NSW NATIONAL PARKS & WILDLIFE SERVICE

Review of Environmental Factors: Kemps Creek Dual Pressure Mains

Department of Planning and Environment, www.environment.nsw.gov.au
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Contents

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Document control

Version	Date	Author/Modified by	Approved by
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Final	21/09/2023		
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1. Brief description of the proposed activity

Proposal name and brief description	**Kemps Creek Dual Pressure Mains Project** Sydney Water proposes to construct and operate the Kemps Creek Dual Pressure Mains project, comprising two parallel DN750 pressure wastewater pipes to service the South West Growth Area (SWGA). The pressure mains would transfer wastewater from the pumping station SP1211 in Austral, currently under construction, to the Advanced Water Recycling Centre (AWRC) in Kemps Creek for treatment. The AWRC was approved as Critical State Significant Infrastructure (CSSI) and construction will start in 2023. About 300 m of the dual pressure mains is proposed to be constructed using trenchless construction within the gazetted depth of the Kemps Creek Nature Reserve (referred to as 'the park' in this REF). This is the proposal and the subject of this REF (Figure 1). The park is reserved under the *National Parks and Wildlife Act 1974* (NPW Act) and is gazetted to a depth of 20 m below ground in the area of the proposal. The pressure mains would service growth in the suburbs of Kemps Creek, Austral, East Leppington, Leppington North, Western Sydney Parklands and parts of Rossmore and Catherine Fields North. The main components of the project are: • dual pressure mains connecting a new wastewater pumping station in Austral (SP1211) to the Upper South Creek Advanced Water Recycling Centre (AWRC) in Kemps Creek • supporting infrastructure including a barometric loop at the AWRC end of the dual pressure mains.
Location of activity	The park is located in south-west Sydney in the suburb of Cecil Park, about 12 km west of Liverpool. The proposal would involve trenchless construction through the southern part of the park between the suburbs of Austral and Kemps Creek.
Name of NPWS park or reserve	Kemps Creek Nature Reserve
Description of any unreserved land	N/A
NPWS Area	NPWS Cumberland Area
Council	Liverpool City Council
NSW State electorate	Liverpool
Estimate capital cost of project*	~ $22 million for the trenchless construction of the dual pressure mains under the park.
Estimated duration of project	6 months
Proposed commencement date	Early 2024

Proposed completion date	Mid 2024 (construction completion)

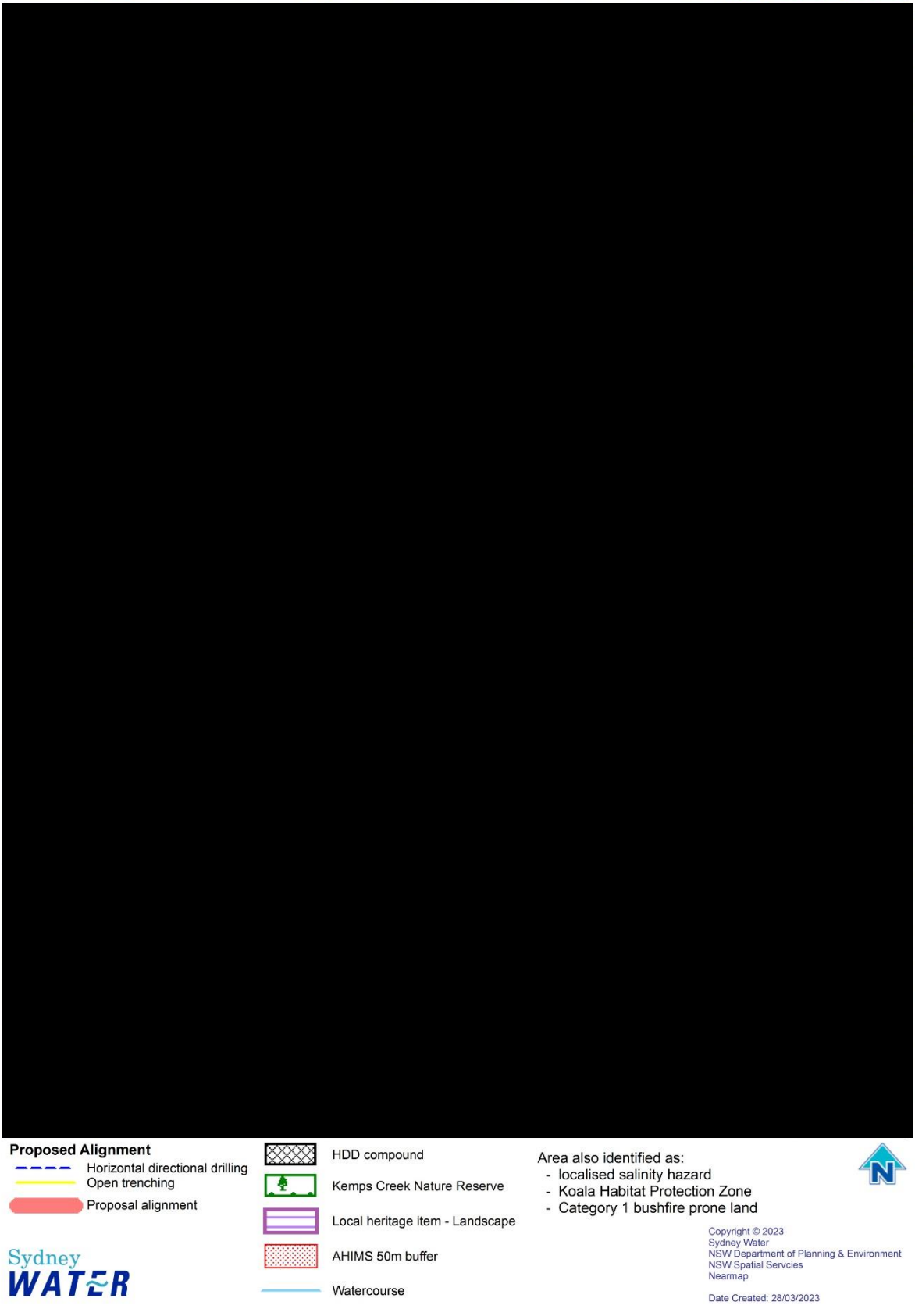

Figure 1 The proposal - general and heritage constraints map

2. Proponent's details

Note: All correspondence and notices will be sent to the address of the proponent.

Contact name	Jonathan Dowling
Position	Senior Environmental Scientist
Street address	Level 10, 1 Smith Street, Parramatta NSW 2150
Postal address (if different to above)	As above
Contact numbers	Business: Mobile: 0458 230 251
Email	jonathan.dowling@sydneywater.com.au

Proponent external to NPWS or DPE Environment and Heritage Group (EHG)

Organisation	Sydney Water Corporation
ACN/ABN	ABN: 49 776 225 038

NPWS/EHG proponents

Area Manager or Unit Manager	Katie Littlejohn (Manager, Cumberland Area)

3. Permissibility and assessment pathway

3.1 Permissibility under NSW legislation

The following sections outline how the activity is permissible under applicable NSW legislation.

3.1.1 National Parks and Wildlife Act 1974 (NPW Act) and NPW Regulation

Objects of the Act

Section 2A states that the objectives of the NPW Act are:

(a) the conservation of nature, including, but not limited to, the conservation of—

(i) habitat, ecosystems and ecosystem processes, and

(ii) biological diversity at the community, species and genetic levels, and

(iii) landforms of significance, including geological features and processes, and

(iv) landscapes and natural features of significance including wilderness and wild rivers,

(b) the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to—

(i) places, objects and features of significance to Aboriginal people, and

(ii) places of social value to the people of New South Wales, and

(iii) places of historic, architectural or scientific significance,

(c) fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation,

(d) providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation.

The proposal has considered the above objectives of the NPW Act and has been designed to have minimal impact on the park and its values. The proposal would involve construction of the dual pressure mains using horizontal directional drilling (HDD). This allows a pipe to be installed underground without impacting sensitive environments such as waterways, vegetation, or items of heritage significance. This construction method would minimise impacts on the park.

The dual pressure mains would be maintenance free – meaning that no surface or above ground structures are necessary for the length of the HDD and no access to the park would be required during operation. Construction or operation of the pressure mains would not impact the natural or cultural aspects of the park or affect the management of the park.

Reserve management principles

Section 30J states the management principles of nature reserves:

(1) The purpose of reserving land as a nature reserve is to identify, protect and conserve areas containing outstanding, unique or representative ecosystems, species, communities or natural phenomena so as to enable those areas to be managed in accordance with subsection (2).

(2) A nature reserve is to be managed in accordance with the following principles—

(a) the conservation of biodiversity, the maintenance of ecosystem function, the protection of geological and geomorphological features and natural phenomena,

(b) the conservation of places, objects, features and landscapes of cultural value,

(c) the promotion of public appreciation, enjoyment and understanding of the nature reserve's natural and cultural values,

(d) provision for appropriate research and monitoring,

(e) provision for the carrying out of development in any part of a special area (within the meaning of the Hunter Water Act 1991) in the nature reserve that is permitted under section 185A having regard to the conservation of the nature reserve's natural and cultural values.

The proposal is consistent with the management principles. The construction method has been specifically designed to consider the sensitive nature of the park and minimise potential impacts on the park's values.

☒ **Title and relevant sections of plan of management or statement of management intent**

The Plan of Management for the Kemps Creek Nature Reserve (PoM) was adopted in December 2022 (NPWS, 2022).

The PoM states that the park is recognised in the Western Sydney Parklands Plan of Management 2030 as a conservation and ecological resource for the parklands and the broader Western Sydney community, and as a vital link in conserving and maintaining the parklands' ecological corridor. The park contains significant biodiversity values. There is a recovery plan in place to help ensure the long-term survival and protection of the threatened species and communities that are found only on the Cumberland Plain. The park also provides valuable habitat for native animals in a landscape where suitable habitat is limited and fragmented.

The objectives and actions of the PoM have been developed in line with the management principles outlined in the NPWS Act. Section 6 of the PoM sets out a series of park outcomes and management actions to achieve those outcomes. The outcomes are grouped into the following categories:

- protecting the natural environment
- looking after our culture and heritage
- providing for visitor use and enjoyment
- park infrastructure and services
- non-park infrastructure and services.

The proposal would not affect the ability of NPWS to deliver the park outcomes and associated management actions outlined in the PoM. The proposal would have minimal impact on the park and its values, consistent with requirements of Table 2 of the PoM. The proposal would not involve any above ground activities during construction within the park, avoiding sensitive environments such as waterways, vegetation, or items of heritage significance.

The pressure mains would be maintenance free, meaning that no surface or above ground structures are necessary for the length of the pipes and no access to the park is needed during operation.

☐ **Title and relevant section of any applicable conservation action plan (CAP) for an asset of intergenerational significance (AIS) and the relevant AIS site number.**

There are no declared assets of intergenerational significance (AIS) for the Kemps Creek Nature Reserve. Hence, there is no applicable conservation action plan.

☒ **Leasing, licensing and easement provisions (Part 12)**

Sydney Water has consulted with NPWS regarding the requirement for a licence, easement or lease. NPWS indicated that following review and determination of this REF, Sydney Water would be referred to the Property and Commercial unit to obtain the appropriate authorisation.

Subject to the requirements of the Property and Commercial unit, Sydney Water will obtain the relevant licence or easement from NPWS for the proposal in accordance with Part 12 of the NPW Act.

☐ (**for internal NPWS/EHG projects only) NPWS/EHG management powers and responsibilities (s 8 and s 12)**

The proposal is not an internal NPWS project. Therefore, this section is not applicable.

3.1.2 Wilderness Act 1987 (for activities in wilderness areas)

The proposal is not within a wilderness area. Therefore, this section is not applicable.

3.1.3 Biodiversity Conservation Act 2016 (BC Act)

The proposal would meet the objectives of the BC Act by maintaining a healthy, productive and resilient environment according to the principles of environmentally sustainable development. It would maintain the diversity and quality of ecosystems by avoiding and minimising impacts on threatened species and ecological communities.

