Review of Environmental Factors Addendum

Yallah Marshall Mount Water and Wastewater Servicing – Wastewater Extension and Watermain Realignment (April, 2024)

Determination

This Review of Environmental Factors Addendum (REFA) assesses potential environmental impacts of the Yallah Marshall Mount Water and Wastewater Servicing – Wastewater Extension and Watermain Realignment. 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 REFA and Yallah Marshall Mount Water and Wastewater Servicing REF (May, 2024) (approved REF). Additional environmental impact assessment may be required if the scope of work or work methods described in this REFA change significantly following determination.

Certification

I certify that I have reviewed and endorsed this REFA 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]		
Jennifer Shaw REFA author Sydney Water Date: 11/04/2025	Sarah Mitchell Environment Representative Sydney Water Date: 04/04/2025	Benn Weston Project Manager Sydney Water Date: 07/04/2025

Decision Statement

The main potential additional construction environmental impacts of the proposal change include impacts from noise and traffic, impacts to ecology, soil, water and drainage. The main impacts during operation are potential air quality and visual amenity impacts. 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.

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]	Sally Spedding A/Senior Manager Environment and Heritage, Sydney Water Date:11 April 2025

1. Proposal description

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

Aspect	Relevance to proposal
Approved REF	Yallah Marshall Mount Water and Wastewater Servicing (May, 2024)
Proposal need and objectives	The West Lake Illawarra Growth Area is about 550 hectares in size and will require wastewater and drinking water services for about 30,000 residential and non-residential properties by 2048. The proposal will provide water and wastewater services to the Yallah Marshall Mount Precinct in the West Lake Illawarra Growth Area. It will manage the future service demand expected from about 4,000 new properties within this precinct.
Proposal change description and methodology	The proposal change includes an extension from the approved rising wastewater main along Marshall Mount Road, to connect to the future West Dapto wastewater gravity main (approved under REF Servicing Growth in West Dapto Package 3 (Cleveland Precinct) October 2023). The wastewater extension would include: • about 0.6 km of OD400 wastewater rising main on Huntley Road and Goolagong Street (no longer running north along Penrose Drive) • about 0.5 km of OD630 and DN450 wastewater gravity main towards the future West Dapto wastewater gravity main • about 0.2 km of OD400 SDR11 wastewater inverted syphon arrangement using dual pipes under Mullet Creek • ventilation shafts (indicatively 12-18 m in height). Most of the wastewater extension would be installed using open trenching construction methodology. However, to avoid environmental impacts, a trenchless technique called horizontal direction drilling (HDD) would be used to install the dual pipe (spaced 5 m apart) inverted syphon under Mullet Creek. HDD launch and receival pits would be about 4 m (L) x 2 m (W) x 1.5 m (D), with the potential for dual bores. The proposal change would also include minor adjustments to the water main alignment and associated construction corridor on Yallah Road. The proposal change is shown on Figure 1 to Figure 4.
Justification for proposal change	The wastewater extension was originally planned to be delivered in multiple stages, with the connection to the future West Dapto wastewater gravity main to be delivered separately. However, due to the timing of the West Dapto wastewater gravity main construction and the proposal aligning, the connection to the future West Dapto wastewater gravity main can now be included in the current proposal scope. Since the approved REF, Wollongong City Council have progressed their local road upgrade designs. The proposal change includes adjustments to the

Aspect	Relevance to proposal
	water main alignment on Yallah Road to accommodate Council's future road upgrade design.
Location and land ownership	The proposal change is in the Cleveland, Avondale, Yallah and Marshall Mount suburbs in the Wollongong City Council local government area (LGA). The lots within the construction corridor are owned by a mix of landowners, including council, private landowners and developers. These lots include:

Lot and DP	Construction proposed within this lot
Lot 313/ DP1188000 Lot 293/ DP751278	Gravity main (inverted syphon), HDD pit
Lot A/ DP156446	Gravity main (inverted syphon), HDD pit
Lot 29/ DP23265	Gravity main (inverted syphon), HDD pit
Lot 300/ DP634513	Gravity main
Lot 301/ DP1198484	Gravity main
Lot 300/ DP1198484	Rising main, gravity main
Lot 400/ DP1252763	Rising main
Lot 1/ DP610188	Rising main
Council road reserve - Goolagong Street, Avondale Road, Huntley Road	Rising main, gravity main
Lot 203/ DP1235464	Water main
Lot 100/ DP216769	Water main
Lot 116/ DP1223046	Water main
Lot 209/ DP1235464	Water main
Council road reserve – Yallah Road	Water main

Ancillary facilities (compounds) and access	The main access points for construction of the wastewater extension would be off Avondale Road through private land, and an existing access road to the north utilised for construction of the West Dapto wastewater gravity main project (REF Servicing Growth in West Dapto Package 3 (Cleveland Precinct) October 2023). Additional compounds to support construction of the wastewater extension would be within the mapped construction corridor. During operation, maintenance of the inverted syphon would require access to the maintenance holes on both sides of Mullet Creek. Temporary access roads would need to be in place until Wollongong City Council future road upgrades are complete. These access road locations would be determined in consultation with the relevant landowners and would be within the mapped construction corridor.

Aspect	Relevance to proposal
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. The proposal change is expected to require work outside these hours to install the gravity main across Avondale Road. This has been assessed in Section 4.
Proposal timing	Construction of the wastewater extension would take about 8 months. However, it is not expected to extend the overall project timing outlined in the approved REF.
Operational requirements	The proposed inverted syphon under Mullet Creek would require periodic cleaning (about 1-2 times per year). The syphon would be accessed via new maintenance holes on either side of Mullet Creek. The dual pipe syphon would provide operational flexibility as it eliminates the need to isolate the pumping station during cleaning and maintenance.

