



Soil and Contaminated Land Impact Assessment

Greater Parramatta, Olympic Peninsula
Water Cycle Management

Sydney Water

16 December 2025

→ **The Power of Commitment**

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Executive summary

Sydney Water is proposing to build and operate a new water resource recovery facility (WRRF) at Camellia-Rosehill. The new WRRF is needed to provide additional wastewater capacity to support growth across the northern suburbs of Sydney, and in the Greater Parramatta and Olympic Peninsula (GPOP) growth corridor. The WRRF and associated infrastructure together form the GPOP Water Cycle Management project (the project).

As a key growth area in Sydney, the population in GPOP is projected to double in size by 2056. An increase of residents and businesses in the area will generate substantial volumes of wastewater requiring treatment. This growth would place pressure on Sydney Water's existing wastewater network which includes the Northern Suburbs Ocean Outfall Sewer (NSOOS). The NSOOS is a critical sewer main which transfers wastewater from a large catchment area to North Head WRRF for treatment. With current growth projections, the NSOOS would reach capacity by 2031-32.

The project is needed to provide a water cycle management solution for the GPOP growth corridor that is efficient and cost effective for the community. The project avoids duplication of the NSOOS and provides a wastewater solution which is sustainable, resilient and adaptable. The project would avoid duplication of the NSOOS and provides a wastewater solution which is sustainable, resilient and adaptable.

The main elements of the project include:

- a new WRRF at Camellia-Rosehill.
- upgrade the existing pumping station at Camellia.
- a new wastewater transfer main from Camellia pumping station to the WRRF.
- a new brine pipeline from the WRRF to Camellia pumping station and repurpose an existing pipeline to transfer brine from Camellia pumping station to the NSOOS.
- install a river release pipeline from the WRRF to release advanced treated water into Parramatta River.

This report presents the findings of soil and contaminated land impact assessment undertaken by GHD Pty Ltd (GHD) as part of the project's Environmental Impact Statement (EIS). The report assesses the potential impacts from the construction and operation of the project in accordance with the Secretary's Environmental Assessment Requirements (SEARs) for contamination and soil.

The primary objectives of the study were to identify the presence and extent of contamination, evaluate potential risks to human health and the environment, and provide mitigation and management measures to reduce these risks where necessary.

Based on the proposed construction methodology and the implementation of the identified additional mitigation measures, including ongoing monitoring, the project is not anticipated to result in unacceptable impacts on human health and the environment related to soil and land contamination.

This report is subject to, and must be read in conjunction with, the limitations set out in Section 10 and the assumptions and qualifications contained throughout the Report.

Acronyms and Abbreviations

Abbreviation	Definition
AAJV	Aecom Aurecon joint venture
ACM	Asbestos containing material
AEI	Area of environmental interest
AFFF	Aqueous Film Forming Foam
AF/FA	Asbestos fine, friable asbestos
AHD	Australian Height Datum
AMP	Asbestos Management Plan
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian and New Zealand guidelines for fresh and marine water quality
ASC NEPM	Assessment of Site Contamination National Environment Protection Measure
AS/NZS	Australia/New Zealand
ASS	Acid Sulfate Soils
ASSMAC	Acid Sulfate Soil Management Advisory Committee
ASSMP	Acid sulphate soils management plan
B(a)P	Benzo(a)pyrene
Bgl	Below ground level
BTP	Brine and transfer pipelines
BOM	Bureau of Meteorology
BTEXN	Benzene, Toluene, Ethylbenzene, Xylenes and Naphthalene
°C	Degrees Celsius
CEMP	Construction Environmental Management Plan
CEnvP (SC)	Certified Environmental Practitioner (Site Contamination) scheme
CLM Act	Contaminated Land Management Act 1997
CMSP	Contamination management sub-plan
COPC	Contaminants of Potential Concern
CPSS CSAM	Certified Professional Soil Scientist Contaminated Site Assessment and Management
CRs	Chromium reducible sulfur
CSM	Conceptual Site Model
DEC	Department of Environment and Conservation (now EPA)
DNAPL	Dense Non-Aqueous Phase Liquid
DPE	Department of Planning and Environment (now DPHI)
DPHI	Department of Planning, Housing and Infrastructure
DSI	Detailed Site Investigation
EHC Act	Environmentally Hazardous Chemicals Act
EIL	Ecological Investigation Level
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
ENM	Excavated natural materials