The proposal would involve HDD, below the ground in Kemps Creek Nature Reserve. This method allows a pipe to be installed underground without impacting ecological communities, flora or fauna. The launch and receival pits would be located outside the Kemps Creek Nature Reserve. The pipes would be at least 7 m below the surface of the park and mostly 15-20 m deep. The roots of trees in the area would be 1-2 m deep. Impact to roots of threatened ecological communities in the park is unlikely. Therefore, the proposal is not expected to impact any threatened species or ecological communities.

3.1.4 Rural Fires Act 1997 (RF Act)

The NSW Planning Portal Mapping indicates that the proposal is classified as 'Vegetation Category 1'. This vegetation category presents the highest bushfire hazard. However, the proposal would not involve any above ground activities during construction. There would be no surface or above ground structures associated with the proposal. Access to the pressure mains during operation would not be required. The proposal is not expected to affect the bushfire hazard classification.

The proposal is consistent with the objectives of the RF Act.

3.2 Environmental Planning and Assessment Act 1979

3.2.1 Assessment pathway

It is confirmed that a REF is the applicable assessment pathway if each of the following apply.

☒ The activity may be undertaken without development consent under the provisions of s 2.73(1)(a) of the Transport and Infrastructure SEPP (TISEPP) as it is:

- ☒ on land reserved under the NPW Act or acquired under Part 11 of the NPW Act, **and**
- ☒ for a purpose authorised under the NPW Act.

☒ The activity is not designated development under Schedule 3 of the Environmental Planning and Assessment Regulation 2021

☒ The activity is not state significant infrastructure under Schedule 3(7) of the Planning Systems SEPP.

The Kemps Creek Pressure Mains project will form part of the Upper South Creek Advanced Water Recycling Centre network. The Critical State significant infrastructure approval for the Upper South Creek Advanced Water Recycling Centre (AWRC) project excludes the wastewater network. This was specified in:

- Sydney Water's application for the AWRC project (section 3.7 of the scoping report)
- section 4.14.1 of the AWRC EIS
- section 2.7.1 of the Department of Planning and Environment's assessment report.

Section 4.14.1 of the EIS notes 'A wastewater collection network will be required to transfer wastewater from residences and businesses to the AWRC for treatment. Sydney Water has started

planning for this network but it is excluded from the project scope because it will likely be built progressively to integrate with future precinct planning and align with development. This means exact locations and timing are not yet known and this network will be subject to separate planning approvals'.

Ancillary development is described in Tables 4-3, 4-5, 4-10 and 4-11 of the EIS (refer to link above) and does not include the wastewater network.

☒ The activity is not designated development under the s 2.7(2) of the Resilience and Hazards SEPP as:

- ☒ it is not on land mapped as littoral rainforest or coastal wetland, **or**
- ☐ it is on land mapped as littoral rainforest or coastal wetland, **and** that land is reserved (not acquired) under the NPW Act, **and** the activity is consistent with the adopted plan of management (s 2.7(6) of the Resilience and Hazards SEPP), **or**
- ☐ it is on land mapped as littoral rainforest or coastal wetland, **and** the activity is routine maintenance with adverse effects restricted to the minimum possible (s 2.7(4) of Transport and Infrastructure SEPP), **or**
- ☐ it is coastal protection works by a public authority and is either identified in a coastal management program, or is beach nourishment, temporary placement of sandbags or routine maintenance and repair of existing coastal protection works (s 2.16(2)(a) of Resilience and Hazards SEPP).

☒ The activity is not declared to be exempt development under an environmental planning instrument or fails to fully meet the requirements for exempt development.

The TISEPP includes provisions, which enable the proposal to be undertaken without development consent, therefore the works can be assessed under Division 5.1 of the EP&A Act.

Under section 2.126(6) of TISEPP, development for sewage reticulation systems may be carried out without consent on any land in the prescribed circumstances. These circumstances include where the development is carried out by or on behalf of a public authority. Sydney Water is a public authority. However, Section 2.126(8) of the TISEPP permits development for sewage reticulation systems on land reserved under the NPW Act only if the development is authorised by or under that Act. NPWS has provided in-principle support for the granting of the necessary authorisation under Part 12 of the NPW Act for the component through Kemps Creek Nature Reserve.

3.2.2 Strategic plans

Is the activity proposed on land covered by a local strategic planning statement, regional strategic plan or district strategic plan made under Division 3.1 of the Act?

- ☐ No
- ☒ Yes

Greater Sydney Region Plan

The Greater Sydney Region Plan – A Metropolis of Three Cities (Greater Sydney Commission, 2018) is a long-term strategic plan for the Greater Sydney area. The plan focuses on developing a more liveable, productive, and sustainable city by dividing the metropolitan area into three interconnected cities: the Western Parkland City, the Central River City, and the Eastern Harbour City.

The Plan sets a 40-year vision (to 2056) and establishes a 20-year plan to manage population growth and change for Greater Sydney in the context of social, economic and environmental matters. It aims to create new jobs, provide more housing choices, improve transport connectivity, and enhance the natural and built environment. The Plan is structured around the following key strategies:

- **infrastructure and collaboration** – investing in critical infrastructure, including water and wastewater, energy and digital infrastructure, and working with other levels of government, the private sector, and the community to ensure that development is sustainable and aligned with community needs and values
- **liveability** – planning for people to provide better access to housing, transport, and employment as well as social, recreational, cultural and creative opportunities
- **productivity** – rebalancing opportunities for all residents in the Greater Sydney region to have greater access to jobs, shops and services and moving away from a monocentric city model to a polycentric region
- **sustainability** – managing Greater Sydney's waterways, biodiversity and bushland, rural lands and its connected green spaces and corridors to promote sustainability and increase resilience.

The project directly supports the first key strategy area by providing wastewater infrastructure to support growth. It also supports the other key strategies by improving and expanding wastewater servicing to enhance liveability for current and future populations, enables development and greater productivity opportunities, and improves sustainability of the region by treating wastewater to a high quality for release into waterways across Western Sydney.

The proposal is designed to avoid impacting biodiversity and biodiversity corridors in Kemps Creek Nature Reserve. This is consistent with the sustainability strategy

Liverpool Local Strategic Planning Statement

The Liverpool Local Strategic Planning Statement (LSPS) outlines a vision for the future of land use within the Liverpool City Council local government area (LGA), focusing on sustainability, liveability, and growth. The LSPS identifies key directions, such as promoting sustainable development, enhancing community infrastructure, supporting economic development, and preserving the natural environment. The LSPS aims to provide a framework for future development and guide decision-making to ensure continued growth and prosperity within the LGA while preserving its unique character and natural assets.

Liverpool LSPS contains a number of planning priorities that relate to infrastructure and aligning with growth while being sustainable and protecting the natural environment. In particular, planning priority 15 aims for Liverpool to be a green, resilient and water-sensitive city. The proposal would support this priority, by transferring wastewater from the surrounding area to the AWRC for treatment. The wastewater would then be treated to a high quality suitable for a range of potential recycled water uses and for release into local waterways.

Additionally, given the proposal would be located below ground and within land reserved under the NPW Act, it is unlikely to affect Liverpool City Council's ability to implement any potential future land use plans.

3.3 Other relevant NSW legislation

3.3.1 Coal Mine Subsidence Compensation Act 2017

The proposal is not located near any active coal mines or within a mine subsidence district.

3.3.2 Fisheries Management Act 1994

The proposal has been designed to avoid waterways and waterbodies by underboring Kemps Creek and therefore, would not impact any key fish habitat. The proposal does not involve any dredging or reclamation, obstruction of fish passage or harm to marine vegetation.

3.3.3 Heritage Act 1977

No State heritage or other matters protected under the *Heritage Act 1977* are located within or in the vicinity of the proposal.

3.3.4 State Environmental Planning Policy (Precincts—Western Parkland City) 2021

The Western Parkland City SEPP coordinates the release of land for residential, employment and other urban development, in the Western Parkland City area. Chapter 3 applies to growth centres, including the South West Growth Area (SWGA) in which the proposal is located.

The proposal is located within the SWGA and is subject to the conditions of the Biodiversity Certification Order (BCO) of the former *State Environmental Planning Policy (Sydney Region Growth Centres) 2006*. This BCO was established under the repealed *Threatened Species Conservation Act 1995*, however remains in force under transitional arrangements of the *Biodiversity Conservation Act 2016*. The provisions of the former *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* were in part replaced by the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021*). The BCO establishes certified areas in which developments do not need to undertake assessment of impacts on threatened species, populations and ecological communities, or their habitats that would normally be required by the *Environmental Planning and Assessment Act 1979*. The BCO also identifies non-certified areas where impacts to existing native vegetation (as defined in the BCO) must be assessed and offset in accordance with the BCO.

Section 3.24 of the Western Parkland City SEPP relates to public utility undertakings (such as construction and operation of a wastewater pipeline) and clearing of native vegetation within the subject area of a BCO. Section 3.24(2) establishes that a public authority must not clear native vegetation within the subject area of a BCO unless notice has been made to DPE. Consideration of any response received within 21 days of the notice is then required.

The proposal is located on non-certified land. However, no native vegetation would be cleared and notified to DPE in accordance with section 3.24 is not required.

Conditions 7 and 8 of the BCO require offsets to be provided for clearing of existing native vegetation (ENV) within non-certified areas at a ratio of up to 3:1. Condition 12 requires clearing of ENV in areas mapped under this condition to be carried out under a plan of management or with DPE approval. The proposal would install pipes below land subject to condition 12 (Figure 2). However, as no vegetation would be cleared, offsetting or approval for clearing from DPE is not required.

3.3.5 State Environmental Planning Policy (Biodiversity and Conservation) 2021

The following section describes the relevant chapters of the SEPP. Chapters that are not described below are not considered relevant to the proposal.

Chapter 4 – Koala Habitat Protection 2021

Chapter 4 of this SEPP aims to encourage the protection, conservation and management of areas of natural vegetation that provide habitat for koalas. Chapter 4 applies to the local government area of Liverpool, however subsection 4.4 (3)(a) provides that the Chapter does not apply to land dedicated or reserved under the NPW Act. Additionally, subsection 4.4 (3)(c) provides that the Chapter does not apply to land on which biodiversity certification has been conferred and is in force. As such, Chapter 4 of this SEPP is not applicable to the proposal. Nevertheless, the proposal would not involve vegetation clearing or disturbance of potential koala habitat.

Chapter 6 – Water Catchments

Chapter 6 of this SEPP provides development controls for the major catchments in the greater Sydney region, applying to land in the Sydney Drinking Water, Sydney Harbour, Georges River and Hawkesbury-Nepean catchments. The proposal is located on land within the Hawkesbury-Nepean catchment.

The development controls of Chapter 6 apply to development requiring consent. While the proposal does not require consent, Section 171A of the Environmental Planning and Assessment Regulation 2021 requires a determining authority to take into account the matters that must be considered by a consent authority. Specifically, the matters contained in sections 6.6, 6.7, 6.8, and 6.9 must be taken into account. A summary of the matters is provided below.

Section 6.6 Water quality and quantity

The proposal would involve trenchless construction and would have a neutral effect on the quality of water entering a waterway, as no ground disturbance or other activity that could potentially adversely (or beneficially) affect water quality would occur near a waterway. The proposal has the potential to encounter groundwater. Groundwater volumes likely to be encountered were estimated based on recorded groundwater levels in the area. Potential drawdown was subsequently calculated and found that no high value groundwater dependent ecosystems would be impacted. Groundwater encountered during works would be managed to minimise potential impacts to existing water quality.

Section 6.7 Aquatic ecology

As described above, the proposal has the potential to encounter groundwater and result in a drawdown of the existing groundwater levels. However, the potential impacts of this are anticipated to be minor and would not affect high value groundwater dependent ecosystems. No other potential impacts to aquatic ecology are expected.

Section 6.8 Flooding

The proposal would be below ground and accordingly would not affect periodic flooding events that benefit wetlands and other riverine ecosystems. Additionally, as the proposal would be below ground, it would not affect existing flood patterns and behaviour, and it would not result in elevated pollutant levels during a flood.