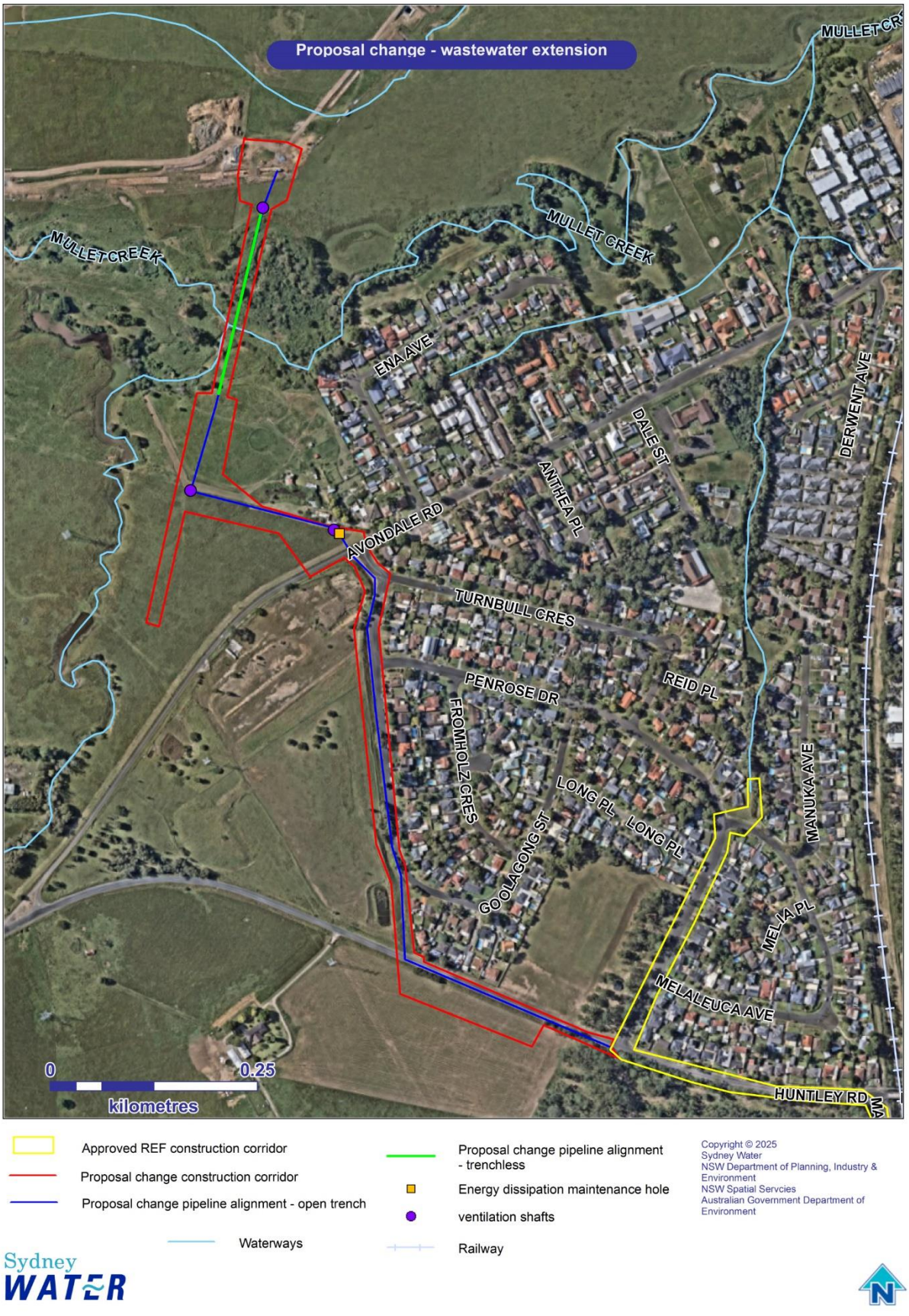


Figure 1 Proposal change – wastewater extension

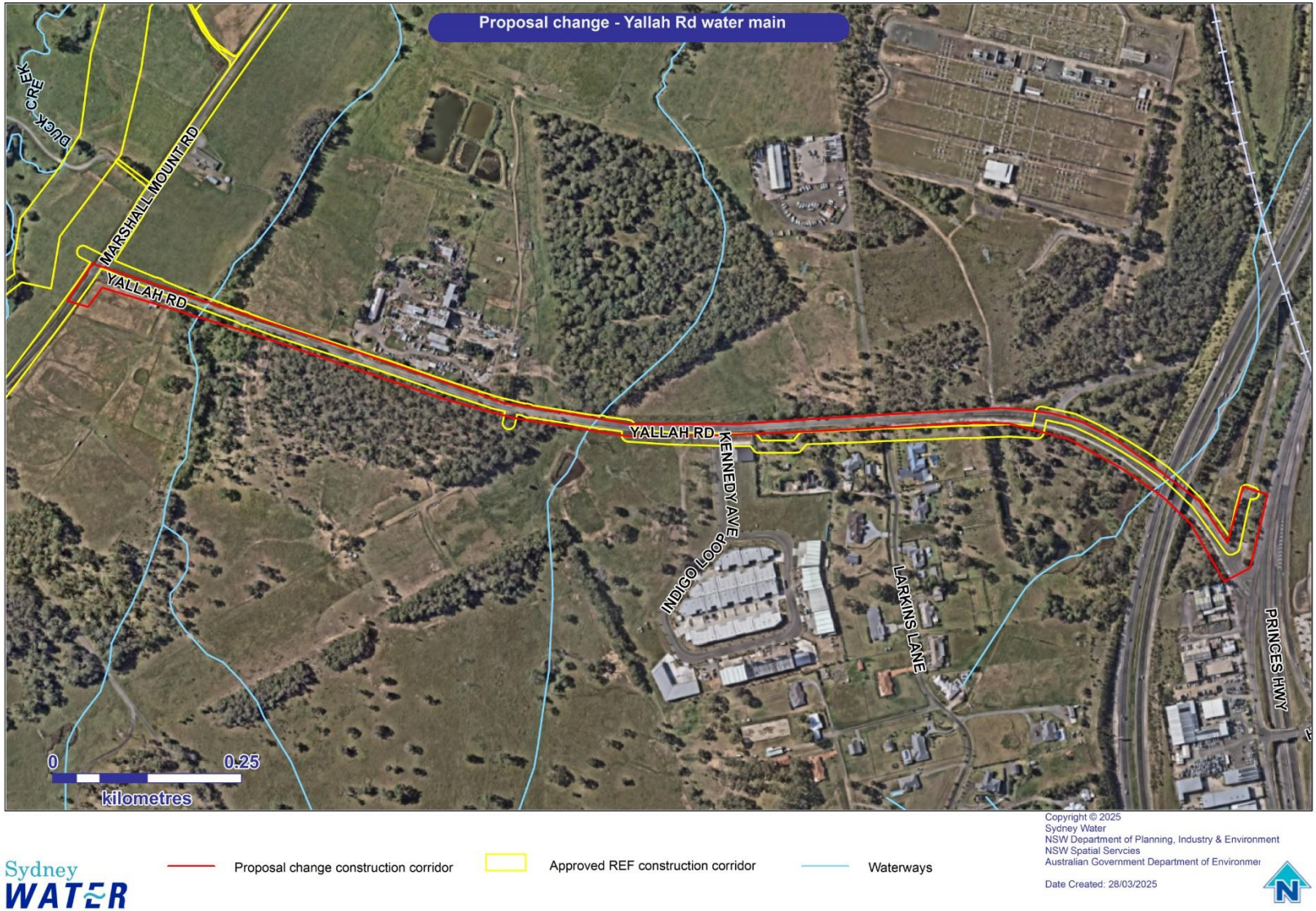


Figure 2 Proposal change - Yallah Rd water main construction corridor

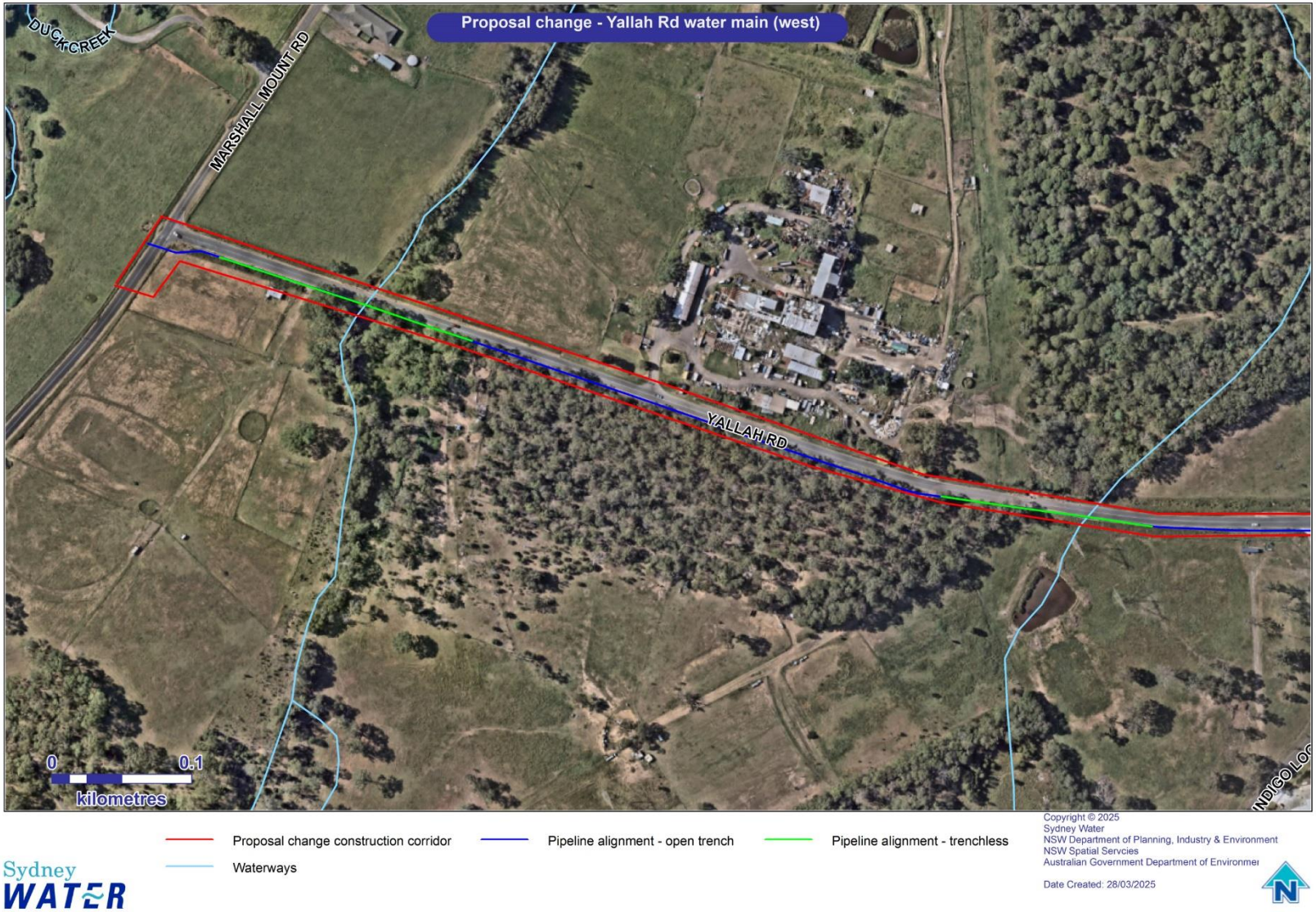


Figure 3 Proposal change - Yallah Rd water main alignment (west)

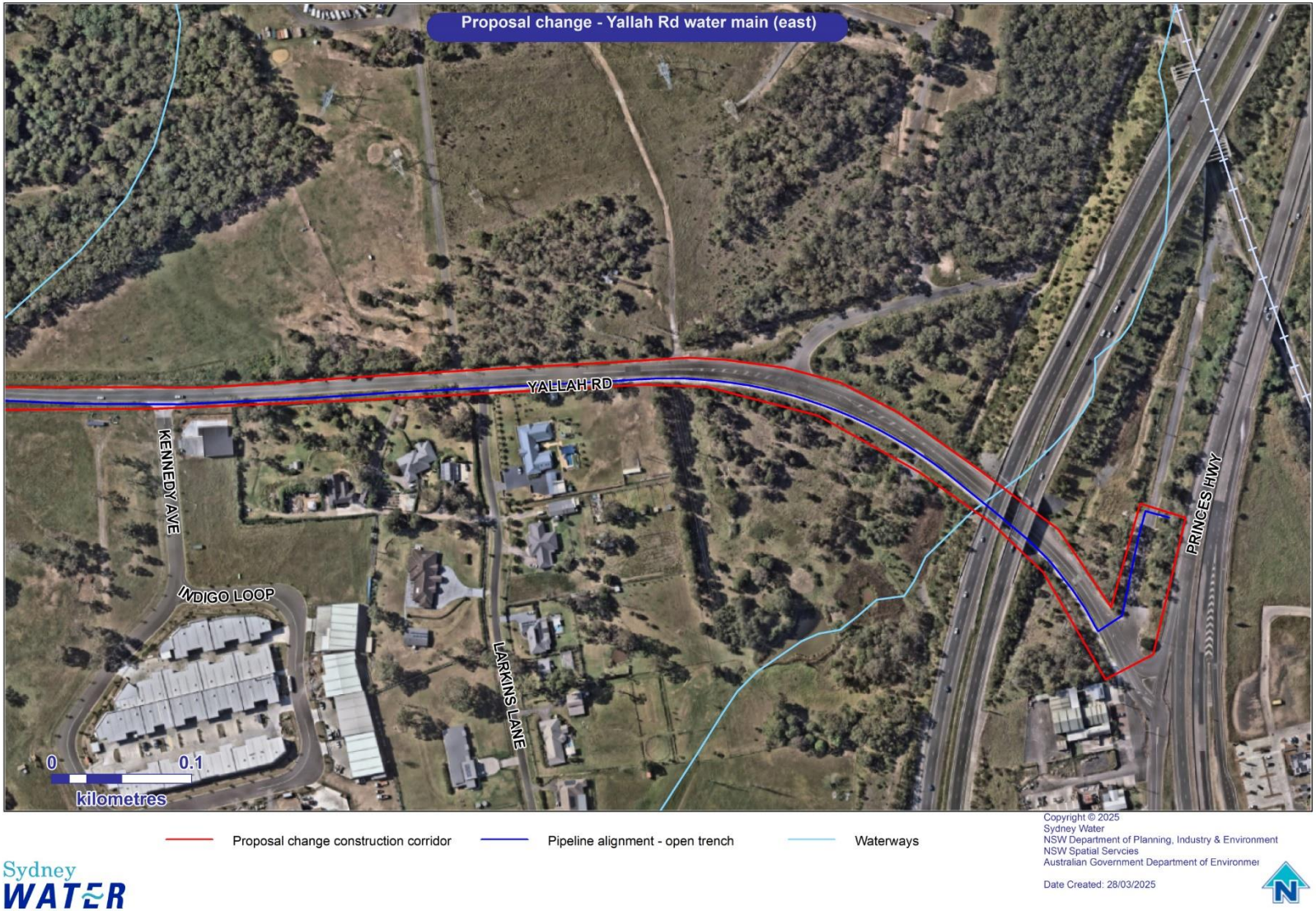


Figure 4 Proposal change - Yallah Rd water main alignment (east)

2. Consultation

Additional consultation matters above those already assessed in the approved REF are detailed below.

2.1 Community and stakeholder consultation – proposal change

A summary of the additional consultation performed for the proposal change is shown in Table 2-1, including some consultation outcomes.

Consultation will continue to be performed in accordance with the project-specific Community and Stakeholder Action Plan (CSAP) and Communication Strategy.