Abbreviation	Definition
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EPL	Environmental Protection Licence
ESL	Ecological Screening Level
FWPS	Foul water pumping station
GDMP	Groundwater dewatering management plan
GPOP	Greater Parramatta and Olympic Peninsula
Ha	Hectare
HDD	Horizontal directional drilling
HEPA	Heads of Environmental Protection Agencies
HGL	Hydrogeological landscape
HIL	Health Investigation Level
HSE	Health, safety and environment
HSL	Health Screening Level
Km	Kilometre
LEP	Local Environment Plan
LGA	Local Government Area
LNAPL	Light Non-Aqueous Phase Liquid
LOR	Limit of reporting
LTEMP	Long term environmental management plan
m	Metre
Mm	millimetre
M bgl	Metres below ground level
mg/L	Milligrams per litre
ML/d	Megalitre per day
NEPM	National Environment Protection Measures
NEMP	National Environmental Management Plan
NHMRC	National Health and Medical Research Council
NSOOS	Northern Suburbs Ocean Outfall Sewer
NSW	New South Wales
OCP	Organochlorine pesticides
OD	Outside diameter
OMO	Ongoing maintenance order
OEMP	Operation Environmental Management Plan
OPP	Organophosphate pesticides
PAH	Polycyclic aromatic hydrocarbons
PACM	Potentially asbestos containing material
PASS	Potential acid sulphate soil(s)
PCB	Polychlorinated Biphenyls
PDC	Pierre De Coubertin Park
POEO	Protection of the Environment Operations (Act)

Abbreviation	Definition
PFAS	Per- and polyfluoroalkyl substances
PFOS	Perfluorooctanesulfonic acid
PFOA	Perfluorooctanoic Acid
PIO	Preliminary investigation order
PN	Pressure nominal
PSI	Preliminary Site Investigation
PST	Primary settlement tank
RO	Reverse osmosis
RRO	Resource recovery order
RRP	River Release Pipeline
SAC	Site assessment criteria
SAR	Site audit report
SAS	Site audit statement
SEARs	Secretary's Environmental Assessment Requirements
SMP	Stockpile management plan
SOPA	Sydney Olympic Park Authority
SPOCAS	Suspension Peroxide Oxidation Combined Acidity & Sulfur
SPR	Source pathway receptor
SSD	State significant development
SSI	State significant infrastructure
SWL	Standing water level
SWMP	Soil and water management plan
T	tonne
TPH	Total petroleum hydrocarbons
TRH	Total recoverable hydrocarbons
UCFP	Unexpected contaminants finds protocol
µg/L	Microgram per litre
VENM	Virgin excavated natural materials
VMP	Voluntary management proposal
VOCs	Volatile organic compounds
WCM	Water Cycle Management
WRRF	Water Resource Recovery Facility
WSU	Western Sydney University

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1. Introduction

1.1 Background

Positioned on the 6,000 hectare Greater Parramatta to Olympic Peninsula corridor, the Greater Parramatta and Olympic Peninsula (GPOP) Water Cycle Management (WCM) project is a State Significant Infrastructure (SSI-74258485) project. Sydney Water is proposing to build and operate a new water resource recovery facility (WRRF) at Camellia-Rosehill with associated infrastructure to provide wastewater services to the Greater Parramatta and Olympic Peninsula growth area.

The project also includes the WRRF's associated pipelines – the River Release Pipeline, Brine and Transfer Pipelines. These pipelines are to be constructed using a combination of open trenching, trenchless, and relining methods, which will connect the WRRF to the Northern Suburbs Ocean Outfall Sewer (NSOOS) through an upgrade of the existing pumping station at Camellia and facilitate discharge of advanced treated water into the Parramatta River. Key constraints include contamination from historical land uses and disturbance of sediments within the Parramatta River.

This report presents the outcomes of a soil and land contamination impact assessment undertaken for the construction and operation of the GPOP WCM project to support the project EIS. The assessment has been informed by preliminary project design information, review of preliminary and detailed site investigations (P/DSIs), applicable legislation, policies and guidelines and publicly available database searches.

1.2 The project

Sydney Water is proposing to build and operate a new WRRF at Camellia-Rosehill. The new WRRF is needed to provide additional wastewater capacity to support growth across the northern suburbs of Sydney, and in the GPOP growth corridor. The WRRF and associated infrastructure together form the GPOP WCM (the project).