Section 6.9 Recreation and public access

The proposal would not impact, or restrict the use of, recreational land uses within the Hawkesbury-Nepean catchment. The proposal also would not affect public access to waterbodies or aquatic environments.

3.3.6 *Marine Estate Management Act 2014*

N/A

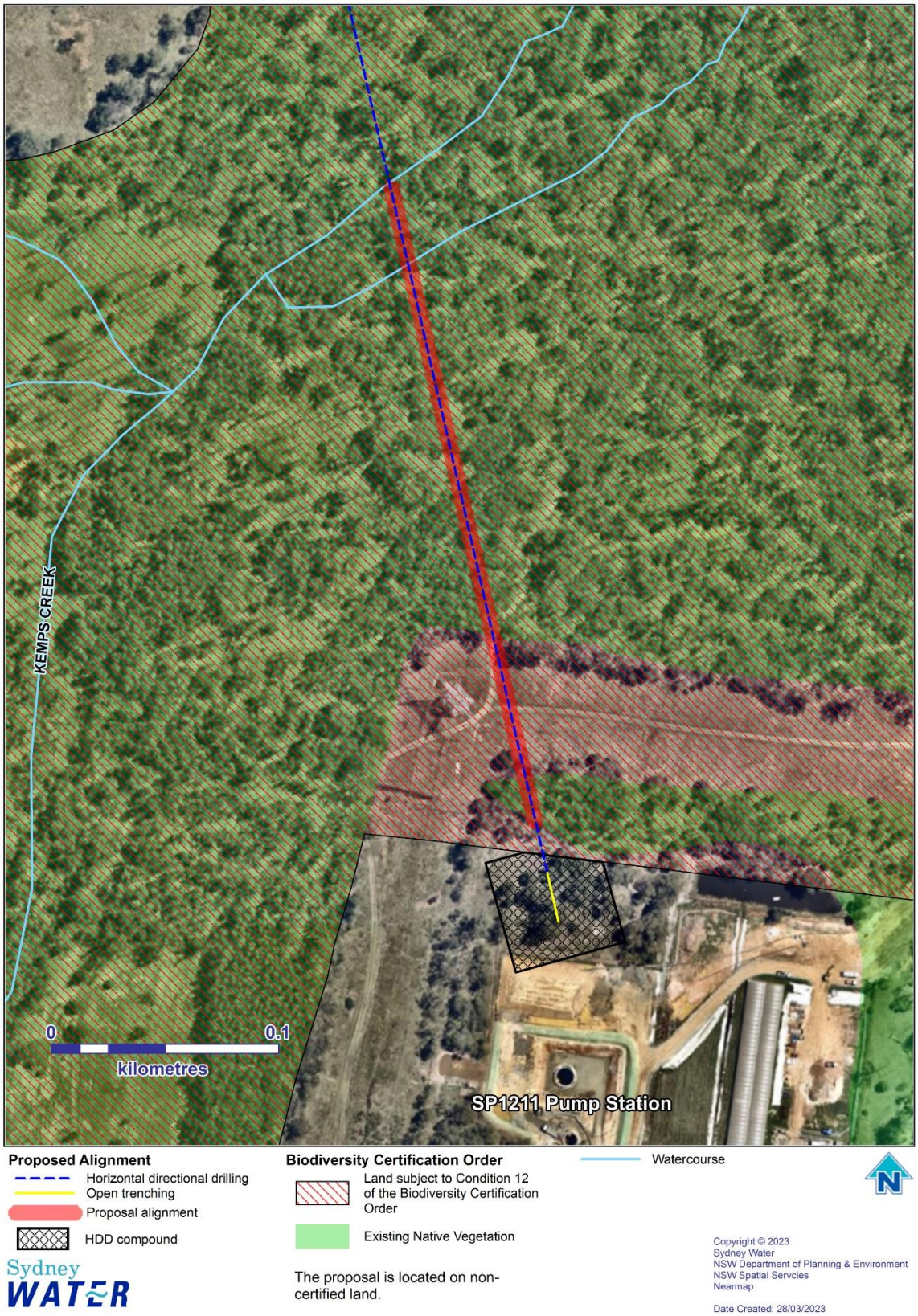

Figure 2 Biodiversity Certification Order constraints map

3.4 Does Commonwealth legislation apply?

3.4.1 Environment Protection and Biodiversity Conservation Act 1999

☐ The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) applies as the activity is on land that contains the following, or the activity may affect:

☒ The EPBC Act does not apply as the activity will not affect any of the following:

- world heritage or national heritage values of a place on the World Heritage List or National Heritage List
- the ecology of a Ramsar wetland
- nationally listed threatened species and ecological communities or listed migratory species.

As discussed in section 3.1.3, tree roots are unlikely to be impacted by the proposal and impact to threatened ecological communities is not expected.

The proposal is not likely to have a significant impact on a matter of national environmental significance and has accordingly not been referred.

3.5 Consistency with NPWS policy

Policy name	How proposal is consistent
No smoking in parks policy	No smoking is permitted in the park.
Neighbour relations policy	Sydney Water would consult with the local community in accordance with Sydney Water policy and guidelines. This would be consistent with the communication requirements of the neighbour relations policy.
Vehicle access policy, and walking tracks policy	No access to the park during operation is required. The park would be accessed during the HDD to monitor for frac-out. Sydney Water's contractor would follow NPWS access requirements.

3.6 Summary of licences and approvals

3.6.1 Approval under the National Parks and Wildlife Act

Brief description of the type of approval sought
Sydney Water is seeking approval from NPWS under Division 5.1 of the EP&A Act for the proposal. Sydney Water is a determining authority for its activities under Part 5 of the EP&A Act. NPWS is also a determining authority under Part 5 for proposals on land reserved under the NPW Act. In accordance with Section 2.126(8) of the TISEPP, development for the purposes of sewerage reticulation systems may be carried out by a public authority on land reserved under the NPW Act only if the development is authorised by or under that Act. NPWS has provided in-principle support for the granting of the necessary authorisation under Part 12 of the NPW Act for the component through Kemps Creek Nature Reserve.

3.6.2 Other approvals

N/A

3.6.3 Publication triggers

The REF must be published following determination if the activity requires an approval or permit identified in section 171(4) of the EP&A Regs before it may be carried out. These triggers are summarised below in relation to the proposed activity.

Triggers for publication of the Review of Environmental Factors

Permit or approval	Applicable?
Environmental Planning and Assessment Regulation 2021, section 171(4)(1) – the REF must be publishing on the determining authority's website or the NSW planning portal if the activity has a capital investment value of more than $5 million	Yes
Fisheries Management Act, sections 144, 201, 205 or 219	N/A
Heritage Act, section 57 (commonly known as a section 60)	N/A
National Parks and Wildlife Act, section 90 (AHIP)	N/A (refer to section 8.3.1)
Protection of the Environment Operations Act 1997, sections 47–49 or 122	N/A

4. Consultation – general

4.1 Consultation required under Transport and Infrastructure State Environmental Planning Policy

Consultation with the following authorities is required as the proposal will affect the items ticked below.

4.1.1 Local Council (sections 2.10, 2.11, 2.12 and 2.14)

☐ local council infrastructure or services (such as stormwater, sewer, roads and footpaths)

☐ heritage items listed under the local environmental plan (LEP)

☐ flood patterns on flood-liable land

☐ land within the mapped coastal vulnerability area and the activity is inconsistent with a certified coastal management program for the land.

The proposed section of pipe would be at a depth of 15-20 m below ground and would not change flood patterns.

4.1.2 National park or other C1-zoned land (sections 2.15(2)(a) and 2.15(2)(b))

☒ land zoned C1 (formerly E1) or on/adjacent to land reserved or acquired under the NPW Act

Outcomes of consultation with NPWS:

Sydney Water consulted with National Parks and Wildlife Service (NPWS) about the proposal on 19/08/2022. NPWS responded on 31 January 2023 and stated that a REF is required to be submitted for NPWS approval (as the determining authority for activities within land administered under the NPW Act).

Ongoing consultation would be undertaken with NPWS regarding the proposal.

4.1.3 Roads or maritime (section 2.15(2)(c) or Schedule 3)

Is the activity:

☐ a fixed or floating structure in navigable waters

☐ traffic-generating development on main roads?

If relevant, provide details of the consultation with Transport for NSW.

4.1.4 Siding Spring Observatory (section 2.15(2)(d))

☐ increase the amount of artificial light in the dark night sky within 200 kilometres of the Siding Spring Observatory

If relevant, provide details of the consultation with the Director of the Observatory.

4.1.5 Defence communications buffer (section 2.15(2)(e))

☐ located within the buffer around the defence communications facility near Morundah as mapped under the Lockhart, Narrandera or Urana LEPs

If relevant, provide details of the consultation with the Secretary of the Department of Defence.

4.1.6 Mine subsidence area (section 2.15(2)(f))

☐ land in a mine subsidence district within the meaning of the Coal Mine Subsidence Compensation Act 2017.

If relevant, provide details of the consultation with the Subsidence Advisory NSW.

4.2 Consultation requirements under National Parks and Wildlife Act for leases and licences

If the activity requires a lease or licence under s 151 or s 151H of the NPW Act, indicate if it requires:

☐ public consultation under s 151F

☐ referral to the NPW Advisory Council or another advisory committee under s 151G.

4.3 Targeted consultation

4.3.1 Adjacent landowners

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

Sydney Water will consult with all landowners impacted by the project, including adjacent landowners during the detailed design process.

In accordance with the above guidelines, work notification letters would be sent to nearby residences prior to construction.

All impacted landowners and nearby residents will be consulted regarding the access, construction activities, easements, and infrastructure on private properties.

Ongoing consultation would be undertaken during construction.

4.3.2 Wider community consultation and/or notification of works

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

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

The nature, scale and extent of the proposal's potential impact has been evaluated in this REF. If the works impact the community in some way, Sydney Water would consult with affected groups in a variety of ways and through different stages of a project. This includes engaging the broader community and stakeholders during plan or strategy development or before making key decisions.

Sydney Water would also provide local councils with reasonable notice when we would like to commence works, regardless of the need for development consent. Local councils would be consulted about public safety issues, the placement of any temporary site sheds or laydown areas on council land, or full or partial road closures of council managed roadways.

Additional engagement will be conducted with nearby residents impacted by construction activities.

4.3.3 Interest groups and/or notification

The proposal is located within the Liverpool City Council LGA. Sydney Water met with Liverpool City Council on 16 September 2022 to provide an overview of the proposal and seek any feedback or relevant information. No matters regarding the proposal within NPWS land were raised.

No interest groups have been identified by Sydney Water for the proposal within Kemps Creek Nature Reserve, as the proposal would not impact any values or uses of the park.

5. Consultation – Aboriginal communities

5.1 Native title notification requirements

1. Is the land subject to an Indigenous land use agreement (ILUA)?

☒ No (Go to Question 2)

☐ Yes

2. Has native title been **extinguished**?

☒ No or unclear (Go to Question 3)

☐ Yes

3. Has there been a determination of native title applicable to the land or is there a native title claim pending (check the National Native Title Tribunal website)?

☒ No (Go to Question 4)

☐ Yes (Record the details of the native title claimant/holder as you may need to consult with them regarding the proposed activity – go to Question 4)

If relevant, provide details of the native title claimant/holder.

4. If native title is not confirmed as extinguished, is the activity occurring on land reserved as park on or before 23 December 1996 **and** is an act in accordance with the purpose of reservation **and**
    a. is either a 'public work' as per subdivision 24J of the Native Title Act (e.g. a building or other structure that is fixed to the landscape, a road or bridge, a well or a bore, or involves major earthworks)
    or
    b. involves the grant of a lease?

☒ No (Go to Question 5)

☐ Yes (Notify any native title holders / native title claimants / NTS Corp regarding the proposed activity and record the outcomes of that notification)

If relevant, provide details of the consultation that has occurred.

If you answer 'Yes' to this question, do not answer Question 5; insert N/A for that question and proceed to Section 5.2.

