/N)
				construction stage, with some activities requiring both to be open at the same time to complete successfully, e.g. cleaning and lining.	
Smaller excavator	Yes	No	Not adopted	Excavation of launch and receival pits need new ground broken, requiring larger powered excavator.	N
Noise and vibration verification/monitoring					
Attended noise and vibration monitoring	Yes	Yes	Adopted	Attended noise monitoring. Vibration monitoring may be required.	Y
Unattended continuous noise monitoring	Yes	No	Not Adopted	If this can be done by logging and monitoring the noise, then yes.	Y
HSEQ Site Presence	Yes	Yes	Adopted	Required.	Y
Noise attenuation at source/site					
Noise barriers at work front	Yes	Yes	Adopted	Required, as described below.	Y
Noise barriers along alignment	No	No	Partially adopted	Portable noise barriers located at work front, e.g. around launch and receival pits, or any other location as practicable.	Y
Purpose built noise wall	No	No	Not Adopted		N
Respite periods					
Duration respite periods	Yes	Yes	Adopted	Required. As above, this will include community consultation and community preference will determine if shifts can extend to more than 2-night shifts per week and the appropriate respite periods.	Y

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Mitigation option	Feasible (can it be done)	Reasonable (should it be done)	Adopted/ partially adopted/ not adopted	Justification or comment	Mitigation measure adopted (Y/N)
Respite periods – Noisy works completed prior to midnight	Yes	Yes	Adopted	Where possible, noisier work (e.g. saw cutting, use of excavator with hammer) will occur early in a shift (i.e. evening hours) and before midnight.	Y
Respite periods for high impact noise works – other options (such as three-hour blocks with a one-hour respite period)	No	No	Not Adopted	This would increase the duration of construction works and impacts to residents.	N
Respite – Alternate Accommodation	Yes	No	Not Adopted	Due to the temporary nature of works, alternative accommodation is not expected to be required. However, this option can be considered on a case-by-case basis if required to mitigate ongoing complaints.	Y, if required for complaints
Consultation for high impact noise works	Yes	Yes	Adopted	Required. The communication representative will consider if additional consultation is appropriate. Additional mitigation must be applied for the sensitive receivers near the bypass and compound, e.g. shielding, quieter generators, earplugs and/or other measures as appropriate	Y
Architectural treatments at properties – i.e. double glazing, soundproofing, door/window sealing	No	No	Not Adopted		N