The additional growth would place pressure on the existing northern suburbs wastewater network, which includes the NSOOS and the North Head WRRF. These critical assets provide wastewater services to around 1.7 million people, and with current growth projections would reach capacity by 2031.

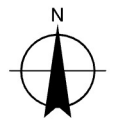
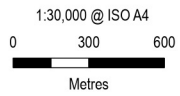
The GPOP WCM project has been designed to be efficient, sustainable, and cost effective for the community, as well as resilient and adaptable for future water uses.

The main elements of the project include:

- a new WRRF at Camellia-Rosehill to treat wastewater to produce advanced treated water.
- upgrades to the existing pumping station at Camellia.
- a new wastewater transfer pipeline from Camellia pumping station to the WRRF.
- a new and repurposed brine pipeline to transfer brine from the WRRF to the NSOOS.
- a new river release pipeline to transfer advanced treated water from the WRRF to a release structure in Parramatta River at Meadowbank.

The location of the main elements of the project is provided in Figure 1.1. Further details of each component of the project are provided in Section 4.

The project is state significant infrastructure (SSI) and Sydney Water is preparing an EIS to support an application to the Minister for Planning and Public Spaces.



Sydney Water Corporation
 Sydney Water GPOP WCM SSI
 Soil and Land Contamination Impact Assessment

Project No. 12673348
 Revision No. 0
 Date. 15/12/2025

Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

Project overview

FIGURE 1.1

1.3 Key elements

Details of each component of the project are provided in Table 1.1.

Table 1.1 Project description

Project component	Detailed description
WRRF	<p>The WRRF would have capacity to treat 70 megalitres per day (ML/d). The WRRF would produce advance treated water to minimise impacts on receiving waterways. The reverse osmosis (RO) treatment process within the WRRF would generate brine as a by-product.</p> <p>The main components of the WRRF include:</p> <ul style="list-style-type: none"> – inlet works. – primary, secondary and tertiary wastewater treatment process units. – advanced treatment processes involving RO. – disinfection systems. – biosolids handling facilities. – odour control facilities. <p>The WRRF would require a range of process infrastructure such as tanks, bioreactors and digestors. The operation of the WRRF would also require ancillary facilities such as an administration building and associated car park, chemical storage and stormwater infrastructure.</p>
Camellia pumping station upgrades	<p>The existing Camellia pumping station would be upgraded to divert wastewater to the WRRF. Upgrades would include installing new pumps to deliver wastewater flows to the new WRRF, while the remaining pumps would pump excess existing flows and brine produced by the WRRF to the NSOOS via existing pressure mains. New connections would be installed to divert the wastewater into the transfer pipeline. The existing site sheds would be replaced with a new electrical switch room along the eastern boundary of the site.</p>
Transfer pipeline	<p>The transfer pipeline is about 2.2 kilometres in length and would transfer wastewater from the Camellia pumping station to the WRRF.</p>
Brine pipeline	<p>The brine pipeline is about 5.2 kilometres in length and would transfer brine from the WRRF to the NSOOS for treatment and offshore discharge at North Head WRRF. A new pipeline would be constructed between the WRRF and Camellia pumping station, along the same alignment as the transfer pipeline. Between the Camellia pumping station and the NSOOS the brine pipeline would repurpose an existing pipeline.</p>
River release pipeline and release structure	<p>The river release pipeline is about 7.6 kilometres in length commencing at the WRRF and within the suburbs of Silverwater, Newington, Sydney Olympic Park, Wentworth Point and Meadowbank. The river release pipeline would discharge advanced treated water into the Parramatta River at Meadowbank.</p> <p>Above ground infrastructure includes two concrete bridge-style aerial crossings over minor waterways in Meadowbank Park, and an approximately 8 metre high barometric loop located near the existing toilet block in Memorial Park.</p> <p>The river release structure involves eight smaller pipelines that extend out underneath the sandstone sea wall and along the riverbed of the Parramatta River. The pipelines would vary in length, with the longest extending about 130 m. Diffusers would release water to enable mixing.</p>
Land ownership and location	<p>The WRRF would be located on Sydney Water owned property at the intersection of Colquhoun and Devon Street, Rosehill (Lot 1, Deposited Plan 1308385). The WRRF site comprises an area of 21.41 hectares (ha) (see Figure 1-1) and is located within the City of Parramatta Local Government Area (LGA).</p> <p>Upgrades to the existing sewage pumping station at Camellia are also located on Sydney Water property within the City of Parramatta LGA.</p> <p>Pipeline alignments are generally within the road corridor, Council or Crown land or Sydney Water easements, except for the transfer and brine pipelines beneath Rosehill Gardens Racecourse.</p>
Construction activities	<p>Key activities for construction of the WRRF will include:</p> <ul style="list-style-type: none"> – site establishment. – delivery of materials. – Earthworks. – civil works.