5. If native title is not confirmed as extinguished and the circumstances of Question 4 do not otherwise apply, is the activity either:
    a. a facility for service to the public (as defined in subdivision 24K of the Native Title Act)
    or
    b. a low-level activity (as defined in subdivision 24L of the Native Title Act)?

☐ No (Notify any native title holders / native title claimants / NTS Corp regarding the proposed activity and record the outcomes of that notification)

☒ Yes, the proposal is a facility for service to the public. (The notification requirements under the Native Title Act do not apply but consultation with native title holders/claimants may still be required under other policies to consult with Aboriginal people. Proceed to Sections 5.2 and 5.3)

5.2 Parks under other joint management arrangements

Is the park's management subject to another joint management arrangement such as a memorandum of understanding?

☒ No (Go to Section 5.3)

☐ Yes (Discuss the proposed activity with the relevant advisory committee or consultative group)

5.3 Other parks

The Aboriginal community was consulted about the entire Kemps Creek Pressure Main alignment as part of the preparation of the Aboriginal Cultural Heritage Assessment Report (ACHAR). The study area for the ACHAR included the sections of bored mains that are assessed in this REF.

The ACHAR was prepared in accordance with the Heritage NSW *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*. Consultation with Aboriginal people was undertaken in accordance with the Heritage NSW *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* and the requirements of Clause 60 of the *National Parks and Wildlife Regulation 2019*.

Twenty-seven community individuals and groups registered their interest in the project. Five stakeholders provided responses to the draft ACHAR. No objections to the ACHAR were raised, including the bored section through the Kemps Creek Nature Reserve.

6. Proposed activity (or activities)

6.1 Location of activity

Description of location	Kemps Creek Nature Reserve is located in south-west Sydney in the suburb of Cecil Park, about 12 km west of Liverpool. The area subject to the proposal is within the south-western part of the Kemps Creek Nature Reserve in the suburbs of Austral and Kemps Creek
Site commonly known as If applicable	N/A
Park name Lands reserved under NPW Act	Kemps Creek Nature Reserve
Other tenures Include lands acquired under Part 11 of the NPW Act	N/A
Lot/DP If available	Lot 11 DP806494
Street address If available	Between Devonshire Road, Kemps Creek NSW 2178 and Gurner Avenue, Austral, NSW 2179
Site reference	

	Easting	Northing	MGA Zone
South proposal extent	296484	6246038	56
North proposal extent	296419	6246324	56

6.2 Description of the proposed activity

6.2.1 The proposed activity: pre-construction, construction, operation and remediation

The dual pressure mains would be constructed using horizontal directional drilling (HDD). Refer to Section 6.2.3 for more details. The launch and receival locations would be located outside the park and will be assessed under a separate REF.

No pre-construction or restoration activities are proposed within the park.

6.2.2 The activity footprint (size of the area of impact)

About 300 m of dual mains would be constructed using HDD at a depth of around 15-20 m below ground. The proposal would not involve any activities above ground within the park.

6.2.3 Proposed construction methods, materials and equipment

HDD allows a pipe to be installed underground without impacting sensitive surface environments such as waterways, vegetation, or items of heritage significance. Figure 3 shows a typical setup for HDD construction, including the excavated pits at either end, the path of the bore beneath the sensitive environment, and the placement of the pipe that is pulled through.

Construction by HDD involves:

- string pipe sections along the construction corridor (assessed under a separate REF)
- prepare launch and receival locations (assessed under a separate REF)
- drill pipe alignments and pull pipes through the alignments.

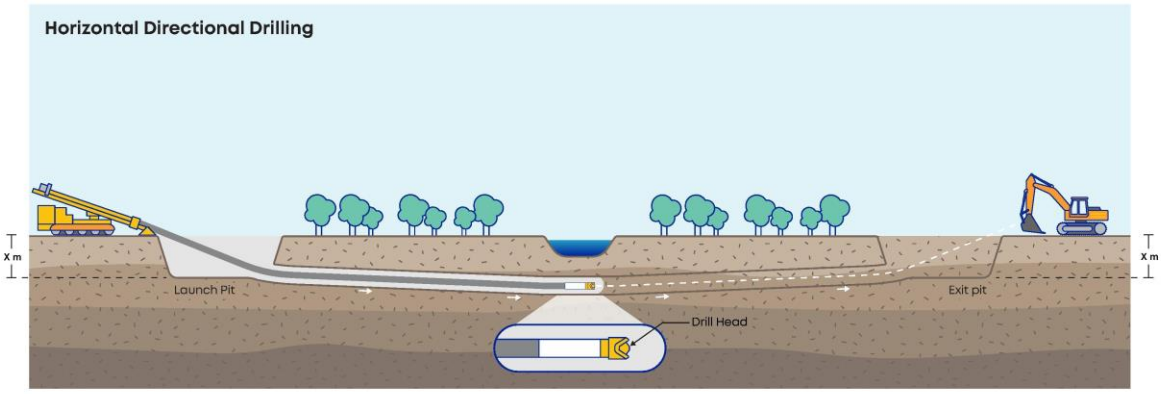

Figure 3 HDD method

The launch pit would be located on private property at the corner of Floribunda Road and Grant Close and the receival pit would be located at the Sydney Water SP1211 pumping station site.

The HDD pipes would be maintenance free, meaning that no surface or above ground structures are necessary for the length of the HDD and no access during operation is necessary. Sydney Water designs pipes to the relevant standards and specifications, including selection of durable materials which are highly unlikely to fail. The design life of these pipes is about 100 years. However, it is likely that they would continue to be in working order beyond this time. In the unlikely event that a failure or other issue occurs with the HDD pipes, a new pipe would be constructed via the same methodology.

6.2.4 Receival, storage and on-site management for materials used in construction

As the proposal does not involve any above-ground activities, no storage or on-site management of materials within the park are required during construction.

6.2.5 Earthworks or site clearing including extent of vegetation to be removed

As the proposal does not involve any above-ground activities, no ground disturbance or excavation is required for the construction of the proposal within the park.

6.2.6 Environmental safeguards and mitigation measures

Environmental safeguards and mitigation measures are outlined in Section 9 of the REF.

6.2.7 Sustainability measures – including choice of materials and water/energy efficiency

The proposal would help to meet the needs of future generations by providing a reliable wastewater service to an area of future growth. Energy efficiency was considered in the proposal design. Deeper pipes require a greater pumping effort and higher energy use. The depth of the pipes was selected to avoid the need for larger pumps and to improve energy efficiency.

Pipe materials would be selected that are fit-for-purpose, including selection of durable materials that reduce the need to replace assets. The proposal has a design life of 100 years. Waste materials generated by the proposal would be managed with consideration of the waste hierarchy: avoid, reuse, recycle, and dispose. Sydney Water maintains a material stockpile dashboard that provides Sydney Water and contractors with real-time civil stockpile information of excess material available for reuse between projects. The dashboard also allows projects to post wanted materials, allowing different project teams to connect and share reusable materials, minimising waste.

Installing the pressure mains using HDD removes the need for access to the park for inspections or maintenance during operation. This minimises future impacts to the park.

6.2.8 Construction timetable and staging and hours of operation

Construction is expected to commence early 2024 and be completed in about six months.

Most work would be scheduled to occur during standard daytime hours:

- 7 am to 6 pm, Monday to Friday
- 8 am to 1 pm, Saturdays.

Some out of hours work may be necessary for certain activities such as work in roads or delivery of oversize equipment. If out of hours work is required, the Contractor would request permission from Sydney Water to undertake work outside standard hours and consultation would be undertaken with neighbouring stakeholders. Neighbouring stakeholders would be informed of the timing and duration of the work likely to affect their locality before it begins.

7. Reasons for the activity and consideration of alternatives

7.1 Objectives and reasons for the proposal

The project objectives are to:

- provide commissioning flows to the AWRC
- service growth in the SWGA
- provide a resilient and effective wastewater system to meet the needs of future populations.

The project is needed to transfer wastewater from the Kemps Creek catchment to the AWRC. This catchment includes suburbs of Kemps Creek, Austral, East Leppington, Leppington North, Western Sydney Parklands and parts of Rossmore and Catherine Fields North. The project would cater for growth in the Western Parkland City, particularly for the SWGA adjoining the Western Sydney Aerotropolis.

The SWGA is an area designated by the Department of Planning and Environment (DPE) for future population growth by unlocking land for housing and associated infrastructure. Sydney Water expects to see substantial growth by 2056 increasing from 2,300 dwellings in 2022 to around 38,000 dwellings by 2056.

Additionally, the AWRC would need to receive a certain volume of wastewater to become operational. The project would transfer this wastewater and provide commissioning flows to the AWRC.

7.2 Consideration of alternatives

An options assessment process informed the design of the project. Several servicing options were considered by Sydney Water to determine their feasibility and ultimately select the most appropriate option. Options were considered against several criteria including their ability to deliver the project objectives, technical feasibility (ie whether it can be designed and built), potential environmental impacts, social and community outcomes, and cost.

Two options were identified for the section of the pressure mains alignment at the southern part of the park (Figure 4):

- Option 1 – follows Gurner Avenue and avoids the Kemps Creek Nature Reserve
- Option 2 – trenchless construction through the park at various depths.

An alignment on the eastern side of the Kemps Creek Nature Reserve was not considered due to the likely high impact to threatened vegetation communities in Western Sydney Parklands.

Both options were evaluated against the proposal criteria which is summarised below.

Evaluation of options against proposal criteria

Criteria	Option 1	Option 2
Project objectives	✓	✓
Technical feasibility	✗	✓
Environmental impact	✓	✓
Social and community	✓	✓

Criteria	Option 1	Option 2
Cost	✖	✓

The Option 1 alignment gains elevation as it moves west from Kemps Creek. This would require a 45 m high barometric loop at the AWRC. The barometric loop is a tall, above ground section of pipe needed to artificially raise the high point of the pressure mains at the AWRC to avoid the system draining by gravity from the high point in the southern part of the project. Gravity inflows at the AWRC would be uncontrolled and would prevent the AWRC from operating efficiently. A barometric loop higher than 20 m is not feasible due to the supporting structure required. The pumping requirement and infrastructure to support the pumps at SP1211 for Option 1 are not feasible and this option was not considered further.

Option 2 maintains the alignment at a lower elevation and reduces the height of the barometric loop at the AWRC to less than 20 m. Additionally, as the elevation change is minimised, the pumping effort required is decreased. This reduces the size of the pumps at SP1211 and the energy needed to operate the dual pressure mains. Ongoing operational costs would also be lower due to the reduced energy consumption as well as reduced maintenance requirements of the trenchless section. This option is preferred but required consideration of pipe depth to optimise operational performance and consider NPWS land.

Refinement of HDD section from SP1211 to Floribunda Road

The length of the underbore between SP1211 and Floribunda Road is about 800 m. The launch pit would likely be at Floribunda Road and the receival pit at SP1211. The following depths were considered for the pressure mains:

- 15-20 m deep. The pipes would be in NPWS land (gazetted to 20m)
- >20 m deep. This option would construct most of the pipes below NPWS land. A short section of the alignment would be within NPWS land as the bore must rise through NPWS land to reach the receival pit at SP1211.
- >20 m deep. This option would avoid all NPWS land. However, this would require the receival pit to be located about 150 m further south of SP1211. This would require an additional 600 m of pipe.

Installing the pressure mains at depths greater than 20 m is not feasible due to:

- large pumps would be required to pump wastewater from depths below 20 m. These pumps would not comply with Sydney Water standards and would have a high energy consumption
- the high voltage infrastructure to power the pumps would be very challenging to install for pumps located below ground
- substantial increase in maintenance effort due to increased siltation in the pipes.

In addition, the option that would avoid NPWS land would require an extra 600 m of pipe. This would require a complicated pipe arrangement at SP1211 and potentially restrict future work at SP1211.

Sydney Water's preferred option is to construct the dual pipes at a depth of 15-20 m. This reduces the pumping requirement, allows the pumps to run more efficiently and ensures the required system performance.