Table 2-1 Proposal change consultation summary

Stakeholder	Consultation type	Queries	Outcomes
Wollongong City Council	• Regular meetings • Emails • Phone calls	• Interface between proposal change alignment and future council road upgrades. • Sharing proposal change design drawings and council road upgrades design drawings.	• Council preference for proposal change to follow future road alignments and consider future road design levels, stormwater design and traffic signal locations. These preferences are reflected in the current design. • Council feedback on draft designs incorporated where possible.
Developers	• Regular meetings • Emails • Phone calls	• Sharing of developer plans and design drawings. • Discussions about proposed alignment going directly through developable portion of land.	• Design and construction timing of proposed new hospital at Huntley/ Avondale Road considered during design development. • Alternative alignments were explored to avoid impacting future development. Alignment has been agreed by council and the developer.
Impacted property owners including residential receivers	• Individual meetings • Emails • Phone calls • Letterbox drops	• Interested to understand the proposed alignment of the extension and location of ventilation shafts. • Timing of construction and temporary impacts to property including access.	• Explained that some main alignments depend on future road upgrade locations, approved developments and existing underground assets. • Estimated construction timeframes shared. • Further meetings with impacted property owners will occur prior to construction.

Stakeholder	Consultation type	Queries	Outcomes
		• Design drawings shared with impacted property owners.	

2.2 Consultation required under State Environmental Planning Policies and other legislation

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

Consultation was required under section 2.10(1)(e) and 2.10(1)(f) of the TISEPP as the extension involves disruption to vehicular traffic and excavation of a council road. Wollongong City Council was consulted on 25 February 2025 and feedback was received on 20 March 2025. Wollongong City Council has requested the following:

- Copies of all traffic guidance schemes and Traffic Management Plans to be provided for their records. Provision is to be made within these plans to ensure that safe access for all road users is maintained during both work and non-work periods, including for pedestrians.
- Notification to impacted bus companies, residents and emergency services.
- Construction vehicles (including worker's vehicles) and materials/equipment are not to be parked or stored in locations where they will impede sight lines for drivers or pedestrians (e.g. at adjacent intersections).
- Appropriate measures should be implemented where appropriate to ensure vehicles entering the road from adjacent worksites on vacant land do not track dirt/mud onto the roadway.
- Restoration works must comply with Council's standard road restoration requirements.
- Notify Council's Civil Assets Team (via council@wollongong.nsw.gov.au, attn to Civil Assets Team) via Notice of Entry for works within the road reserve.
- Any damage to Council assets such as kerb and gutter, pavement, drainage structures etc. (including by movements of heavy vehicles/equipment) needs to be notified to Council's Civil Assets Team and rectifications works undertaken to the satisfaction of Council.

Section 4 of this REFA includes additional mitigation measures based on this feedback from council.

As detailed in Appendix C, no other TISEPP consultation was required for the proposal change.

The proposal change would also involve works within a mapped crown waterway (Mullet Creek). Sydney Water also consulted with Crown Lands on 24 February 2025. Advice received from Crown Lands on 25 February 2025 stated that the waterway may be held in private title and not by Crown Lands. A review of landowner data indicated that the waterway is equally owned by the adjoining landowners on either side of the creek, already being consulted as part of the project.

3. Legislative requirements

Additional legislative requirements above those already assessed in the approved REF are detailed in Table 3-1 and Table 3-2.

Table 3-1 Environmental planning instruments relevant to the proposal change

Environmental Planning Instrument	Relevance to proposal
State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP)	Section 2.159(1) of the TISEPP permits development by or on behalf of a public authority for water reticulation systems without consent on any land. Section 2.126(6) of the TISEPP permits development for wastewater reticulation systems without consent on any land in the prescribed circumstances. Development is carried out in the prescribed circumstances if it is carried out by or on behalf of a public authority. As Sydney Water is a public authority, the proposal change is permissible without consent.

Table 3-2 Consideration of key environmental legislation

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) *Biodiversity Conservation Act 2016 (BC Act)*	A Flora and Fauna Assessment was carried out for the REFA (Appendix D). The impact of the proposal change on threatened species, communities and their habitats has been assessed in Section 4 of the REFA. No significant impacts are expected for any BC Act listed entity and therefore, a Species Impact Statement (SIS) is not required. No significant impacts are expected for any EPBC Act listed entity and therefore, a referral to the Australian Government Minister for the Department of the Environment is not required.	REF	Pre-construction, Sydney Water
Biosecurity Act 2015	The construction corridor contains several weed species, 5 of which are listed under the Act and have an associated biosecurity duty. These weeds and appropriate mitigation measures have been discussed in Section 4 of the REFA.	Compliance with biosecurity duty	Construction, delivery contractor
Local Land Services Act 2013 (LLS Act)	The LLS Act No 51 (Part 5A) sets out the clearing of native vegetation for allowable activities that is authorised without any other approval under Part 5A of this Act in a regulated rural area (that is, an area of the State to which that Part applies) that is category 2- regulated land on the native vegetation regulatory map. The construction corridor contains areas of Category 1- exempt land, Category 2-regulated land and Category 2- vulnerable regulated land. Category 2 mapped areas require assessment. This assessment has been carried out (Appendix D) and summarised in Section 4 of this REFA. Section 60O(b)(ii) of the LLS Act states that clearing of native vegetation is authorised if the clearing is an activity carried out by a determining authority within the meaning of Part 5 of the EP&A Act. As Sydney Water is a determining authority, clearing Category 2 vegetation is authorised under this REF.	Flora and Fauna Assessment, REF	Pre-construction, Sydney Water
National Parks and Wildlife Act 1974 (NPW Act)	An Aboriginal Heritage Due Diligence (AHDD) was carried out for the proposal change (Appendix E). The assessment did not identify any Aboriginal heritage within the construction	Existing AHIP	Pre-construction, delivery contractor

Legislation	Relevance to proposal	Permit or approval	Timing and responsibility
	corridor. Therefore, an Aboriginal heritage impact permit (AHIP) under the NPW Act is not required. Further details and appropriate mitigation measures have been discussed in Section 4 of the REFA. The proposal change construction corridor encroaches into the boundary of AHIP [redacted], expiring on 17 January 2029. AHIP [redacted] was issued to Sydney Water for the Servicing Growth in West Dapto Package 3 (Cleveland Precinct) project. The proposal would need to comply with any ongoing consent conditions contained within AHIP [redacted].		
Fisheries Management Act 1994 (FM Act)	The proposal change involves underboring Mullet Creek, which is mapped as Key Fish Habitat (KFH). Excavation and vegetation impacts will remain above top of bank. As such, notification to the Department of Primary Industries (DPI Fisheries) is not required. Potential indirect impacts to KFH are discussed in Section 4 of the REFA.	N/A	Pre-construction, Sydney Water
Water Act 1912/ Water Management Act 2000	A Water Supply Works Approval (WSWA) was obtained for the proposal ([redacted]) from the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for 12 megalitres (ML) of groundwater. This has been linked to Sydney Water's existing Sydney Basin South Water Access Licence (WAL) ([redacted]). Additional groundwater is likely to be extracted during construction of the proposal change. A variation to the WSWA will be required for additional groundwater extraction.	WSWA variation	During or post REF if >3ML known during planning (Sydney Water to initiate). If unknown, pre-construction, delivery contractor.
Roads Act 1993	The proposal change includes work within local road corridors managed by Wollongong City Council. Permits for lane closures from council would be required where works are in or near the local road corridor.	Council approval	Pre-construction, delivery contractor

4. Environmental assessment

The environmental impacts checklist (SWEMS0019.01) was considered for the proposal change. Table 4-1 includes only the potentially impacted/ changed aspects and Table 4-2 lists relevant/ additional mitigation measures. Additional impacts discussed below apply to all areas of the proposal change, unless stated otherwise. All other environmental impacts in the approved REF remain the same and will be incorporated into the contractor's CEMP.

Table 4-1 review of environmental aspects

Aspect	Potential additional impacts
Topography, geology and soils	Potential impacts to topography, geology and soils during construction include erosion and sedimentation from additional trenching, excavation and temporary stockpiling of excavated material. Surface earthworks would also be required for ground levelling and installing temporary and permanent access roads. Environmental risk will be greatest where works would occur near Mullet Creek. Excavations and temporary access roads will be restored to pre-existing conditions following completion of construction. Some access roads may be retained for maintenance access to the inverted syphon. Additional impacts can be managed through implementation of the mitigation measures in the approved REF.
Water and drainage	The construction corridor crosses Mullet Creek. Localised flooding around Mullet Creek and its tributaries is mapped to occur during a 1 in 100-year flood event (SES, 2023). However, the Mullet Creek crossing is proposed to be trenchless construction (HDD), with the launch and receival pits located above the top of bank, and outside of the 1 in 100-year flood event mapped extent. The wastewater extension is located in the Sydney Basin South groundwater management area. Additional geotechnical investigations and installation of groundwater wells were undertaken for the extension (D4C, 2025). Data from these activities indicate that some groundwater is likely to be encountered during construction of the extension, and additional dewatering required (approx. 0.13 ML). Groundwater may be encountered during open trenching for main installation, excavation of launch and receival pits for trenchless construction and excavation for maintenance hole construction. The use of exclusion methods would result in a reduction of inflows into open pits. However, a WSWA variation will be submitted to DCCEEW following REFA determination. Trenchless construction has a potential risk of drilling fluid escaping the bore and entering the environment from a spill or frac-out (drilling intercepting faults and fractures in the rock). Construction activities will involve excavation and temporary stockpiling, with the potential to cause sedimentation to waterways if not adequately managed. The excavations will be progressively backfilled and restored to a condition similar to that before the disturbance. Additional construction impacts to water and drainage can be managed through implementation of the mitigation measures in the approved REF. During operation, periodic cleaning of the inverted syphon would be required using a vacuum or jetter truck. The risk of potential spills would be low and can be managed through the additional mitigation measures in Table 4-2.

Aspect	Potential additional impacts
Flora and fauna	**Wastewater extension** A new Flora and Fauna Assessment (FFA) for the wastewater extension was completed by Arcadis in March 2025 (Appendix D) and summarised below. The FFA study area (Figure 5) covered an area larger than the construction corridor for the wastewater extension. However, for impact assessment, it is assumed all vegetation within the construction corridor would be cleared (except the area of HDD under Mullet Creek). The assessment is considered to present a worst-case scenario, and it is likely that impacts can be minimised on site through minor reductions in the construction corridor where feasible. It should also be noted that following preparation of the FFA, the construction corridor for the wastewater extension was adjusted to avoid impact to structures on private property and expand work areas. While some areas in the construction corridor are not captured by the FFA, the impacts summarised below would still be consistent with the changes to the construction corridor shown in Figure 1. **Existing environment** Vegetation communities Three Plant Community Types (PCTs) were present within the study area following field surveys. Features of these PCTs are summarised in the table below and shown in Figure 5.