Project component	Detailed description
	<ul style="list-style-type: none"> – structure construction. – installation of mechanical and electrical plant and equipment. – landscaping and rehabilitation. – commissioning. <p>The new sections of pipelines from the WRRF to Camellia pumping station and the river release location, would be constructed using a combination of trenching and horizontal directional drilling (HDD) techniques. Between Camellia pumping station and the NSOOS, the existing rising main would be relined and repurposed to form part of the brine pipeline.</p> <p>The upgrade of Camellia pumping station would include augmentation of underground infrastructure, installation of pumps, and upgrade of power supply.</p>
Construction program	Construction of the project would commence in 2028 with a duration of around 36 months. Operation is planned to commence in 2031.

1.4 Assessment areas

The assessment areas in this report include the following:

- Project footprint – The area that has been marked out for the purpose of this EIS to be directly affected by the construction and operation of the project. It includes the:
 - Brine pipeline – Relining of the current pipeline between Kissing Point Road and Grand Avenue North.
 - Brine and transfer pipelines – Trenchless pipelines that are located between Grand Avenue North and the WRRF.
 - Camellia pumping station which includes open trenching to connect the brine and transfer pipeline to the station.
 - WRRF – Construction of the facility on a 22 hectare site.
 - River release pipeline – A combination of trenchless and open trench pipeline that runs through the suburbs of Rosehill, Silverwater, Newington, Sydney Olympic Park, Wentworth Point and Meadowbank where the outlet is into the Parramatta River.
- Contamination study area – The project footprint includes a 500 m buffer on either side of the alignment as presented in Figure 1.2.

1.5 Secretary’s environmental assessment requirements

The project is SSI and the New South Wales (NSW) Department of Planning, Housing and Infrastructure (DPHI) has issued project specific Secretary’s Environmental Assessment Requirements (SEARs). These SEARs provide the technical requirements for the impact assessment of each potential key issue, including the desired performance outcome, requirement and current guidelines.