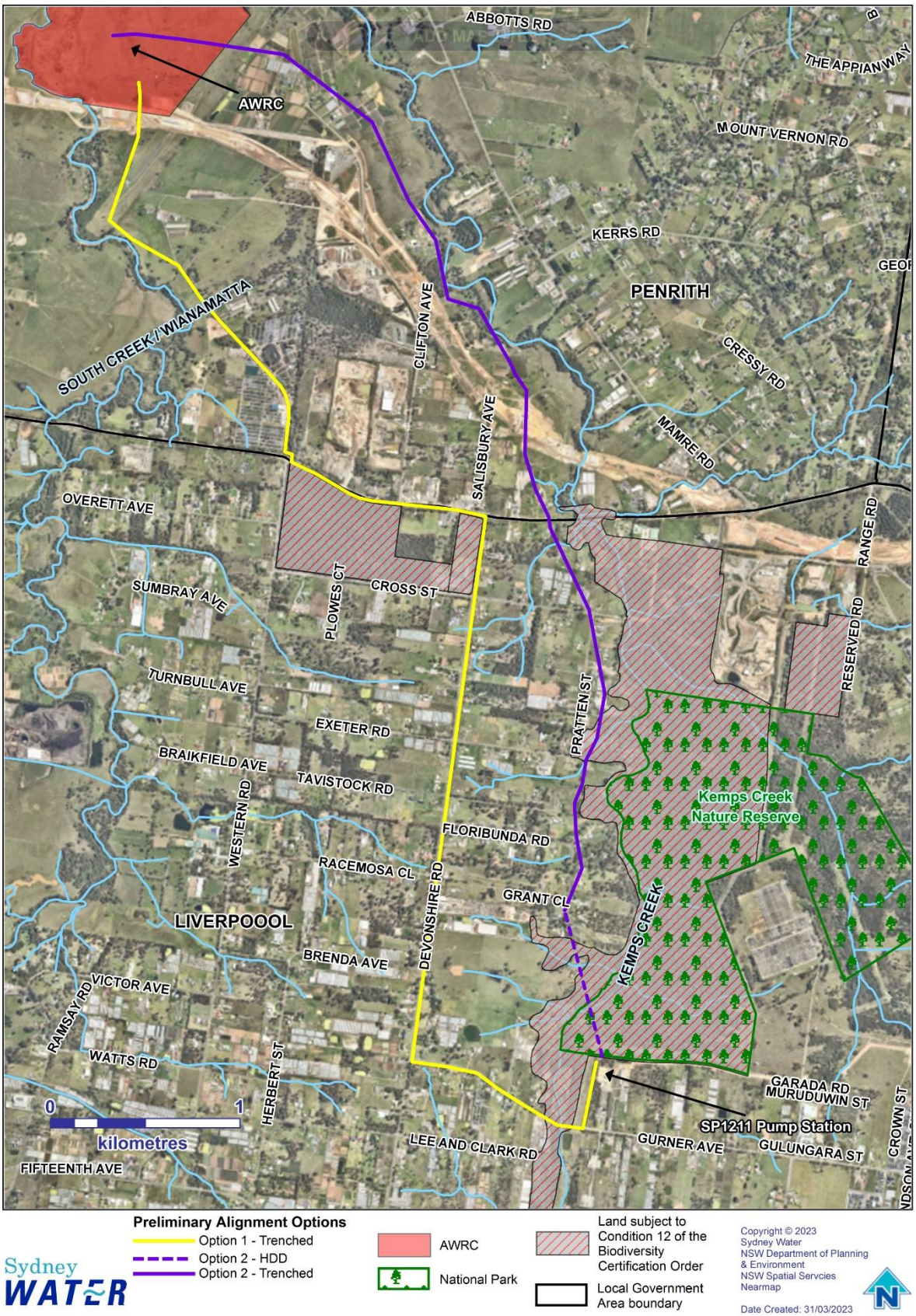

Figure 4 Option 1 and 2

7.3 Justification for preferred option

The preferred option was selected as it meets the objectives outlined in Section 7.1 and was found to be the most suitable option following evaluation against the criteria presented in Section 7.2.

The trenchless alignment within Kemps Creek Nature Reserve would result in better operational performance, reducing the size of supporting infrastructure required and energy consumption, while also minimising and avoiding impacts to environmentally sensitive environments. The preferred option would also reduce ongoing maintenance requirements. Refinement of the preferred option further optimised the operational performance of the dual pressure mains, reducing energy consumption and maintenance requirements.

7.4 Site suitability

The NPWS site suitability matrix (Figure 5) was applied to the proposed alignment. NPWS's *Sustainability assessment criteria for visitor use and tourism in New South Wales national parks* was used to inform the analysis of site character and landscape context.

Site character	The site characteristics along the pipeline alignment in the park include: • native vegetation • Kemps Creek • Transgrid electricity easement. The site character along the alignment is largely unmodified.
Landscape context	The landscape context of the park is largely unmodified natural and cultural heritage condition. Vegetation, with the exception of the Transgrid easement, is intact and consists of five threatened ecological communities. The landscape surrounding the park has been highly modified, mainly for agriculture, and will be further modified for residential development. The park is currently closed due to the presence of Phytophthora. Access is limited to NPWS and easement management activities. The park has potential to have high social value due to its high quality vegetation.
Application of site suitability matrix	The above ground alignment is classed as 'less suitable for use' (Figure 5). However, the dual pressure mains would be bored under the park to avoid any surface impact. The dual pressure mains would not require above ground infrastructure in the park. While the mains would be located in unmodified natural ground, they would not impact the site character or landscape context of park. The matrix is not directly applicable to the proposal and the proposed location of the pressure mains is considered suitable.
Strategic site assessment (if required by the matrix)	A strategic site assessment is not required because the pressure mains would be below ground and there would be no impact to the surface of the park.

The proposal is subject to a lease or licence under s. 151 of the NPW Act, subject to reasonable terms.

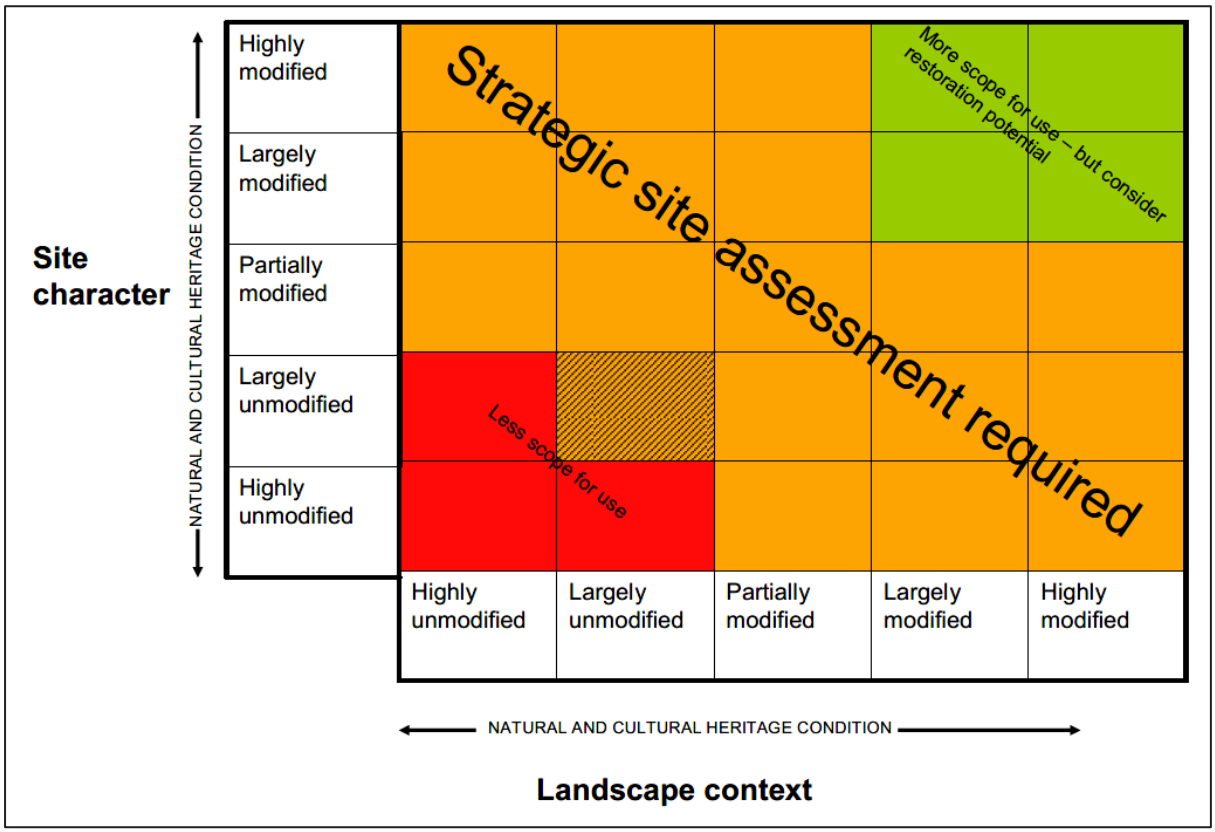

Figure 5 NPWS site suitability matrix

8. Description of the existing environment

8.1 Overview of the project area

The proposal is located within Kemps Creek Nature Reserve in the suburb of Cecil Park. Kemps Creek Nature Reserve covers 197 hectares and is part of the Western Sydney Parklands. The lands to the south of the park are used for mixed purposes, including market gardening and horticultural enterprises, and are being progressively developed for low-density residential housing.

The park contains vegetation communities, ecosystems and habitats once widespread within Western Sydney and is a good example of the southern Wianamatta Shale vegetation communities, particularly those associated with low-lying creek habitats.

Kemps Creek Forest, which covers the Kemps Creek Nature Reserve, is listed as a local heritage item under the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021.*

The primary purpose of the Kemps Creek Nature Reserve is to conserve ecosystems, species, communities or natural phenomena. Due to its strong focus on conservation values, there are no visitor facilities provided in Kemps Creek Nature Reserve. There is no public road access into the park. All management trails in the park are used for authorised purposes such as control of introduced species, fire management, research and managing non-NPWS assets.

The park is fenced around the boundary and boundary gates are installed in a number of locations to assist with managing access to the park and to minimise rubbish dumping.

The park is currently closed to the public due to the risk of phytophthora spread. This soil-borne pathogen is known to be present and is a threat to native vegetation within the park.

8.2 Natural values

8.2.1 Geology, geomorphology and topography

The topography of the area generally consists of gently sloping undulating hills with a high point towards the southern end of the project. Elevations range between around 52 m to 54 m Australian Height Datum (AHD).

The geology is predominantly characterised by alluvial floodplain deposits. The alluvial floodplain deposits have been formed as part of the Cenozoic Sedimentary Province, consisting of fine-grained sand, silt and clay. Geotechnical investigations identified that at the depth of HDD, bedrock would be encountered consisting of the Bringelly Shale geological unit. At shallower depths (where the HDD would pass through) topsoil transitions to alluvium associated with quaternary floodplain deposits which generally becomes thicker closer to Kemps Creek. This layer is up to 6 m thick and transitions to residual soils and extremely weathered material of the Bringelly Shale unit before reaching bedrock.

8.2.2 Soil types and properties (including contamination)

The Penrith 1:100,000 Soil Landscapes Series Sheet 9030 (Hazelton, et al., 1989) indicates that South Creek soil landscape groups are present at the proposal. The South Creek soil landscape is described as a fluvial landscape, comprised of quaternary alluvium derived from Wianamatta Group Shales and Hawkesbury Sandstone. The soils of this unit that are likely to be found on site associated with this landscape are described as ‘bright brown light to medium clay with strongly pedal structure and dense smooth-faced ped fabric’.

The main limitations noted of this soil type are flood hazards, localised high shrink swell potential, high erodibility, salinity, localised permanently high-water tables, and localised surface movement potential.

The map of salinity potential for Western Sydney (DIPNR, 2003) indicates that the proposal area has moderate salinity potential.

The proposal area does not contain acid sulfate soils (NSW Government, 2022).