PCT	Associated TEC	Area (ha) within study area	TEC listing
3330 - South Coast Lowland Woolybutt Grassy Forest	• Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion (BC Act) • Illawarra and south coast lowland forest and woodland ecological community (EPBC Act)	0.72	The area of PCT 3330 within the study area is consistent with the BC Act listing. Some areas of PCT 3078 within the study area are consistent with the EPBC Act listing.
3078 - Illawarra Lowland Wet Vine Forest	• Illawarra Subtropical Rainforest in the Sydney Basin Bioregion (BC Act) • Illawarra-Shoalhaven Subtropical Rainforest of the Sydney Basin Bioregion (EPBC Act)	0.57	The area of PCT 3078 within the study area is **not consistent** with the BC Act/EPBC Act listing.
4084 - Southern Escarpment River Oak Forest	None	0.06	N/A
Weeds		1.36	
Native/exotic (non-PCT)		0.36	

Aspect	Potential additional impacts
	Total vegetation **3.07**

Mixed native/exotic vegetation

Some of the study area comprises of non-local native and exotic species (Figure 5). These areas do not confirm to any PCTs and have a total cover of 0.36 ha. All unmapped areas within the study that are not developed support exotic pastures.

Priority weeds

Large portions of the study area, in particular surrounding Mullet Creek support exotic weed species (Figure 5). Five of these are listed as state priority weeds under the South East Regional Strategic Weed Management Plan and have a mandatory biosecurity duty (a person must not import into the state or sell):

- Blackberry *(Rubus fruticosus spp. agg.)*
- Fireweed *(Senecio madagascariensis)*
- Lantana *(Lantana camara)*
- Madeira Vine *(Anredera cordifolia)*
- Willow *(Salix spp.).*

Threatened flora and fauna

No threatened flora species were identified within the study area during surveys. However, surveys were undertaken during July which did not coincide with the recommended survey season of all threatened plants with potential to occur. Based on habitat quality and features present, 4 threatened flora species were considered to have a moderate likelihood to occur in the study area following field surveys.

One threatened fauna species was observed during the field survey: a Grey-headed Flying Fox (*Pteropus poliocephalus*). Two hollow-bearing trees (HBT) were identified within the study area, supporting small and medium sized hollows (Figure 5). These hollows have potential to support threatened species, mainly threatened microbats. Following field surveys including threatened fauna habitat assessment, it was determined that 17 threatened fauna species have a moderate likelihood of occurrence in the study area, and one is known to occur.

Platypus

While not listed as a threatened species under the BC Act or EPBC Act, Platypuses (*Ornithorhynchus anatinus*) have been recorded in Mullet Creek approximately 1 km from the study area.

Visual inspections of Mullet Creek did not observe Platypuses or signs of Platypuses within the study area. It is likely that the section of Mullet Creek within the study area does not constitute high-quality habitat for this species. The results of the Platypus habitat appraisal are shown on Figure 5.

Aquatic habitat

Mullet Creek is a Strahler stream order 4 perennial natural water course and could provide foraging habitat for the Southern Myotis (*Myotis macropus*) and low-quality habitat for Platypus. Mullet Creek is mapped as KFH and classified as a 'type 2 – moderately sensitive key fish habitat' (DPI 2013). Mullet Creek is also considered as Class 2 waterway, an intermittent creek with defined bed and banks, semi-permanent to permanent pooling waters or connected wetland areas (DPI 2013).

Aspect	Potential additional impacts

An unnamed tributary of Mullet Creek also occurs in the study area, though it contains turbid water with muddy substrate, oils and foams and is unlikely to be suitable for any threatened species. Two small agricultural dams are also present in the study area but are unlikely to provide habitat to threatened species.

Vegetation along Mullet Creek in the study area has been identified as having low to moderate potential to be Groundwater Dependent Ecosystems (GDEs). PCT 4084 is classified as a forested wetland which would have a moderate dependency on groundwater while PCT 3078 is listed as a wet sclerophyll forest and would have a low dependency on groundwater.

Potential impacts – direct

Vegetation removal

Vegetation impacts assessed here are the maximum areas to be impacted. Overall, impacts to biodiversity values have largely been avoided or minimised through the positioning of the construction corridor and proposed HDD. Values that will be impacted are in poor condition and/ or already subject to degradation and edge effects due to their proximity to roads.

Direct impacts to vegetation are summarised below and shown in Figure 7. A total area of 0.22 ha of vegetation is expected to be impacted (0.06 ha of which is associated with a PCT), out of the 3.07 ha of vegetation identified within the survey area.

PCT	TEC	Area of direct impact (ha)	Significance	Assessment of significance
3330 - South Coast Lowland Woolybutt Grassy Forest	Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion (BC Act) Illawarra and south coast lowland forest and woodland ecological community (EPBC Act)	0.06	Test of Significance (ToS) assessment (BC Act) Significant Impact Criteria (SIC) Assessment (EPBC Act) Unlikely to be a significant impact.	The vegetation being removed is from the edge of a larger patch which extends beyond the construction corridor. The area to be removed is of lower quality, with signs of degradation from weeds. It is also adjacent to the road edge, where it is subject to edge effects and disturbance.
3078 - Illawarra Lowland Wet Vine Forest	Not present	0	N/A	N/A
4084 - Southern Escarpment River Oak Forest	None	0		

Aspect	Potential additional impacts

None	None - native/exotic (non-PCT)	0.16

Impact to threatened species habitat

Of the 4 threatened flora and 17 threatened fauna with a moderate or higher likelihood of occurrence, 3 flora and 16 fauna are predicted to be impacted by the proposed works in the construction corridor due to habitat removal. The species and their relevant predicted impacts are listed below.

Threatened species	BC Act	EPBC Act	Description of impacts
Flora			
Chorizema parviflorum	EP	-	Removal of habitat (PCT 3330).
Lespedeza juncea subsp. sericea	EP	-	
Pimelea curviflora var. curviflora	V	V	
Fauna			
Hollow roosting microbat species			
Greater Broad-nosed Bat (*Scoteanax rueppellii*)	V	-	Removal of foraging habitat (PCT 3330, native and exotic vegetation (non-PCT)).
Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*)	V	-	
Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)	V	-	
Southern Myotis (*Myotis Macropus*)	V	-	
Little Bent-winged Bat (*Miniopterus australis*)	V	-	
Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)	V	-	
Raptors and Owls			
Spotted Harrier (*Circus assimilis*)	V	-	Removal of habitat (PCT 3330, native and exotic vegetation (non-PCT)).
White-bellied Sea-Eagle (*Haliaeetus leucogaster*)	V	-	
Little Eagle (*Hieraaetus morphnoides*)	V	-	
Square-tailed Kite (*Lophoictinia isura*)	V	-	
Powerful Owl (*Ninox strenua*)	V	-	
Masked Owl (*Tyto novaehollandiae*)	V	-	

Aspect	Potential additional impacts			
	Tree nesting woodland and nectarivores birds			
	Dusky Woodswallow (*Artamus cyanopterus cyanopterus)*	V	-	Removal of habitat (PCT 3330, native and exotic vegetation (non-PCT)).
	Varied Sittella (*Daphoenositta chrysoptera*)	V	-	
	Scarlet Robin (*Petroica boodang)*	V	-	
	Hollow-nesting woodland birds and Cockatoos			
	Little Lorikeet (*Glossopsitta pusilla)*	V	-	Removal of foraging habitat (PCT 3330, native and exotic vegetation (non-PCT)).
	Other			
	Grey-headed flying-fox (*Pteropus poliocephalus*)	V	V	Removal of habitat (PCT 3330, native and exotic vegetation (non-PCT)).

EP = Endangered Population, V = Vulnerable

ToS and SIC assessments have been prepared to assess impacts to these species and outcomes summarized below.

Threatened species	Likelihood of significance impact?	Justification
Flora	Unlikely	Only 0.06 ha of suitable habitat would be removed with much of the vegetation already subject to degradation and weed invasion. No individuals were identified during site investigations. Unlike *Chorizema parviflorum* and *Pimelea curviflora var. curviflora, Lespedeza juncea subsp. Sericea* is known to be able to thrive in disturbed environments in the locality. As such, targeted pre-clearing flora surveys for *Lespedeza juncea subsp. Sericea* are recommended.
Hollow roosting microbat species **Hollow-nesting woodland birds and Cockatoos** Little Lorikeet (*Glossopsitta pusilla)*	Unlikely	Only 0.06 ha of suitable habitat would be removed. The area to be removed is a small proportion compared to what will be retained in the study area and negligible to what is in the broader area. Impacts to HBTs will be avoided.

Aspect	Potential additional impacts		
	Raptors and Owls **Tree nesting woodland and nectarivores birds**	Unlikely	Only 0.06 ha of suitable habitat would be removed. The area to be removed is a small proportion compared to what will be retained in the study area and negligible to what is in the broader area.
	Other Grey-headed flying-fox (*Pteropus poliocephalus*)	Unlikely	Only 0.06 ha of suitable habitat would be removed as a result of the Proposal. The area to be removed is a small proportion compared to what will be retained in the Study Area and negligible to what is in the broader area. No roosting camps will be impacted by the Proposal.

Fauna injury and mortality

Fauna injury or mortality may occur during vegetation clearing activities or may result from collisions with work vehicles or plant, or accidental entrapment in plant or equipment. Mitigation measures would be implemented to minimise the risk of occurrence.

Aquatic habitats

Impacts to Mullet Creek, potential Platypus habitat and GDEs along the creek are considered unlikely as the proposal would utilise trenchless methods. There would be no impacts to the bed or banks of Mullet Creek as the HDD launch and receival pits would be located above the top of bank.

Potential impacts – indirect

Potential indirect impacts are consistent with those assessed in the approved REF and will be managed through implementation of the mitigation measures in the approved REF.

Yallah Road watermain realignment

Due to the changes to the construction corridor along Yallah Road, the potential impacts to flora and fauna have been revised. An addendum memo (Appendix D) to the FFA prepared for the approved REF (Arcadis, 2024) is summarised below.

An additional 0.4 ha of native vegetation removal would be required for the proposal change along Yallah Road. This vegetation consists of PCT 3330 (South Coast Lowland Woollybutt Grassy Forest), with associated BC Act and EPBC TECs (Figure 8).

The ToS and SIC assessments from the approved REF were updated to reflect this additional vegetation removal (Appendix D). They found that a significant impact to this TEC is unlikely and this increase in impacts can be considered minor. In addition, this increase in native vegetation removal represents an incremental increase in habitat removal for some threatened species. However, this minor increase is not anticipated to further significantly impact foraging and breeding resources.

Sydney Water biodiversity offset requirements

Additional vegetation removed for the proposal change will be offset in accordance with Sydney Water's non-statutory offset guide. The table below shows the new total offsetting obligations for the project and supersedes the total in the approved REF.

Aspect	Potential additional impacts

Vegetation type	New project total impact area / number of trees	New project total offset requirement
Illawarra Lowlands Grassy Woodlands (TEC)	1.15 ha	3.45 ha
PCT 3153 Illawarra Escarpment Bangalay x Blue Gum Wet Forest	0.13 ha	0.26 ha
Native/exotic (non-PCT - contains a mixture of mostly non-locally native trees, exotic trees and locally native trees)	0.49 ha	To be confirmed during construction by a qualified arborist.
HBTs	4 HBTs	8 HBTs

Aboriginal heritage

An Aboriginal Heritage Due Diligence (AHDD) assessment was carried out by Kelleher Nightingale Consulting (KNC) for the wastewater extension (Appendix E) under the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*.