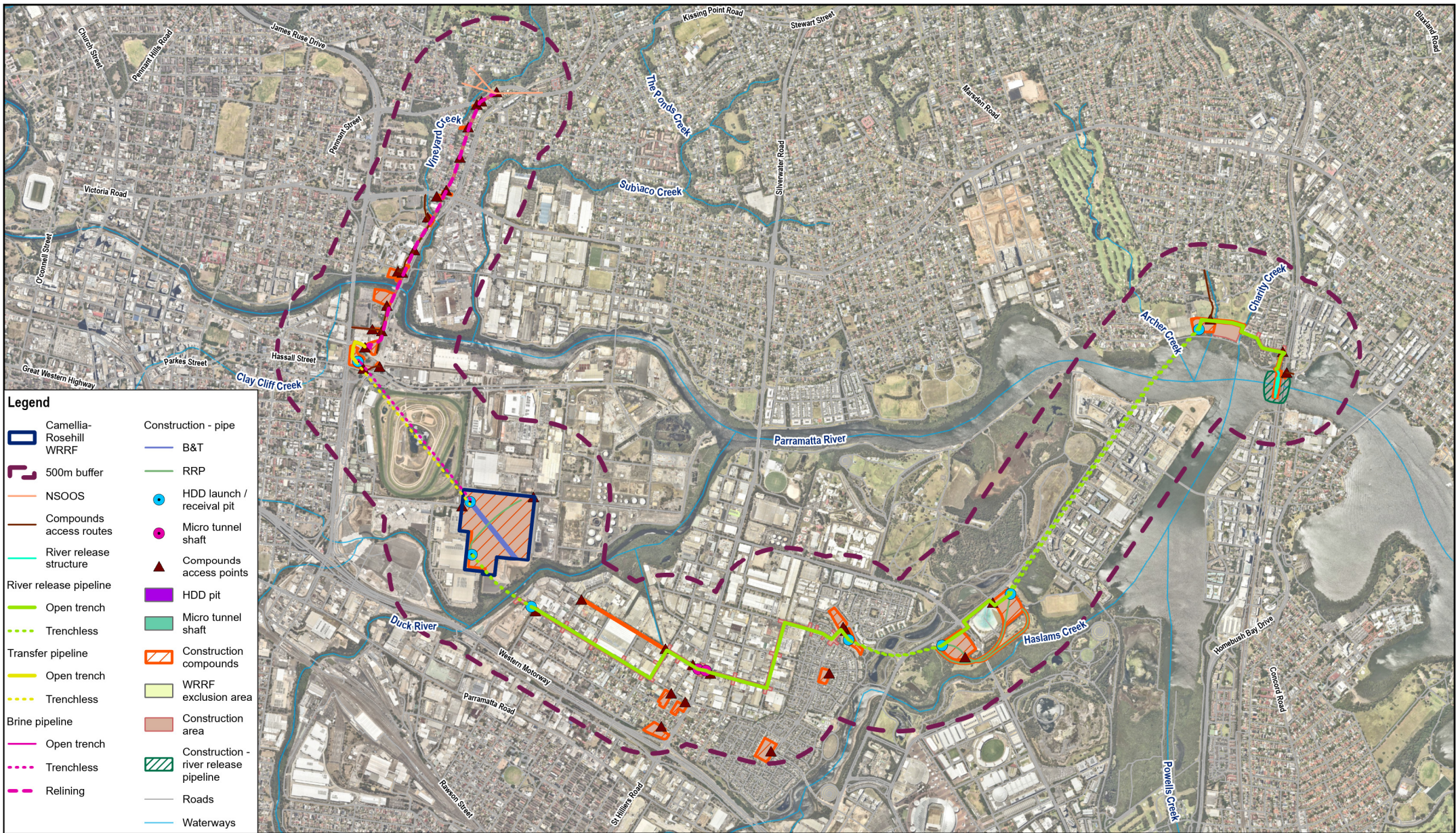
The assessment has been prepared to fulfil the requirements included in the SEARs, which are outlined in below Table 1.2.

Table 1.2 Key soil and contaminated land related SEARs

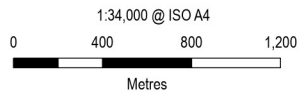
SEARs to be addressed by the study	Where addressed in this report
<p>4. Contamination – human and environmental health is protected by understanding the presence and risks associated with contaminated land, including impacts to soils, groundwater, surface water and sediments. Contamination risks are independently considered consistent with the auditing regime established under the Contaminated Land Management Act, 1979.</p>	