A search of the NSW Environment Protection Authority (EPA) list of contaminated sites did not identify any contaminated sites in the vicinity of the Kemps Creek Nature Reserve.

8.2.3 Watercourses, waterbodies and wetlands (including their catchment values)

The proposal is located entirely within the Kemps Creek catchment. The main waterways are Kemps Creek and its tributaries. The water quality of Kemps Creek is poor due to stormwater runoff, which can contain weeds, pathogens, phosphates and other nutrients, as well as litter and industrial waste.

The proposal is located within the floodplain of Kemps Creek. For areas close to waterways, it is likely that a range of smaller and more common flooding events occur.

The proposal is not within the coastal environment and is not mapped as wetlands.

8.2.4 Coasts and estuaries

The proposal would not have any impact on coastal processes or hazards.

8.2.5 Biodiversity

Overview of terrestrial and aquatic biodiversity

The mapped vegetation types that occur in the park are all components of threatened communities listed under both state and Commonwealth legislation. The park also contains 103 native plant and 105 native animal species. The park provides valuable habitat for native animals in a landscape where suitable habitat is limited and fragmented.

The proposal is situated within the SWGA to which an order conferring biodiversity certification was made under the former State Environmental Planning Policy (Sydney Region Growth Centres) 2006.

Kemps Creek forms the western boundary of Kemps Creek Nature Reserve and the park occupies part of the floodplain of Kemps Creek. Other drainage lines also run through the park and, after heavy rain, the soils can remain waterlogged for extended periods. The soils are highly erodible, and stream bank erosion is common in these areas. In addition, the moist soil conditions and warm temperatures aid the growth and reproduction of the soil- borne pathogen, phytophthora. Phytophthora infects many plant species and may contribute to plant death where other stresses are present, such as waterlogging, drought or wildfire. It is readily dispersed in flowing water and by vehicles, animals and walkers.

Groundwater dependent ecosystems (GDEs) consist of ecological communities that are dependent, either entirely or in part, on the presence of groundwater for their health or survival. The Bureau of Meteorology’s GDE Atlas and the High Ecological Value Aquatic Ecosystems (HEVAE) high priority GDE mapping was reviewed to determine the occurrence of potential GDEs within and surrounding the proposal. The review indicates that there is potential for GDEs to occur in the southern extent in the vicinity of Kemps Creek Nature Reserve.

Areas of outstanding biodiversity value or critical habitat

The proposal is not within an area of outstanding biodiversity value.

Environmental assets of intergenerational significance (AIS)

There are no declared assets of intergenerational significance (AIS) for the Kemps Creek Nature Reserve.

Threatened ecological communities

Two threatened ecological communities (TECs) are mapped within the proposal area (Figure 6):

- Cumberland Red Gum Riverflat Forest, listed as an endangered ecological community under the BC Act. This TEC is mapped along most of the alignment.
- Cumberland Shale Plains Woodland, listed as a critically endangered ecological community under the EPBC Act. This TEC is mapped in the southern section of the alignment.

Threatened species and populations

There is one threatened plant species, *Dillwynia tenuifolia*, which is listed as vulnerable under the BC Act. Eight threatened animal species have been recorded in the park, including the Cumberland Plain Land Snail and Little Eagle (PoM, 2022).

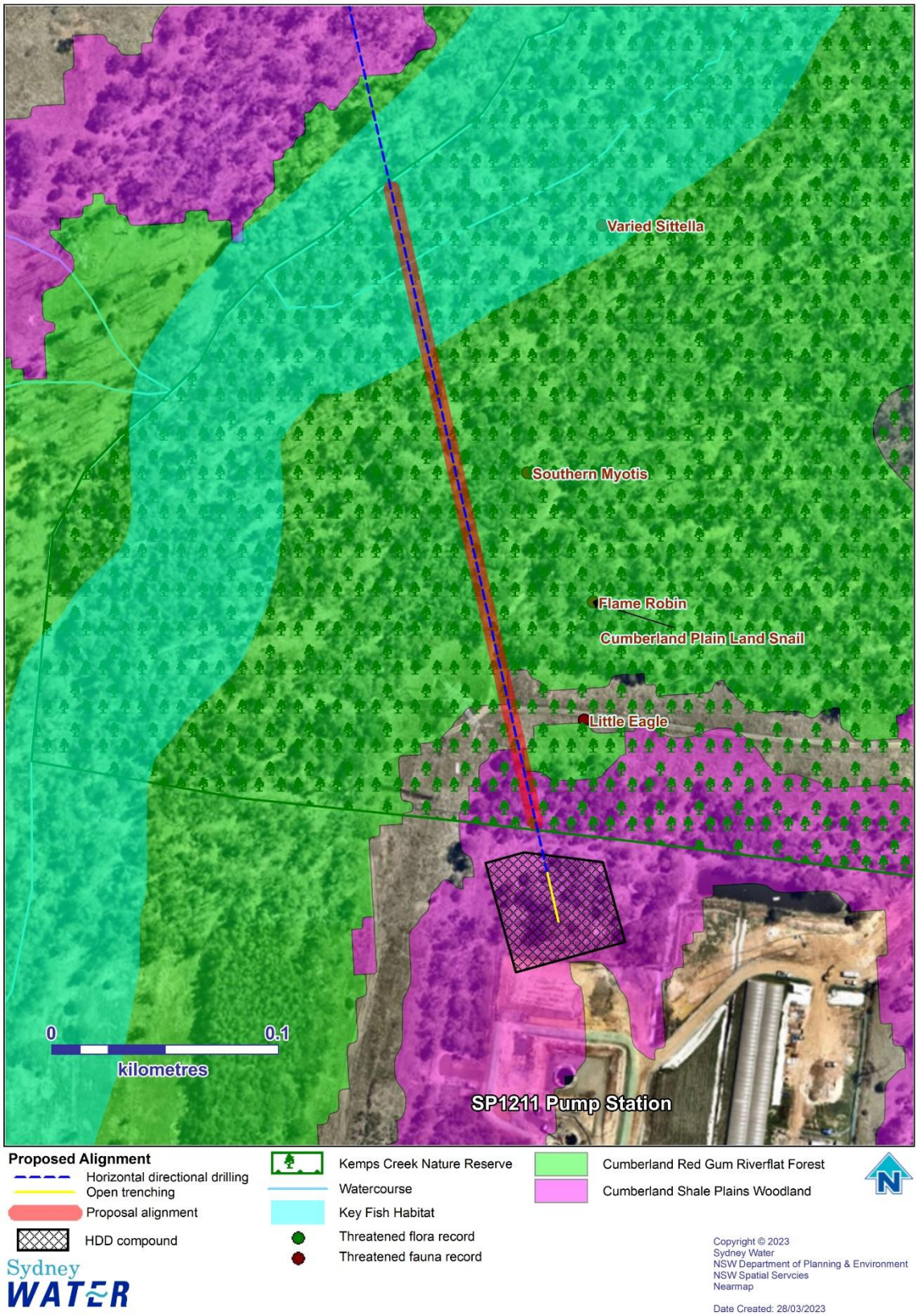

Figure 6 Biodiversity constraints map

8.3 Cultural values

8.3.1 Aboriginal cultural heritage

A search of the Aboriginal Heritage Information Management System (AHIMS) identified one Aboriginal heritage record [redacted] within 200 m of the proposal (Figure 1). This record is located [redacted] authorised by an Aboriginal Heritage Impact Permit. As the proposal would be constructed via trenchless methods, no surface or shallow sub-surface impacts would occur, and no Aboriginal cultural heritage is expected to be encountered.

8.3.2 Historic heritage values

Kemps Creek Forest, which covers the Kemps Creek Nature Reserve, is listed as a local heritage item under the State Environmental Planning Policy (Precincts – Western Parkland City) 2021. Potential impacts and mitigation measures are outlined in Section 9 of the REF.

Kemps Creek Forest is a nature reserve gazetted under the *National Parks and Wildlife Act 1974* in March 2003, covering an area of about 197 hectares. As part of the Western Sydney Parklands, it remains as one of the larger contiguous areas of remnant native vegetation in Western Sydney, before reaching the Blue Mountains to the west.

Kemps Creek and other watercourses in the area attracted European immigrants, and the first land grants were made in 1805. The area around Kemps Creek was used for farming and timber-getting by immigrants and remained sparsely populated throughout the 19th century. The area was later cleared for agricultural pursuits, including market gardening.

There are no known historic heritage features within the park.

8.4 Social values

8.4.1 Recreation values

The primary purpose of nature reserves is to conserve ecosystems, species, communities or natural phenomena. Research, educational use, nature study and enjoyment are appropriate uses where they do not conflict with conservation. Due to its strong focus on conservation values, there are no visitor facilities provided in Kemps Creek Nature Reserve. There currently is no public road access into the park.

8.4.2 Scenic and visually significant areas

Due to its strong focus on conservation values, there are no visitor facilities provided in Kemps Creek Nature Reserve.

The park is currently closed to public access due to the significant risk of phytophthora spreading further within the park or beyond the park. In the immediate future, public access will continue to be restricted with research and educational opportunities supported under defined phytophthora protocols. In the medium to long-term NPWS will investigate opportunities for controlled public access to the park in ways that mitigate the spread of phytophthora, including options for providing appropriate infrastructure that link the bushland corridor in the Western Sydney Parklands.

8.4.3 Education and scientific values

The park provides unique opportunities for research that could contribute to improved management of remnant vegetation communities and greater understanding of the impacts and control of

phytophthora in the park. NPWS will continue to encourage environmental research in the park to improve our understanding of the park's values and park management outcomes.

As the surrounding land is developed, there will be increasing pressure on green space in the area. The significant natural values of the park are promoted as part of the broader Western Sydney Parklands Plan of Management 2030.

8.4.4 Interests of external stakeholders

N/A

8.5 Matters of National Environmental Significance

A search of the EPBC Database undertaken on 22 February 2023. Nationally listed threatened and migratory species are likely to be found at the surface. However, the activity footprint is 15-20m below ground. The HDD involves drilling and ground-borne noise and vibration from the HDD are anticipated to be minimal. No matters of national environmental significance (MNES) are present at the depth of the pressure mains and no impact to MNES is anticipated.

9. Impact assessment

This part of the REF provides an analysis of all possible impacts from the proposed activity and a description of any proposed mitigation measures. The *Guidelines for Preparing a Review of Environmental Factors* provide further guidance on assessing potential impacts, their type and level and mitigation measures. All stages of the activity must be considered: pre-construction, construction, operational and restoration stages.