Background research, including a review of Aboriginal Heritage Information Management System (AHIMS), and other database searches, did not identify any Aboriginal archaeological sites within the construction corridor. The closest registered Aboriginal site was low density artefact scatter site [redacted] of the construction corridor. This site was subject to assessment as part of the West Dapto wastewater gravity main project. AHIP [redacted] was obtained on 17 January 2024 for total impact to this site (Figure 9). Following determination of the approved REF for the Yallah Marshall Mount Water and Wastewater Servicing project, AHIP [redacted] was granted on 5 November 2024 (Figure 9).

Visual inspection confirmed that the study area has been disturbed by recent land use practices including extensive cut and fill works associated with road and infrastructure developments, modifications of the landscape and displacement of natural soil deposits due to horse agistment and other farming activities. Natural erosional processes, as well as flooding would also impact on preservation of natural soil deposits that would contain Aboriginal cultural material. Aboriginal archaeological potential of the construction corridor was assessed as low.

It is therefore reasonable to assume that no Aboriginal objects or sites would be affected by the proposal change and no variation to AHIP [redacted] would be required.

The Yallah Road watermain adjustments were reviewed by KNC on 19 March 2025. KNC concluded that there would be no impact to Aboriginal archaeological objects.

Potential impacts to Aboriginal heritage from the proposal change can be managed in accordance with the mitigation measures in the approved REF. This includes unexpected finds procedures for Aboriginal objects.

Noise and vibration

Noise and vibration impacts associated with the Yallah Road watermain realignment are consistent with those assessed in the approved REF.

Additional impacts associated with the wastewater extension are assessed below. It should also be noted that following preparation of the noise and vibration

Aspect	Potential additional impacts
	assessment, the construction corridor for the wastewater extension was adjusted to avoid impact to structures on private property and expand work areas. However, the impacts summarised below would still be consistent with the changes to the construction corridor shown in Figure 1. Background noise levels and sources are consistent with those assessed in the approved REF. Some noise sensitive receivers near the wastewater extension include: • Northern Stars Swim School Dapto • Goolagong Street Reserve/ Penrose Park • low density suburban residential properties • rural lots with residential properties. The closest receivers to the proposal change include the residential properties and reserve along Goolagong Street, directly adjacent to the construction corridor. Trenching activities would progress about 10 m per shift and underboring about 13 m per shift. **Construction impacts - noise** An additional quantitative noise impact assessment was undertaken to supplement the assessment in the approved REF. The additional assessment captured impacts to receivers from the proposed wastewater extension. This was performed using the Transport for NSW (TfNSW) Construction and Maintenance noise estimator tool (TfNSW, 2022) and included below. The proposal change would be installed via open trenching and underboring, with plant and equipment consistent with those in approved REF. The noisiest plant chosen for the noise assessment is the 13.5 t excavator with hammer. Night works are anticipated for works crossing Avondale Road. As such, an assessment of works during standard construction hours (day) and out of hours work (night) has been undertaken. Results of the assessment concluded that: • Non-residential receivers with line of sight including Northern Stars Swim School Dapto and Goolagong Street Reserve/ Penrose Park in Avondale are predicted to be noise impacted during day work (Figure 10). • Residential receivers within 70 m with no line of sight and 170 m with line of sight are predicted to be noise impacted during day work (Figure 11). • During night work, residential receivers within 870 m, with line of sight of the proposal change are predicted to be impacted. Residential receivers within 590 m, with no line of sight of the proposal change are predicted to be impacted (Figure 12). • There is potential for sleep disturbance impact on residential receivers within 390 m of the proposal during use of 13.5 t excavator with hammer during night works. It should be noted that some of the impacted noise sensitive receivers may overlap with those assessed in the approved REF. In addition, some receivers assessed in

Aspect	Potential additional impacts
	the approved REF may no longer be impacted due to the proposal change (e.g. alignment no longer running along Penrose Drive). Open trenching and underboring are linear activities. These activities would not cause noise impacts to any one receiver for every shift over the 8 months of construction of the proposal change. Sensitive receivers around the compounds and access roads are likely to be noise impacted over most construction shifts. Construction noise impacts can be managed through implementation of the mitigation measures in the approved REF, with consideration of the additional receivers in Figure 10 to Figure 12. **Construction impacts - vibration** Vibratory plant and equipment would be consistent with those listed in the approved REF. Additional residential buildings may be within the minimum working distances of this plant and equipment due to the proposal change. Vibration impacts to these receivers will be minor and managed by the mitigation measures listed in the approved REF. **Operational impacts** The proposal change would not result in any operational vibration impacts. Minimal noise impacts may be generated during periodic cleaning of the inverted syphon from the use of a vacuum or jetter truck. Impacts would be short-term, temporary and infrequent. Maintenance activities would be undertaken in accordance with Sydney Water's existing procedures.
Waste and hazardous materials	The proposal change has the potential to generate additional waste consistent with the waste types in the approved REF. Most of the additional waste would be excess spoil from excavation for the new mains and drilling fluids from HDD activities for the wastewater extension. Groundwater may also require dewatering from excavations. During operation silt is likely to accumulate at the low point in the inverted syphon, which would be removed during periodic cleaning. This would be managed in accordance with Sydney Water's existing procedures and policies. Additional waste generated from the proposal change can be managed in accordance with the mitigation measures in the approved REF.
Traffic and access	The proposal change would be constructed within the following existing road reserves: • Huntley Road • Goolagong Street • Avondale Road • Yallah Road • Marshall Mount Road. Works along Yallah Road and Marshall Mount Road are consistent with those assessed in the approved REF. Huntley Road, Goolagong Street and Avondale Road are local roads managed by Wollongong City Council, with 2 lanes and a speed limit of 50 km/h. There are no

Aspect	Potential additional impacts
	formalised footpaths or bus stops within the construction corridor for the wastewater extension. Construction of the proposal change would require single lane closures along Huntley Road and Goolagong Street during standard construction hours. Installation of the gravity main across Avondale Road is proposed to be carried out at night to reduce traffic impacts to the community. The construction corridor crosses private properties, road reserves (existing and proposed future roads) and electricity transmission easements. The delivery contractor would liaise with the relevant landholders to confirm site access arrangements. Construction access to the wastewater extension would be from Avondale Road through private land, and an existing access road utilised for construction of the West Dapto wastewater gravity main project. While it is expected that property access would be maintained, property owners would be informed of any potential impacts to access. Appropriate measures to either provide an alternative access or reinstate access at the end of the day would be negotiated. Construction traffic and access impacts can be managed through the mitigation measures in the approved REF, including preparing and implementing a Traffic Management Plan (TMP) and consultation. During operation, access to the maintenance holes on both sides of the inverted syphon under Mullet Creek would be required. Temporary access roads would need to be in place during operation until Wollongong City Council's future road upgrades are complete. These access road locations would be determined in consultation with the relevant landowners and would be within the mapped construction corridor. Maintenance activities would be undertaken in accordance with Sydney Water's existing procedures which would minimise the potential for traffic and access impacts.
Air quality	The proposal change has the potential to impact on air quality by generating additional dust and emissions during construction of the wastewater extension. Potential operational impacts on air quality would include odours from the inverted syphon, energy dissipation maintenance hole immediately north of Avondale Road and additional ventilation shafts (Figure 1). However, the wastewater extension has been designed to optimise air movement and turbulence and minimise offensive odours. Ventilation shaft placement and height has been designed to reduce the likelihood of odours impacting on amenity. Installation of odour control units will be considered for any residual impacts during operation. As such, operational odour impacts are expected to be minor. Potential impacts on air quality can be managed in accordance with the mitigation measures in the approved REF.
Social and visual	Additional noise and vibration, air quality and traffic and access impacts to social amenity are assessed above. Additional receivers adjacent to the proposal change along Goolagong Street, Avondale Road and Ena Avenue would experience visual impacts associated with the presence of plant, machinery and construction compounds. Visual and other amenity impacts at individual locations would occur for a short duration because construction would progress along the main alignments at about 10 to 13 metres per shift. Areas

Aspect	Potential additional impacts
	disturbed by construction would be progressively rehabilitated to reduce visual impacts. The proposal change would include the installation of additional ventilation shafts for the wastewater extension. The ventilation shafts would generally consist of a 300 mm diameter supported pipe, which would be about 12-18 m tall. The ventilation shafts would be in proximity to existing and future residential receivers. Before future development starts, visual impacts of these ventilation shafts may have a moderate impact to nearby residents.

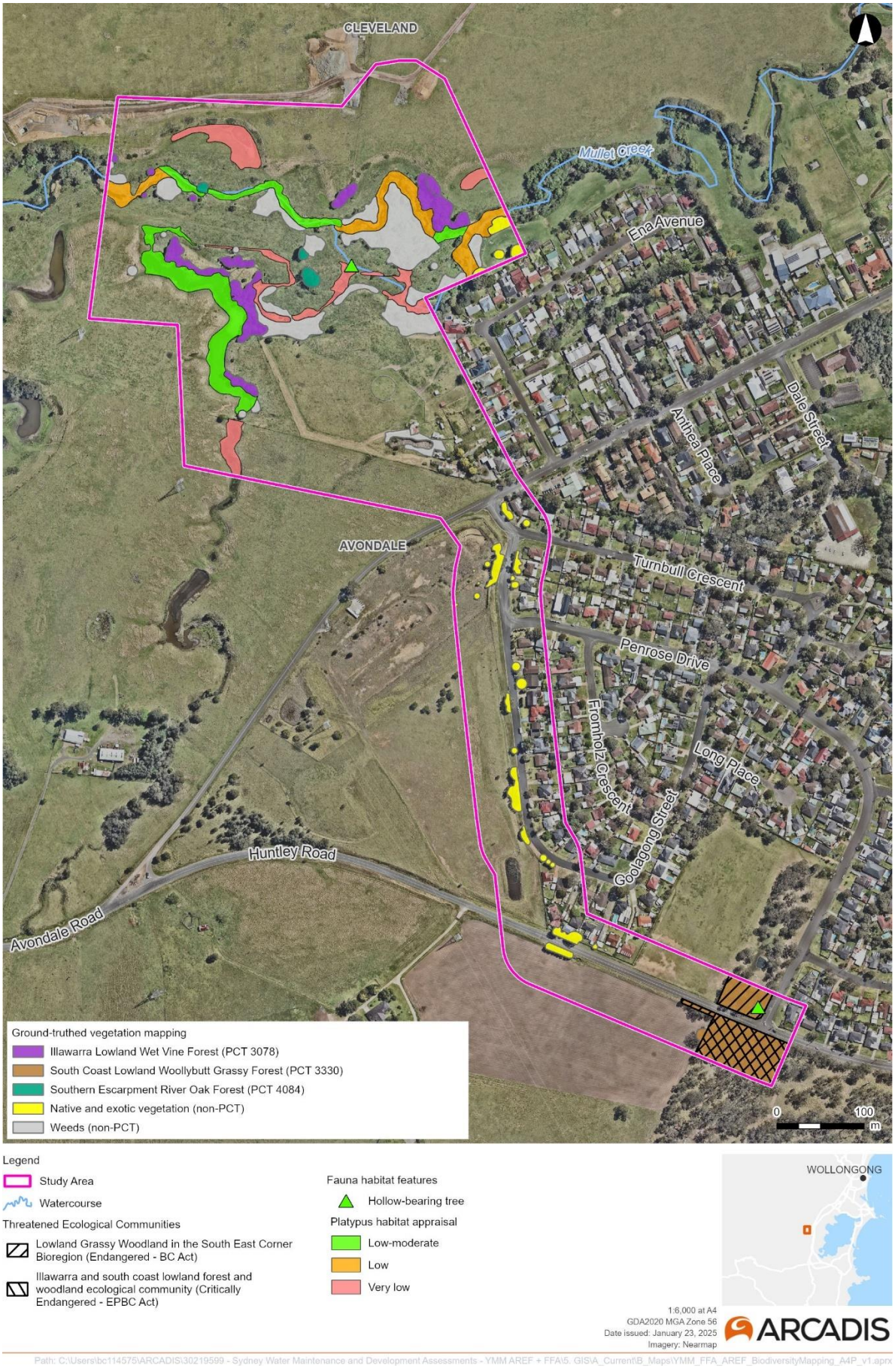


Figure 5 Map of ground-truthed vegetation in the wastewater extension FFA study area