SEARS to be addressed by the study	Where addressed in this report
<p>1. Identify the likelihood of contamination (which includes soils, groundwater, ground gas, surface water and sediments, where applicable) by considering the context of past, existing and future land uses. The EIS must document how the assessment of contaminated land has considered relevant guidelines for contaminated land made or approved under Section 105 of the <i>Contaminated Land Management Act 1997</i>.</p>	<p>Section 2.1 and Section 7. Preliminary site investigation (PSIs) for brine and transfer pipelines and river release pipeline. Detailed site investigations (DSIs) for WRRF, brine and transfer pipelines and river release pipeline.</p>
<p>2. Where contamination is considered likely based on past or current land uses or other factors (such as offsite contamination migrating onto the site), undertake detailed site investigation/s to determine the nature and extent of the contamination.</p>	<p>Detailed site investigations (DSIs) for WRRF, brine and transfer pipelines and river release pipeline were undertaken and evaluated in Section 7.</p>
<p>3. Where contamination exists, assess if remediation of the land is required, having regard to the ecological and human health risks posed by the contamination.</p>	<p>Detailed site investigations (DSIs) for WRRF, brine and transfer pipelines and river release pipeline were undertaken. No remediation was recommended following the DSIs.</p>
<p>4. Any Preliminary Site Investigation, Detailed Site Investigation, or other related reports on contamination (including but not limited to a Sampling Analysis Quality Plan), must be accompanied with an Interim Audit Advice or a Site Audit Statement from a NSW EPA accredited Site Auditor certifying the appropriateness of the assessments. Any risk rating of areas of environmental interest (or areas of environmental concern or any other similar terminology) as well as the proposed mitigation measures must be also reviewed as appropriate by the accredited Site Auditor.</p>	<p>The NSW EPA accredited Site Auditor has reviewed relevant reports Section 5 and Appendix A – Auditor correspondence.</p>
<p>5. Consider potential impacts to the integrity of the Sydney Olympic Park Authority's waste containment systems, in particular at the Woo-La-Ra landfill and its leachate gravity drain and vertical cut-off wall south of the waste mound.</p>	<p>Section 7</p>
<p>6. Contamination reports must be prepared or reviewed by a Contaminated Land Consultant certified under either the Environment Institute of Australia or New Zealand's "Certified Environmental Practitioner" (Site Contamination) scheme (CEnvP(SC)) or the Soil Science Australia "Certified Professional Soil Scientist Contaminated Site Assessment and Management" (CPSS CSAM) scheme.</p>	<p>Section 2 and Section 5.</p>
<p>7. A Detailed Site Investigation must be prepared if recommended by a Preliminary Site Investigation unless justification is provided in the EIS on why it is not possible to undertake a such an investigation.</p>	<p>Section 5.1 outlines the process undertaken for Preliminary site investigations (PSIs) and Detailed site investigations (DSIs). DSIs for WRRF, brine and transfer pipelines and river release pipeline and were reviewed by an NSW EPA accredited Site Auditor (Appendix A).</p>
<p>15. Soils The environmental values of land, including soils, subsoils and landforms are protected. Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulphate soils.</p>	
<p>1. Verify the risk of acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Risk Map) within, and in the area likely to be impacted by, the project.</p>	<p>Section 6.2.5.2.</p>
<p>2. The impact of the project on acid sulfate soils (including impacts of acidic runoff offsite) in accordance with the current guidelines.</p>	<p>Section 7.</p>
<p>3. Identify whether soil salinity is likely to be an issue and if so, determine the presence, extent and severity of soil salinity within the project area, and assess the impacts of the project on soil salinity and how it may affect groundwater resources and hydrology.</p>	<p>Section 6.2.5.3 and 7.</p>

SEARS to be addressed by the study	Where addressed in this report
4. The impacts on soil and land resources (including erosion risk or hazard). Particular attention must be given to soil erosion and sediment transport consistent with the practices and principles in the current guidelines.	Section 6, Section 7.1.1 and Section 8.



- Legend**
- Camellia-Rosehill WRRF
 - 500m buffer
 - NSOOS
 - Compounds access routes
 - River release structure
 - River release pipeline**
 - Open trench
 - Trenchless
 - Transfer pipeline**
 - Open trench
 - Trenchless
 - Brine pipeline**
 - Open trench
 - Trenchless
 - Relining
 - Construction - pipe
 - B&T
 - RRP
 - HDD launch / receival pit
 - Micro tunnel shaft
 - Compounds access points
 - HDD pit
 - Micro tunnel shaft
 - Construction compounds
 - WRRF exclusion area
 - Construction area
 - Construction - river release pipeline
 - Roads
 - Waterways



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

Sydney Water Corporation
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Contamination study area and project footprint

FIGURE 1.2

1.6 Purpose and structure of this report

The main purpose of this report is to assess the potential soil and contamination impacts from the construction and operation of the project to support the environmental assessment of the project in accordance with the *Environmental Planning and Assessment Act 1979*. This report comprises a review of the detailed site investigations undertaken along the alignment for potential contamination.

The structure and content of this report are as follows:

- Section 1 – Introduction, background, project description and purpose of the report
- Section 2 – Legislation and policy context
- Section 3 – Data sources
- Section 4 – Proposed work
- Section 5 – Assessment methodology
- Section 6 – Existing environment
- Section 7 – Impact assessment
- Section 8 – Mitigation measures and management measures
- Section 9 – Conclusions
- Section 10 – Limitations
- Section 11 – References.

2. Legislation and policy context

2.1 Legislative and policy context of the assessment

Table 2.1 summarises the legislation, guidelines and/or policies driving the approach to the assessment.