9.1 Physical and chemical impacts during all stages of the activity

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. impact on soil quality or land stability?	☐	N/A	N/A	N/A
Has a landslide or rockfall hazard been identified? If so, attach the risk assessment (using the Health and Safety Risk Matrix) and confirm if professional geotechnical advice has been sought on managing the risk. If the risk is assessed as high or above, a risk treatment plan must also be attached.				
2. affect a waterbody, watercourse, wetland or natural drainage system – either physically or chemically (e.g. due to runoff or pollution)?	☒	Negligible	A Dewatering Management Plan, including a groundwater extraction estimate, was prepared for the entire project. The groundwater extraction estimate involves calculating the volume of groundwater that would be dewatered during construction of the entire project, including the HDD. The estimate identified that there would be small volumes of groundwater dewatered from the launch pit (maximum extraction of 5m^3) and the receival pit (maximum extraction of 1,600m^3).	N/A

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			Groundwater seepage into the underbore is expected to be low. The proposal would not require dewatering of a large volume of groundwater and there would be minimal impact to the water table. Therefore, there would be no impact to potential GDEs. Dewatered groundwater at the launch and receival pits would be managed in accordance with a Dewatering Management Plan. Groundwater would be tested prior to release to the environment. Groundwater that does not meet the relevant water quality criteria would be disposed of offsite (e.g. as trade waste) or treated onsite.	
3. change flood or tidal regimes, or be affected by flooding?	☐	N/A	N/A	N/A
4. affect or be affected by coastal processes and coastal hazards, including those under climate change projections (e.g. sea level rise)?	☐	N/A	N/A	N/A

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures

5. involve the use, storage or transport of hazardous substances, or use or generate chemicals which may build up residues in the environment?	☒	Low	**Frac-out**
			HDD has the potential for frac-outs, which is the temporary loss of drilling fluids into the soils or nearby waterways. Geotechnical investigations identified that at the depth of HDD, bedrock would be encountered consisting of the Bringelly Shale geological unit. At shallower depths (where the HDD would pass through) topsoil transitions to alluvium associated with the quaternary floodplain deposits which generally becomes thicker closer to Kemps Creek. This layer is up to 6 m thick and transitions to residual soils and extremely weathered material of the Bringelly Shale unit before reaching bedrock.
			Sydney Water would manage the HDD to minimise the risk of frac-out in the park. However, there is a low risk that some drilling fluid (water and bentonite) could reach the surface. If a frac-out occurs in the park, it would be likely to occur in the Transgrid easement as the HDD rises towards the surface. Sydney Water would implement standard clean up procedures. These may include removing the impacted soil using hand tools or using a vacuum truck to remove the drilling fluid. The frac-out area would be restored to pre-existing condition following the clean-up.
				• HDD methods will be appropriately managed by experienced drilling contractors to ensure no impacts to the surrounding environment occurs.
				• Sydney Water will minimise the risk of frac out using the following procedure:
				  ○ Analyse the pressures on the bore head during the bore and identify the potential frac zone.
				  ○ Stop the drill head before the frac zone.
				  ○ Reduce the pressure on the drill head.
				  ○ Continue drilling once the above steps are complete.
				• Prepare Drilling Fluid Management plan to avoid impacts, including:
				  ○ contain and monitor drilling fluids at entry/exit points
				  ○ identify and manage frac-outs
				  ○ re-use and/or disposal of drilling fluids (checking waste classification).
				• Spotters will be located along the HDD alignment in the Transgrid easement to monitor for frac-outs. The contractor must:
				  ○ Notify NPWS prior to accessing Kemps Creek Nature Reserve

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			Pipe failure The pipes are designed with a high level of safety factors and are designed to withstand all external and internal loads for a minimum of 100 years of design life. Sydney Water applies additional design factors beyond those required under Australian Standards for HDD installations. The pipes would be considered maintenance free. The pipe material is polyethylene, which is resistant to corrosion and one of the most suitable materials to convey wastewater. This type of pipe accounts for normal and abnormal operating pressures and also fatigue over time. The joints would be fully welded to reduce the risk of leaks. Pipe joint welding is tested based on industry-specified quality assurance processes. The welded pipeline is pressure tested prior to and after installation, before it starts operating, in accordance with industry-specified procedures. Therefore, the likelihood of pipe failure is extremely low. Pipe failure ranges from minor leaks to pipe breakage. Leaks are very unlikely and pipe breakage is extremely rare. The pipes would be contained in bores about 1.2m in diameter. The void around the pipes would be filled with water and drilling fluid (bentonite). Some grouting may	○ Ensure spotters follow hygiene procedures to prevent the spread of phytophthora • In the event of a frac out, Sydney Water will: ○ notify NPWS of the frac out, including location, estimate volume of drilling fluid and proposed clean up procedure ○ implement clean up procedure to remove drilling fluid ○ restore impacted frac-out area.

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			be used to seal groundwater movement at the start and finish of the bores. There would be pressure sensors at SP1211 and the AWRC that can detect changes in pressure in the system during operation. As only one pipe would carry wastewater at a time wastewater can be pumped through the other pipe if needed. In the event of a failure, the pumps would be stopped remotely and the isolation valves on both sides of HDD would be closed manually. Once the failed pipe is out of service, the wastewater would be directed to the pipe that is in operation, or temporarily stored in the upstream network and/or emergency storage at the wastewater pumping station (SP1211) until it can be transferred to the pipe in operation. Pumps would restart to avoid any overflow within the upstream catchments. A catastrophic failure of the pipe would result in some wastewater being released to the space around the pipe filled with grout or bentonite. However, the grout and bentonite would solidify over time and contain wastewater released from the pipe. Wastewater is not expected to be released to the environment. Accordingly, we do not anticipate a pipe failure would result in pollution in the park via the local water table.	

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			The following actions are typical of the response to pipe failure: • sensors record drop in pressure in the system • the pumps will be stopped remotely, and Sydney Water operators will attend to the site to isolate the valves upstream and downstream of the section that has failed • suction would be used to remove as much wastewater from the pipe as possible. Suctioned wastewater is collected in scour pits, pumped to tankers and usually put back into the wastewater system at another location. The pipe condition would be determined and boring a new pipe would be required if the pipe cannot be repaired. The failed pipe would remain in situ.	
6. involve the generation or disposal of gaseous, liquid or solid wastes or emissions?	☐	N/A	N/A	N/A
7. involve the emission of dust, odours, noise, vibration or radiation?	☒	Low	The HDD would cause low levels of ground-borne noise and vibration. This is not expected to impact ground conditions or the water table.	N/A

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
			The HDD eliminates the need for vegetation clearing during construction and the need for operation/maintenance access during operation. The potential, short-term noise and vibration impacts due to the HDD are therefore justified.	

*** If yes,** check box and all columns need to be completed. If no, leave unchecked and write 'NA' in the third and fourth columns.

9.2 Biodiversity impacts during all stages of the activity

In identifying potential impacts on ecological communities or species/population of conservation significance, cross-reference the results of the tests of significance completed in Section 11 of the REF.

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. affect any declared area of outstanding biodiversity value or critical habitat or environmental asset of intergenerational significance?	☐	N/A	N/A	N/A

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
2. result in the clearing or modification of vegetation, including ecological communities and plant community types of conservation significance? ^	☐	N/A	No clearing or modification of vegetation is proposed as the proposal does not involve any above-ground activities.	N/A
3. endanger, displace or disturb terrestrial or aquatic fauna, including fauna of conservation significance, or create a barrier to their movement? ^	☐	N/A	N/A	N/A
4. result in the removal of protected flora or plants or fungi of conservation significance? ^	☐	N/A	N/A	N/A
6. contribute to a key threatening process to biodiversity or ecological integrity?	☐	N/A	N/A	N/A
7. introduce weeds, pathogens, pest	☐	N/A	N/A	N/A

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
animals or genetically modified organisms into an area?				

9.3 Community impacts during all stages of the activity

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. affect community services or infrastructure?	☒	Negligible	The proposal would help to meet the needs of future generations by providing a reliable wastewater service to an area of future growth. No above-ground activities are proposed and therefore no community services or infrastructure are likely to be impacted by the proposal.	N/A
2. affect sites important to the local or broader community for their recreational or other values or access to these sites?	☐	N/A	N/A	N/A

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
3. affect economic factors, including employment, industry and property value?	☐	N/A	N/A	N/A
4. have an impact on the safety of the community?	☐	N/A	N/A	N/A
5. cause a bushfire risk?	☐	N/A	N/A	N/A
6. affect the visual or scenic landscape? ^	☐	N/A	N/A.	N/A

*** If yes**, check box and all columns need to be completed. If no, leave unchecked and write 'NA' in the third and fourth columns.
^ Include consideration of any permanent or temporary signage (e.g. signs advertising an event and related sponsorship) and whether there are any impacts on adjacent landowners such as loss of privacy, glare or overshadowing of their properties.

9.4 Natural resource impacts during all stages of the activity

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. result in the degradation of the park	☐	N/A	N/A	N/A

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
or any other area reserved for conservation purposes?				
2. affect the use of, or the community's ability to use, natural resources?	☐	N/A	N/A	N/A
3. involve the use, wastage, destruction or depletion of natural resources including water, fuels, timber or extractive materials? ^	☐	N/A	N/A	N/A
4. provide for the sustainable and efficient use of water and energy? †	☐	N/A	N/A	N/A

*** If yes**, check box and all columns need to be completed. If no, leave unchecked and write 'NA' in the third and fourth columns.
^ Consider opportunities to utilise recycled or alternative products.
† Where relevant to the proposal, consider high efficiency fittings and appliances, insulation, lighting, rainwater tanks, hot water and electricity supply.

9.5 Aboriginal cultural heritage impacts during all stages of the activity

Addressing the matters in questions 1–3 will assist in meeting the requirements set out in the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. In answering question 2, use **all** known sources of information on the likely presence of Aboriginal objects or places, including (but not restricted to) AHIMS search results and the results of consultation with the Aboriginal community. A separate report clearly documenting each of the steps in the Code, including the outcomes and qualifications of any visual inspection can form an attachment to the REF.

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. disturb the ground surface or any vegetation likely to contain culturally modified trees?	☐	N/A	N/A	N/A
2. affect or occur near known Aboriginal objects, Aboriginal places or an Aboriginal cultural asset of intergenerational significance? If so, can impacts be avoided? How?	☒	Negligible	Kelleher Nightingale Consulting carried out an Aboriginal heritage due diligence assessment of the entire Kemps Creek Pressure Main alignment in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. The study area for the due diligence assessment included the sections of bored mains that are assessed in this REF. The due diligence assessment did not identify any Aboriginal heritage sites along the proposed alignment of the pipes in the park. The assessment stated that the HDD section does not involve surface disturbance and does not require impact assessment.	Where practicable, monitor tailings from the underbore for Aboriginal heritage. Unexpected finds will be managed in accordance with the project Incident Management Plan.

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
3. affect areas: - within 200 m of waters - within a sand dune system - on a ridge top, ridge line or headland - within 200 m below or above a cliff face - in or within 20 m of a cave, rock shelter or a cave mouth? If so, can impacts be avoided? How?	☐	N/A	N/A	N/A
4. affect wild resources which are used or valued by the Aboriginal community or affect access to these resources?	☐	N/A	N/A	N/A
5. affect access to culturally important locations?	☐	N/A	N/A	N/A

*** If yes**, check box and all columns need to be completed. If no, leave unchecked and write 'NA' in the third and fourth columns.

Special explanatory note: If the above assessment indicates that there is still a reasonable risk or potential that Aboriginal objects, Aboriginal places or sensitive landscape features could be adversely affected by a proposal, consistent with the precautionary principle, it should either be reconsidered or further detailed

investigations undertaken. If it is concluded that an activity **may** have unavoidable and justified impacts on Aboriginal objects or Aboriginal places, the proponent should consider applying for an Aboriginal heritage impact permit (AHIP) **under s 90 of the NPW Act**.

9.6 Other cultural heritage impacts during all stages of the activity

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. affect or occur near places, buildings or landscapes of heritage significance? ^	☒	Negligible	The proposal is located within the Kemps Creek Forest heritage item, listed under the State Environmental Planning Policy (Precincts – Western Parkland City) 2021. The proposal would not involve any above-ground activities. No vegetation disturbance would be undertaken. Therefore, the potential impact of the proposal on Kemps Creek Forest is considered to be negligible.	N/A
2. impact on relics or moveable heritage items, or an area with a high likelihood of containing relics? ^	☐	N/A	N/A	N/A
3. impact on vegetation of cultural landscape value (e.g. gardens and settings, introduced exotic species, or	☐	N/A	N/A	N/A

Is the proposed activity likely to…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
evidence of broader remnant land uses)?				

*** If yes**, check box and all columns need to be completed. If no, leave unchecked and write 'NA' in the third and fourth columns.

^ Attach relevant supporting information where required, such as a statement of heritage impact. Consider any cultural asset of intergenerational significance for non-Aboriginal heritage value, items on the state heritage register or listed as local heritage on the local environmental plan. Also consider items on HHIMS (the NPWS s 170 register) or any relic or material evidence of non-Aboriginal origin older than 25 years, as these are protected under the NPW Regulation.