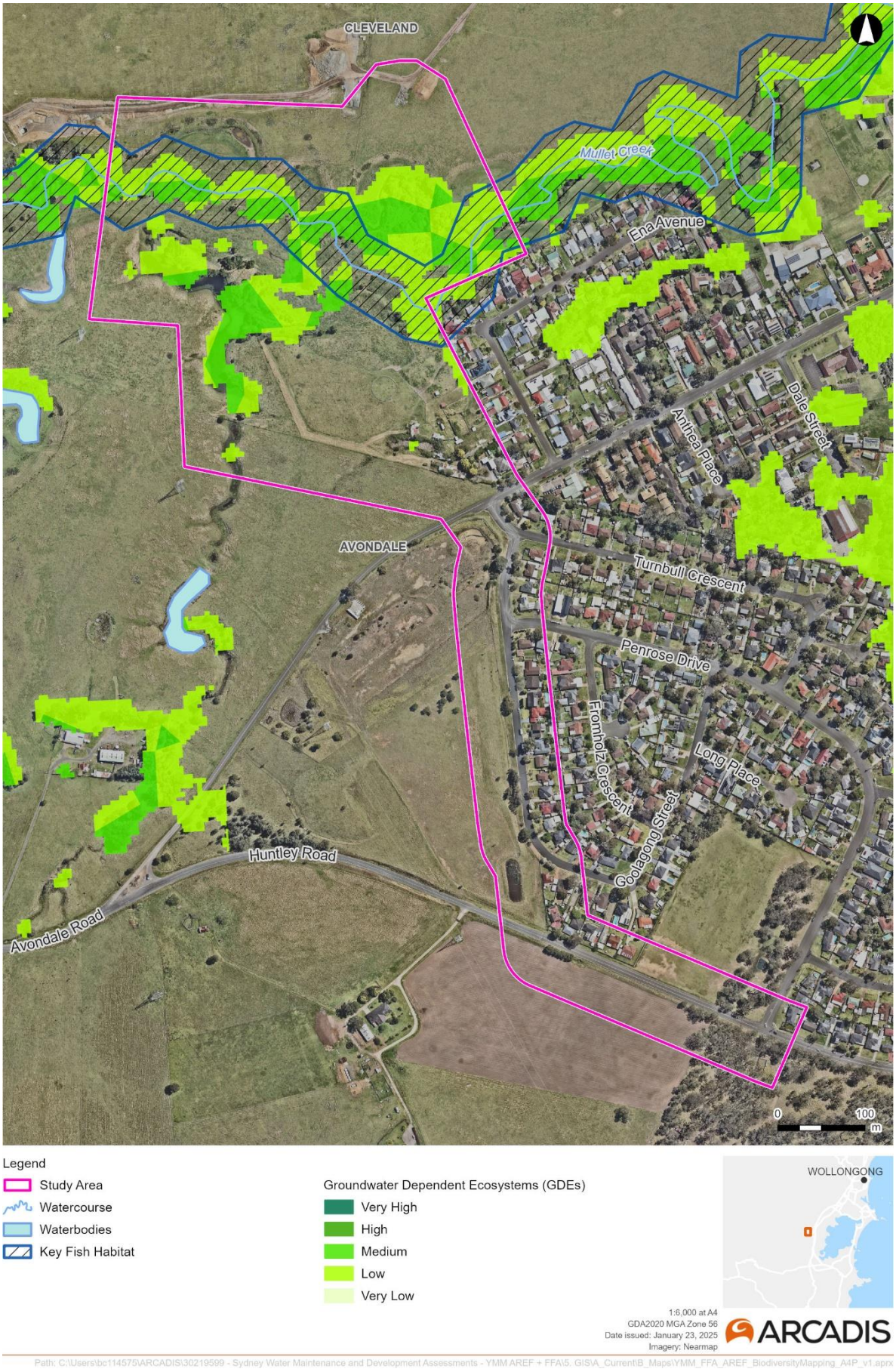
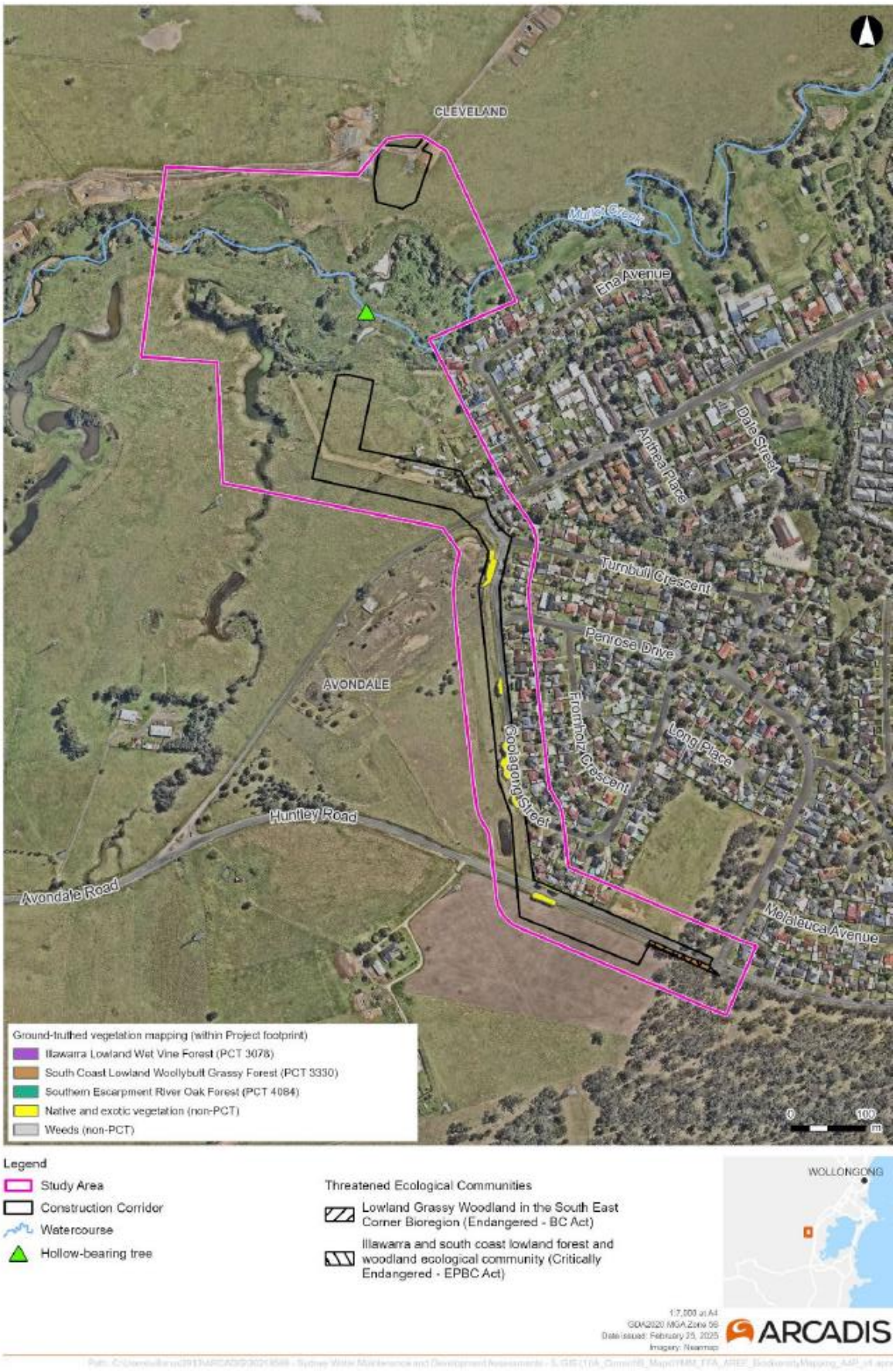


Figure 6 Aquatic habitats, KFH and GDEs in the wastewater extension FFA study area



Note: the HDD section of the construction corridor has been excluded from this figure as there will be no above ground disturbance.