Table 2.1 Legislation and policy

Legislation/Policy	Relevance
<i>Environmental Planning and Assessment Act 1979</i> (EP&A Act)	<p>The EP&A Act is the core legislation relating to planning and development activities in NSW and provides the statutory framework under which development projects are assessed. The EP&A Act aims to encourage the proper management, development and conservation of resources, environmental protection and ecologically sustainable development.</p> <p>The project is being assessed as a SSI, in accordance with section 5.2 of the EP&A Act.</p>
<i>Contaminated Land Management Act 1997</i> (CLM Act)	<p>The CLM Act is part of the management framework for contaminated land in NSW. The CLM Act enables the NSW Environment Protection Agency (EPA) to respond to and manage site contamination when it considers that contamination is significant enough to require regulation. Site contamination requires regulation under the CLM Act when a site is declared “significantly contaminated land” (defined as land described in a notice having effect under Section 11 of the CLM Act) or when land is subject to a management order or an approved voluntary management project.</p> <p>Section 105 of the CLM Act allows the EPA to make or approve guidelines for the purposes connected with the objectives of the CLM Act. Contaminated sites not regulated by the EPA can be managed through the planning process by the relevant planning consent authority.</p> <p>The EPA holds records of sites that have been notified under Section 60 of the CLM Act or otherwise reported to the EPA. This contamination assessment includes a search of the record of sites held by EPA to identify sites which may impact soil and/or groundwater quality within the construction area.</p> <p>The WRRF site was declared significantly contaminated land under the <i>Contaminated Land Management Act 1997</i> in 2016 due to the presence of contaminated soil and groundwater. Remediation of the site was undertaken in the following years as part of the Clyde Western Area Remediation Project. As of July 2022, the land is no longer declared to be significantly contaminated. Nevertheless, there is contaminated material across the project, including acid sulfate and asbestos contaminated soils.</p>
<i>Protection of the Environment Operations Act 1997</i> (POEO Act)	<p>The POEO Act is administered by the NSW EPA, which is an independent statutory authority and the primary environmental regulator for NSW. The objectives of the POEO Act are to protect, restore and enhance the quality of the environment.</p> <p>Under the POEO Act, an Environment Protection Licence (EPL) is required for premises at which a ‘scheduled activity’ is conducted. Schedule 1 of the POEO Act lists activities that are scheduled activities for the purpose of the Act. Licence conditions relate to pollution prevention and monitoring and can control the air, noise, water and waste impacts of an activity. The project is defined as a scheduled activity for sewage treatment in accordance with Clause 36 of Schedule 1 of the POEO Act and therefore would require an EPL for operation of the treatment system. A licence variation application would be required to incorporate the project as part of the NSOOS System EPL (EPL No. 378).</p>
<i>Protection of the Environment Operations (Waste) Regulation 2014</i> (POEO (Waste) Regulation)	<p>The POEO (Waste) Regulation allows the NSW EPA to protect human health and the environment and provides a platform for a modern and fair waste industry. It includes strict thresholds for EPLs and outlines the waste levy system. Clause 93 imposes the requirements for resource recovery orders and exemptions in NSW.</p> <p>The project is likely to generate excavated natural materials (ENM), virgin excavated natural materials (VENM) and potentially contaminated soils as spoil through excavation and soil disturbance activities. The methodology and management of these wastes would be in accordance with the Regulation.</p>

Legislation/Policy	Relevance
<i>State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP)</i>	<p>The Resilience and Hazards SEPP aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment. Chapter 4 specifies that consent may be required for remediation activities from the Consent Authority. Remediation work is distinguished under two categories: Category 1 (needing consent) and Category 2 (not needing consent).</p> <p>Measures would be put in place during construction should contamination be identified, and all spoil would be waste classified prior to beneficial reuse and/or disposal. Remediation of land, if required as part of the project due to contamination, would comply with Chapter 4 of the SEPP, including notifications to consent authorities.</p>

2.1.1 Guidance and standards

This soil and land contamination impact assessment has been completed with consideration of guidelines made or endorsed by the NSW EPA under Section 105 of the *Contaminated Land Management Act 1997*. These guidelines include the following key documents:

- Australian Standards. (2005). AS4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil Part 1: Non-volatile and semi-volatile compounds.
- National Environmental Protection Council (2013). National Environment Protection (Assessment of Site Contamination) Measure (NEPM).
- NSW EPA (2020). Consultants reporting on contaminated land: Contaminated Land Guidelines.
- NSW Department of Environment and Conservation (DEC) (2007), Guidelines for the Assessment and Management of Groundwater Contamination.
- NSW EPA (2015) Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997*.
- NSW EPA (2017) Contaminated Land Management; Guidelines for the NSW Site Auditor Scheme (3rd Edition).
- Heads of Environmental Protection Agency (HEPA) (2025), PFAS National Environmental Management Plan (NEMP) 3.0¹.