9.7 Impacts on matters of national environmental significance under the Environment Protection and Biodiversity Conservation Act during all stages of the activity

Is the proposal likely to affect MNES, including:	Applicable? *	Likely impact (negligible, low, medium or high adverse; or positive; or N/A)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. listed threatened species or ecological communities)?	☐	N/A	The proposal would not involve any above ground works during construction within Kemps Creek Nature Reserve. The pressure mains would be maintenance free, meaning that no surface or above ground structures are necessary for the length of the HDD and no access to the park would be required during operation. As such, there would be no impacts to any nationally listed threatened species present above the Kemps Creek Nature Reserve.	N/A

Is the proposal likely to affect MNES, including:	Applicable? *	Likely impact (negligible, low, medium or high adverse; or positive; or N/A)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
2. listed migratory species?	☐	N/A	As above, there would be no impacts to any listed migratory species present above the Kemps Creek Nature Reserve.	N/A
3. the ecology of Ramsar wetlands?	☐	N/A	N/A	N/A
4. world heritage values of World Heritage properties?	☐	N/A	N/A	N/A
5. the national heritage values of national heritage places?	☐	N/A	N/A	N/A

*** If yes**, check box and all columns need to be completed. If no, leave unchecked and write 'NA' in the third and fourth columns.

Note: Refer to Matters of National Environmental Significance: Significant impact guidelines 1.1 produced by the Australian Government to determine if a significant effect on any matter of national environmental significance is likely. This consideration should be explicitly documented in an appendix to this REF. Referral to the Commonwealth may be required if the activity is likely to have a significant effect on matters of national environmental significance.

9.8 Cumulative impacts during all stages of the activity

When considered with other projects, is the proposed activity likely to affect…	Applicable? *	Impact level (negligible; or low, medium or high adverse; or positive; or NA)	Reasons (describe the type, nature and extent of impact, taking into account the receiving environment and proposed safeguards which will limit the impact)	Safeguards/mitigation measures
1. natural landscape or biodiversity values through cumulative impacts?	☐	N/A	N/A	N/A
2. cultural (Aboriginal, shared and historic heritage) values through cumulative impacts?	☐	N/A	N/A	N/A
3. social (amenity, recreation, education) values through cumulative impacts?	☐	N/A	N/A	N/A
4. the community through cumulative impacts on any other part of environment (e.g. due to traffic, waste generation or perceived over-development?	☒	Negligible	It is expected that ongoing construction activities would occur in the region, particularly associated with the broader release of land for development within the South West Growth Area and development of the Western Sydney Aerotropolis. However, the proposal is not expected to have cumulative impact.	N/A

10. Proposals requiring additional information

Only complete the following sections **if applicable** to the proposal. The *Guidelines for preparing a Review of Environmental Factors* provides further guidance.

10.1 Lease or licence proposals under s 151 National Parks and Wildlife Act

N/A

10.2 Telecommunications facilities

10.2.1 Consideration of matters listed under s 153D National Parks and Wildlife Act

N/A

10.2.2 Provision and maintenance of an asset protection zone

N/A

10.3 Activities within regulated catchments

Activities within the catchment are subject to the provisions of the Chapter 8 of the Biodiversity and Conservation SEPP. The following factors require consideration.

10.3.1 All regulated catchments

The following factors require consideration.

Factors	Response
(a) Will the proposal have a neutral or beneficial effect on the quality of water entering a waterway?	The proposal would be a maintenance free pressure main at a depth of 15-20 m below ground. There would be no construction or operational impacts to waterways. The proposal would have a neutral effect on waterways.
(b) Will the proposal have an adverse impact on water flow in a natural waterbody?	The proposal would be 15-20 m below ground and would not have an adverse impact on water flow in a natural waterbody.
(c) Will the proposal increase the amount of stormwater runoff from a site?	There would be no increase to the amount of stormwater runoff from the site.
(d) Will the proposal incorporate on-site stormwater retention, infiltration or reuse?	The proposal is a 300 m long underbore at a depth of 15-20 m and would not require onsite stormwater retention, infiltration or reuse.
(e) What is the impact of the proposal on the level and quality of the water table?	A small volume of groundwater may be extracted from the bores. This is not expected to impact the level or quality of groundwater.

Factors	Response
(f) What will be the cumulative environmental impact of the proposal on the regulated catchment?	The proposal would have no cumulative impact on the regulated catchment.
(g) Does the proposal make adequate provision to protect the quality and quantity of ground water?	The pressure mains would have a minimal effect on groundwater.
Aquatic ecology	
(a) will the proposal have a direct, indirect or cumulative adverse impact on terrestrial, aquatic or migratory animals or vegetation? How?	The proposal would be 15-20 m below ground and would not impact terrestrial, aquatic or migratory animals or vegetation
(b) does the proposal involve the clearing of riparian vegetation?	There would be no clearing of riparian vegetation.
(c) will the proposal minimise or avoid the erosion of land abutting a natural waterbody and/or the sedimentation of a natural waterbody?	The proposal would not impact waterbodies due to the depth of the pressure mains.
(d) will the proposal have an adverse impact on wetlands (not including those in mapped coastal wetlands and littoral rainforests areas)?	The proposal would not impact wetlands due to the depth of the pressure mains.
(e) does the proposal include adequate safeguards and rehabilitation measures to protect aquatic ecology?	Not applicable.
(f) If the development site adjoins a natural waterbody, are additional measures required to ensure a neutral or beneficial effect on the water quality of the waterbody?	The proposal does not adjoin a natural body.
Flooding	
What is the likely impact of the proposal on periodic flooding that benefits wetlands and other riverine ecosystems?	The proposal would not impact periodic flooding.
Recreation and public access	
(a) what is the likely impact of the proposal on recreational land uses?	The proposal would not impact recreational land uses.
(b) will the proposal maintain or improve public access to and around foreshores without adverse impact on natural waterbodies, watercourses, wetlands or riparian vegetation?	The proposal would not affect public access to and around foreshores.

10.3.2 Sydney Drinking Water Catchment

Not relevant to the proposed activity as it does not occur within the Sydney Drinking Water Catchment.

10.3.3 Sydney Harbour Catchment's Foreshores and Waterways Area

10.4 Activities in River Murray riverine land

N/A

11. Summary of impacts and conclusions

Summarise the impacts and consider the cumulative impacts of the activity based on the classification of individual impacts as low, medium or high adverse, negligible or positive. The *Guidelines for preparing a Review of Environmental Factors* provide further guidance.

Environmental factor	Consideration	Significance of impact*
(a) the environmental impact on the community	Social, economic and cultural impacts as described in sections 9.3, 9.5 and 9.6	Not significant
(b) the transformation of the locality	Human and non-human environment as described in sections 9.1, 9.2 and 9.4	Not significant
(c) the environmental impact on the ecosystems of the locality	Amount of clearing, loss of ecological integrity, habitat connectivity/ fragmentation and changes to hydrology (both surface and groundwater) as described in sections 9.1, 9.2 and 9.4 and, for nationally listed threatened ecological communities, in section 9.7.	Not significant
(d) reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality	Visual, recreational, scientific and other impacts as described in section 9.3.	Not significant
(e) the effects on any locality, place or building that has— (i) aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance, or (ii) other special value for present or future generations	Impacts to Aboriginal and historic heritage associated with a locality (including intangible cultural significance), architectural heritage, social/community values and identity, scenic values and others, as described in sections 9.3, 9.5 and 9.6 and (for MNES heritage places) section 9.7.	Not significant
(f) the impact on the habitat of protected animals, within the meaning of the Biodiversity Conservation Act	Impacts to all native terrestrial species, including but not limited to threatened species, and their habitat requirements, as described in section 9.2.	Not significant
(g) the endangering of a species of animal, plant or other form of life, whether living on land, in water or in the air	Impacts to all listed terrestrial and aquatic species, and whether the proposal increases the impact of key threatening processes, as described in section 9.2	Not significant
(h) long-term effects on the environment	Long-term residual impacts to ecological, social and economic values as described in all parts of section 9.	Not significant
(i) degradation of the quality of the environment	Ongoing residual impacts to ecological, social and economic as described in section 9.4.	Not significant

Environmental factor	Consideration	Significance of impact*
(j) risk to the safety of the environment	Impacts to public and work health and safety, from contamination, bushfires, sea level rise, flood, storm surge, wind speeds, extreme heat, rockfall and landslip, and other risks likely to increase due to climate change as described in sections 9.1, 9.3 and 9.4.	Not significant
(k) reduction in the range of beneficial uses of the environment	Impacts to natural resources, community resources and existing uses as described in sections 9.3 and 9.4.	Not significant
(l) pollution of the environment	Impacts due to air pollution (including odours and greenhouse gases); water pollution (water quality health); soil contamination; noise and vibration (including consideration of sensitive receptors); or light pollution, as described in sections 9.1 and 9.3.	Not significant
(m) environmental problems associated with the disposal of waste	Transportation, disposal and contamination impacts as described in section 9.3.	Not significant
(n) increased demands on natural or other resources that are, or are likely to become, in short supply	Impacts to land, soil, water, gravel, minerals and energy supply as described in section 9.4.	Not significant
(o) the cumulative environmental effect with other existing or likely future activities	The negative synergisms with existing development or future activities as considered in section 9.8.	Not significant
(p) the impact on coastal processes and coastal hazards, including those under projected climate change conditions	Impacts arising from the proposed activity on coastal processes, and impacts on the proposed activity from those coastal processes and hazards, both current and future, as considered in section 9.1.	Not significant
(q) applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1	Inconsistency with the objectives, policies and actions identified in local, district and regional plans, as considered in section 3.2.2.	Not significant
(r) other relevant environmental factors.	Any other factors relevant in assessing impacts on the environment to the fullest extent, such as native title.	Not significant

In conclusion indicate if:

- There is likely to be a significant effect on the environment and an environmental impact statement is required

  ☒ No

  ☐ Yes

Reason(s): The potential impact on the environment is assessed to be low and an environmental impact statement is not required.

- There is likely to be a significant effect on threatened species, populations, ecological communities or their habitats and a species impact statement is required

  ☒ No

  ☐ Yes

Reason(s): The proposal is below ground and is not likely to have a significant effect on threatened species, populations, ecological communities or their habitats. A species impact statement is not required.

- The activity is likely to have a significant impact on matters of national environmental significance listed under the Cwth Environment Protection and Biodiversity Conservation Act

  ☒ No

  ☐ Yes

Reason(s): Nationally listed threatened and migratory species are likely to be found at the surface. However, the activity footprint is 15-20m below ground and no matters of national environmental significance (MNES) are present at this depth below ground.

- The activity will require certification to the Building Code of Australia, Disability (Access to Premises – Buildings) Standards 2010 or Australian Standards in accordance with the NPWS Construction Assessment Procedures

  ☒ No

  ☐ Yes

12. Supporting documentation

Please provide details of documentation included with this application.

Note: Supporting information may include, but is not limited to, a sustainability assessment (for proposals requiring a lease of licence under s 151A NPW Act); threatened species assessments; AHIMS search; engineering plans and/or maps; specialist studies etc.

Document title	Author	Date
1.		
2.		
3.		
4.		

13. Fees for external proponents

Proponents external to NPWS are required to pay an initial fee of $220 (a final fee is also required before determination of the REF).

☒ $220 payment/cheque for initial fee is enclosed

☐ A waiver of fees is requested for the following reasons:

Please justify the request. If the activity consists of environmental remediation and/or the proponent is a community group, NPWS may waive the fees on request.

14. Declarations

As the person responsible for the preparation of the REF, I certify that, to the best of my knowledge, this REF is in accordance with the EP&A Act, the EP&A Regs and the Guidelines approved under section 170 of the EP&A Regs, and the information it contains is neither false nor misleading.

Signature	[redacted]
Name (printed)	
Position	[redacted]
Date	

The REF must also be certified by the **proponent**. Where NPWS Park Operations is the proponent, the REF must be endorsed by the Area Manager as the proponent.

By endorsing the REF, the proponent confirms that the information in the REF is accurate and adequate to ensure that all potential impacts of the activity can be identified.

Signature	[redacted]
Name (printed)	
Position	[redacted]
Date	

Seal (if signing under seal):

Signature	[redacted]
Name (printed)	
Position	[redacted]
Date	

Next steps

- Submit the signed REF to the relevant NPWS Area Office, requesting determination of the REF and advice on when approval for the works may be forthcoming.