Figure 7 Vegetation within the construction corridor of the wastewater extension

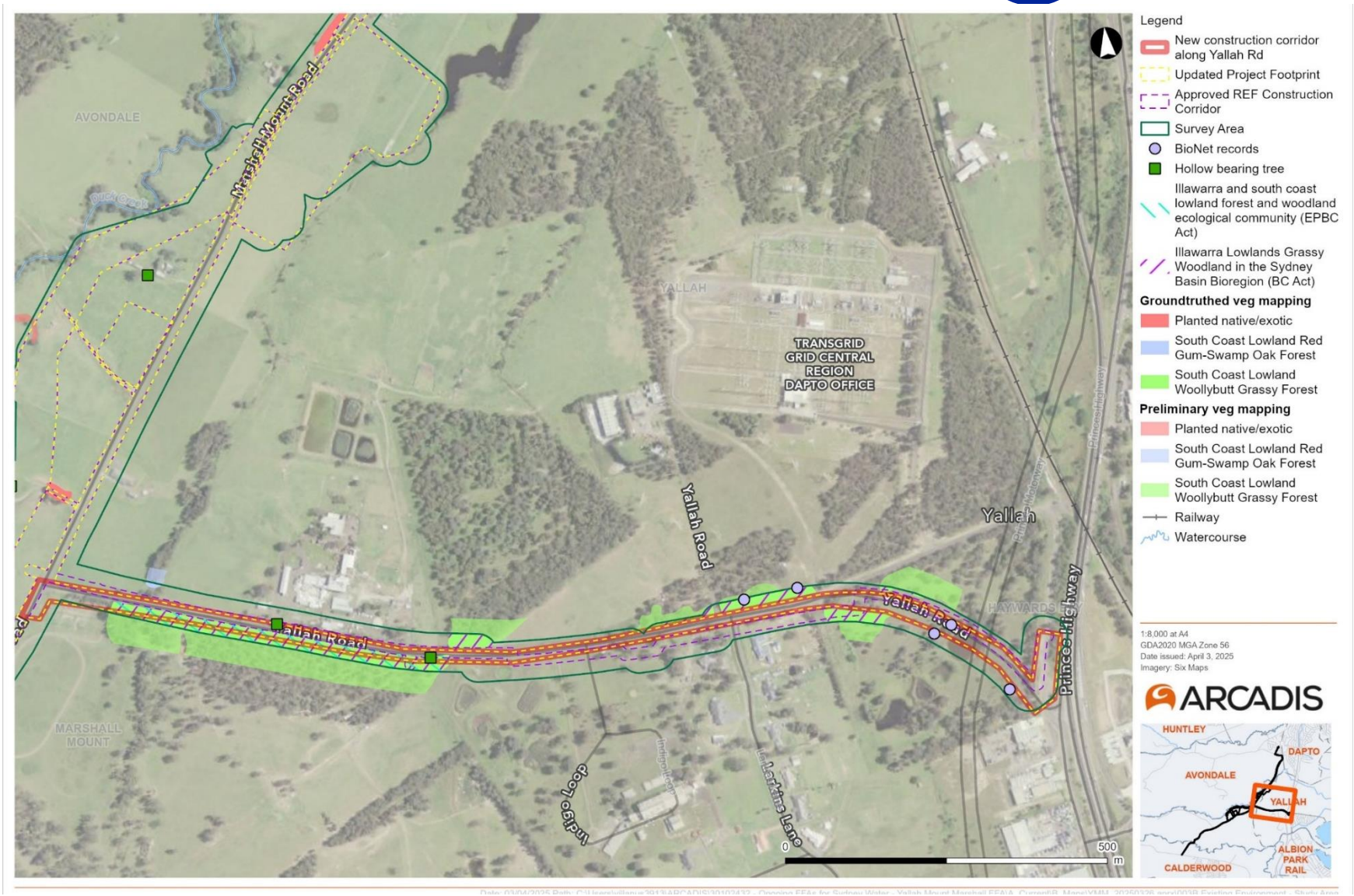


Figure 8 Vegetation within the construction corridor of the Yallah Rd water main

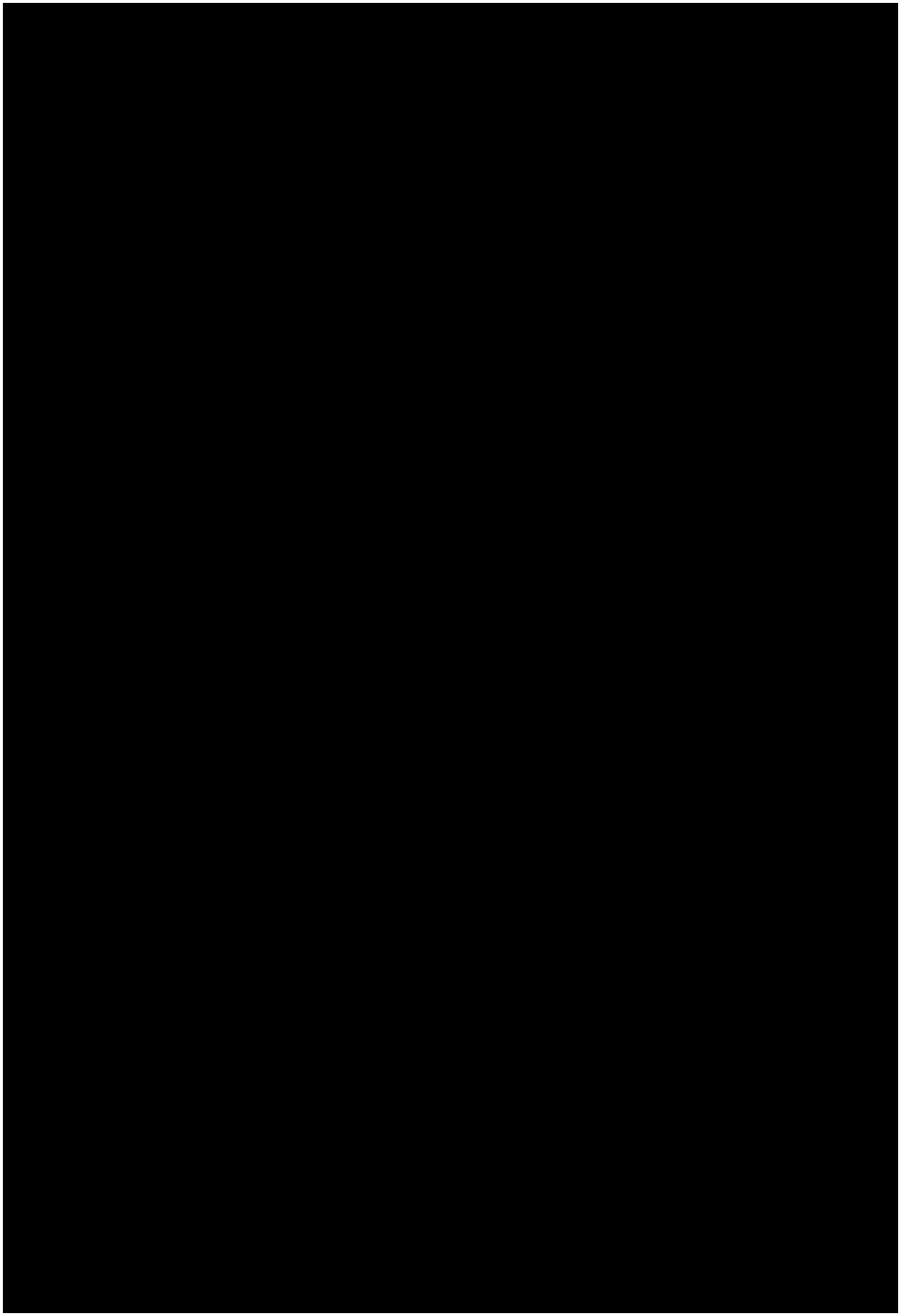
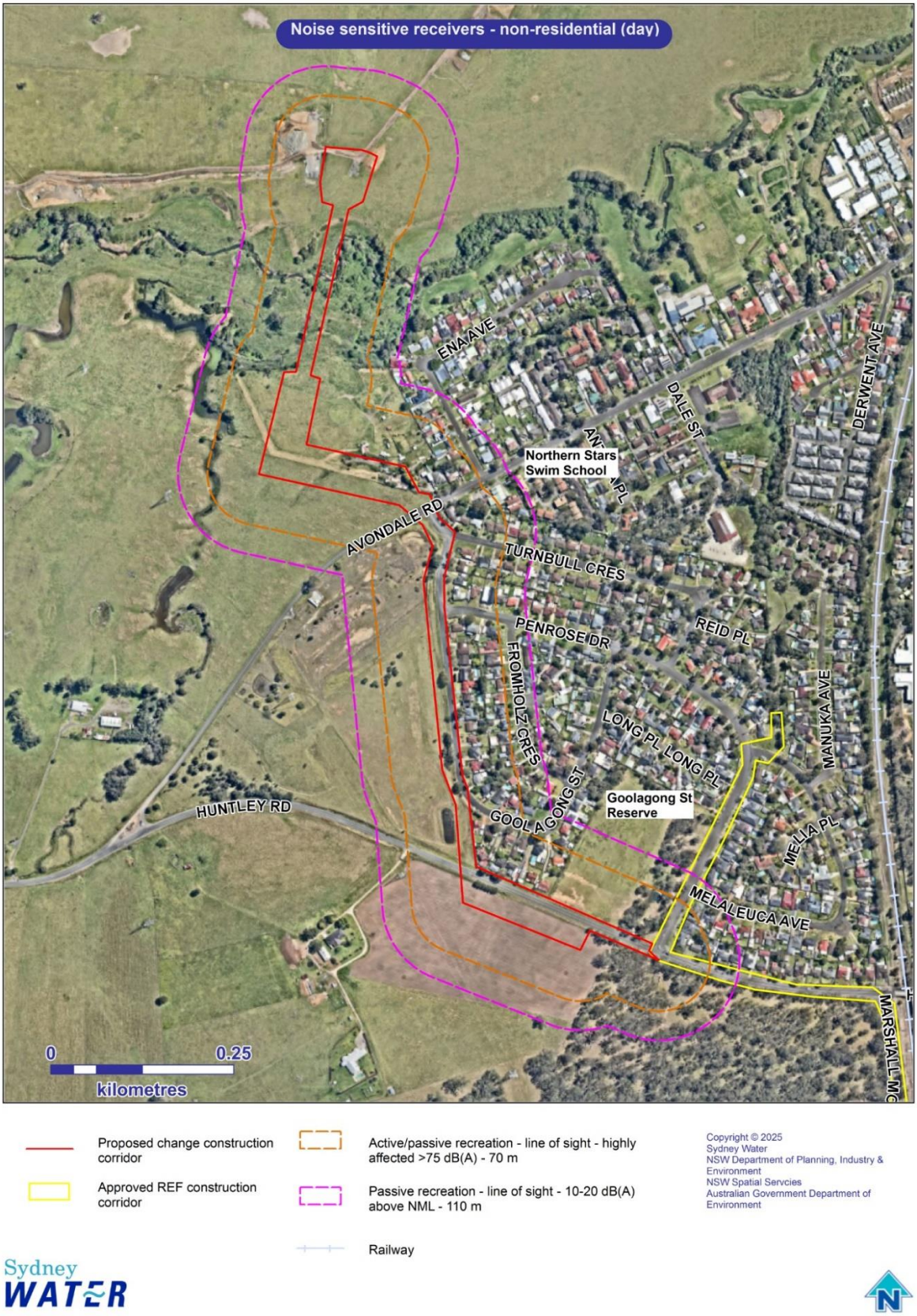


Figure 9 AHDD assessment of the wastewater extension



Note: This assessment was prepared prior to final adjustments to the construction corridor. As such, the construction corridor shown here differs slightly to Figure 1.

Figure 10 Predicted noise impacts for non-residential receivers during day work for the wastewater extension

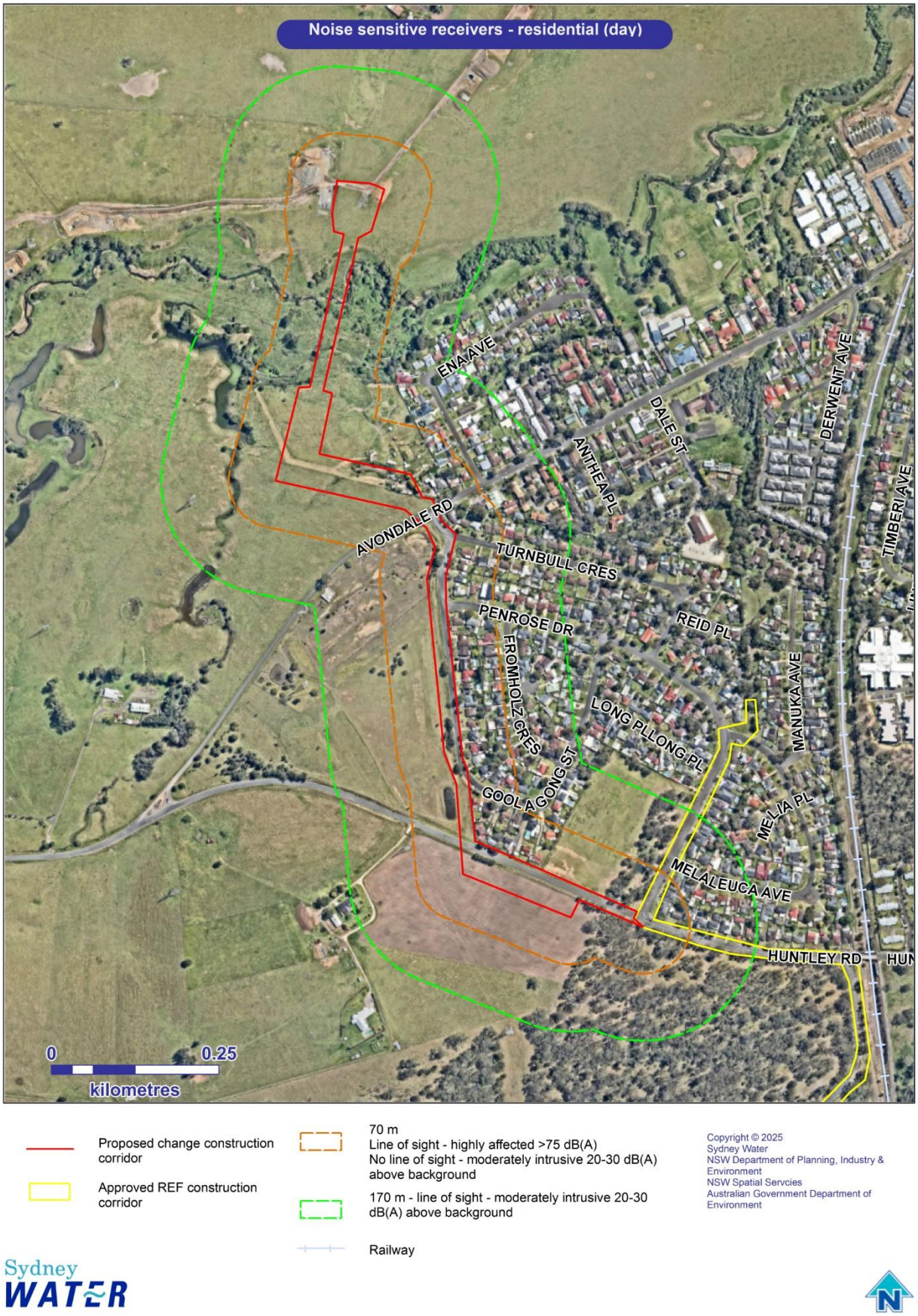


Figure 11 Predicted noise impacts for residential receivers during day work for the wastewater extension

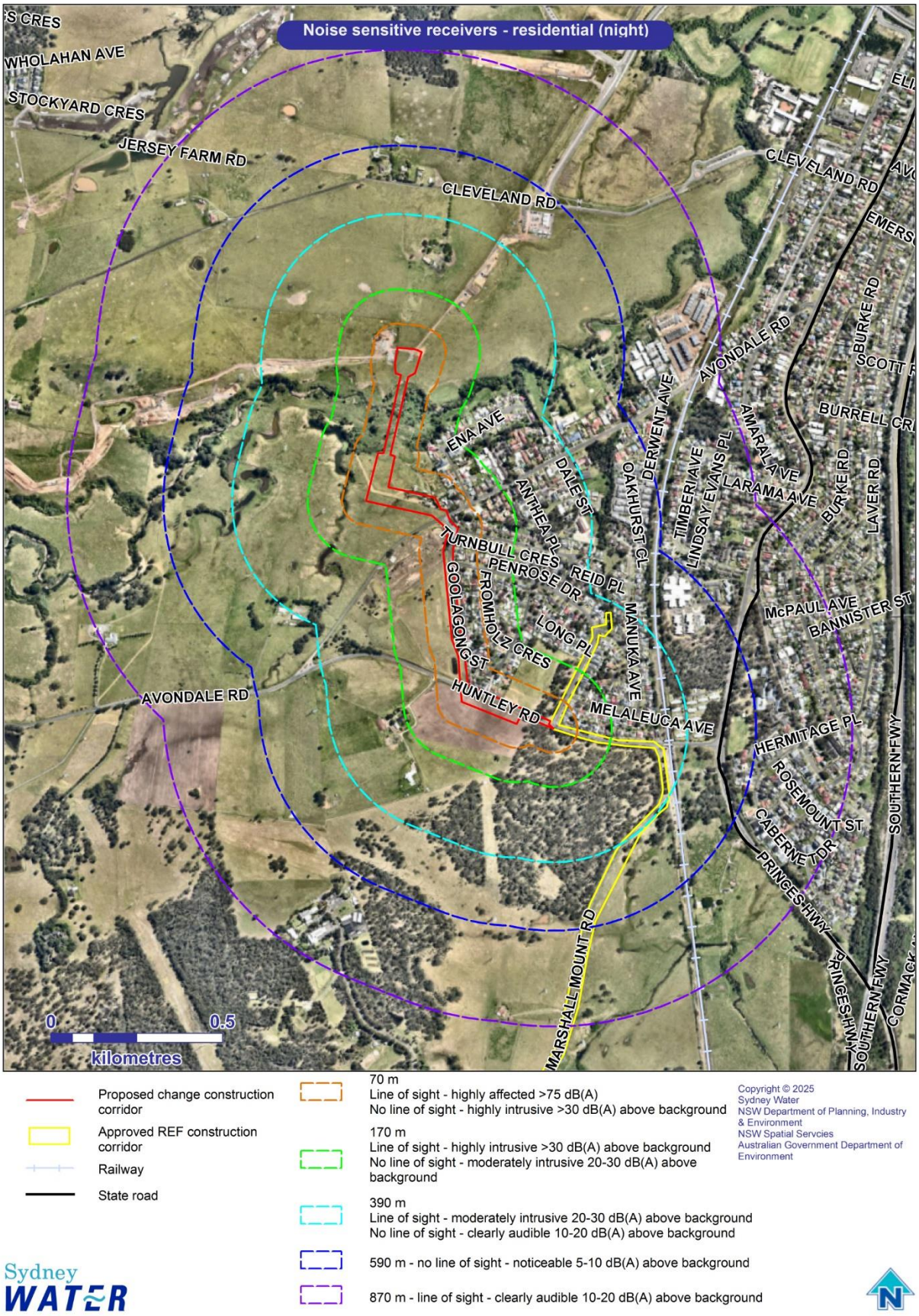


Figure 12 Predicted noise impacts for residential receivers during night work for the wastewater extension

Table 4-2 Additional mitigation measures

Mitigation measures
Sydney Water will design and maintain access roads used for maintenance of the inverted syphon during operation to ensure no ongoing erosion impacts occur.
Sydney Water will apply to vary the existing groundwater Water Supply Works Approval ([redacted]) for the approved REF. With regard to the proposal change, the delivery contractor is responsible for: • updating the Dewatering Management Plan prior to construction • complying with the conditions of the approvals (such as protecting water quality; minimising aquifer extraction volumes, monitoring extraction with flow meters and recording volumes).
During maintenance/cleaning of the inverted syphon, the following mitigation measures will apply: • Bund open maintenance holes if there is a risk of wastewater spills. • Keep functioning spill kit on site for clean-up of accidental chemical/fuel spills. Keep the spill kits stocked and located for easy access. • No wash down of equipment permitted onsite.
A suitably qualified ecologist will complete pre-clearing surveys for *Lespedeza juncea subsp sericea* during survey window (January – March).
Native/exotic (non-PCT) tree offsetting requirements will be confirmed during construction by a qualified arborist.
Prior to construction, the Contractor must notify the Sydney Water Project Manager responsible for implementing [redacted] about proposed works within the existing AHIP boundary and comply with consent conditions.
For works within Wollongong City Council's road reserve: • Copies of all traffic guidance schemes and Traffic Management Plans (TMP) to be provided to Council for their records. Provision is to be made within these plans to ensure that safe access for all road users is maintained during both work and non-work periods, including for pedestrians. • Construction vehicles (including worker's vehicles) and materials/equipment are not to be parked or stored in locations where they will impede sight lines for drivers or pedestrians (e.g. at adjacent intersections). • Appropriate measures should be implemented where appropriate to ensure vehicles entering the road from adjacent worksites on vacant land do not track dirt/mud onto the roadway. • Restoration works must comply with Council's standard road restoration requirements. • Any damage to Council assets such as kerb and gutter, pavement, drainage structures etc. (including by movements of heavy vehicles/equipment) needs to be notified to Council's Civil Assets Team and rectifications works undertaken to the satisfaction of Council.

5. Conclusion

Sydney Water has prepared this REFA to assess the potential environmental impacts of Yallah Marshall Mount Water and Wastewater Servicing – Wastewater Extension and Watermain Realignment. The proposal is required to provide water and wastewater services to the Yallah Marshall Mount Precinct in the West Lake Illawarra Growth Area. This proposal change was required to meet future service demand and accommodate future local road upgrades.

The main potential additional construction environmental impacts of the proposal change include impacts from noise and traffic, and impacts to ecology, soil, water and drainage. The main impacts during operation are potential air quality and visual amenity impacts. Given the nature, scale and extent of impacts and implementation of the mitigation measures outlined in this REFA and the approved 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 ESD. 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.

6. References

Arcadis, 2024. Flora and Fauna Assessment – Yallah Marshall Mount Water and Wastewater Servicing, May 2024.

D4C, 2025. 20029545-MEM-0001 RevA: Dewatering Groundwater ‘take’ estimation for the Proposed Yallah Marshall Mount Package 32 – Technical Memorandum, March 2025.

State Emergency Services (SES), 2023. Mullet Creek Flood Model (displayed on SP1201-Gavity Main Extension 50% Detailed Design).

Sydney Water, 2023. Servicing Growth in West Dapto Package 3 (Cleveland Precinct) REF, October 2023.

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Appendix A – Section 171 checklist

There are no requirements in addition to those considered in the approved REF.

Appendix B – Consideration of Ecologically Sustainable Development

There are no ESD consideration in addition to those covered in the approved 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?		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