Guidance document relevant to waste disposal in NSW:

- NSW EPA (2014). Waste Classification Guidelines, Part 1 – Classifying Waste.

Guidance documents relevant to acid sulfate soils:

- Acid Sulfate Soils Manual (Acid Sulfate Soils Management Advisory Committee, 1998).
- Acid Sulfate Soils Assessment Guidelines (Acid Sulfate Soils Management Advisory Committee, 1998).
- Acid Sulfate Soils Laboratory Methods Guidelines (Queensland Department of Natural Resources, Mines and Energy, 2004).

Guidance documents relevant to soils and salinity:

- Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004a) and Volume 2 (A. Installation of Services; B. Waste Landfills; C. Unsealed Roads; D. Main Roads; E. Mines and Quarries (DECC, 2008).
- Australian Soil and Land Survey Handbook (CSIRO, 2009).
- Soil and Landscape Issues in Environmental Impact Assessment (DLWC, 2000).
- Site investigations for Urban Salinity (DLWC, 2002b).

All reports undertaken for the assessment (including PSIs and DSIs completed by Jacobs) were either prepared or reviewed by a Contaminated Land Consultant certified under the Environment Institute of Australia “Certified Environmental Practitioner (Site Contamination) Scheme (CEnvP (SC)).

¹ DSIs undertaken as part of the project were assessed against criteria detailed in NEMP 2.0 which have been superseded by NEMP 3.0.

The PSIs and DSIs undertaken as part of this assessment were reviewed and approved by an NSW EPA accredited site auditor Rebeka Hall of Geosyntec Consultants.

3. Data sources

3.1 Reports

Table 3.1 provides a list of the reports from desktop reviews and site investigations that were used to support the soil and land contamination impact assessment. A summary of the scope of the PSIs, DSIs and the groundwater monitoring and management report is provided in Appendix D.

Table 3.1 List of reports and drawings used in this impact assessment

Reference	Title	Document No	Date of Issue
Jacobs (2024a)	Greater Parramatta and Olympic Peninsula (GPOP) Project – WRRF Camellia – Detailed Site Investigation Report	IA319500-00-T-J-RPT-00-01 Version D	21 January 2025
Jacobs (2025b)	Camellia WRRF Reference Design Report (WRRF 05)	IA319500-00-T-G-RPT-00-01 Version 3	7 March 2025
Jacobs (2025c)	Greater Parramatta and Olympic Peninsula (GPOP) Project – Brine and Influent Pipelines – Preliminary Site Investigation Report	IA319500-00-T-J-RPT-00-13	16 April 2025
Jacobs (2025d)	Greater Parramatta and Olympic Peninsula (GPOP) Project - Detailed Site Investigation – Brine and Influent Pipeline Alignment	IA319500-00-T-J-RPT-00-17	17 April 2025
Jacobs (2025e)	Greater Parramatta Olympic Peninsula River Release Pipeline 100% Concept Design Drawings Brine and Influent Pipeline Drawings (drawings only)	IA319500-BR-C-90-DRG-ALL	23 May 2025
Jacobs (2025f)	Greater Parramatta and Olympic Peninsula (GPOP) Project – Groundwater Monitoring and Management Plan for WRRF Capping	IA319500-00-T-J-RPT-00-04	24 April 2025
Jacobs (2025g)	Greater Parramatta Olympic Peninsula River Release Pipeline 100% Concept Design Drawings River Release Pipeline (No report available)	IA319500-EF-X-90- DRG-ALL	27 May 2025
Jacobs (2025h)	Greater Parramatta and Olympic Peninsula (GPOP) Project – River Release Pipeline – Preliminary Site Investigation Report	IA319500-00-T-J-RPT-00-08	27 May 2025
Jacobs (2025i)	Greater Parramatta and Olympic Peninsula (GPOP) Project – Detailed Site Investigation – River Release Pipeline Alignment	IA319500-00-T-J-RPT-00-12	16 June 2025
Birch, G.F. and Batley, G. (2025)	Greater Parramatta and Olympic Peninsula Water Cycle Management – Sediment size and chemistry for cores retrieved from the John Whitton Bridge potential release site	N/A	June 2025
Jacobs (2025j)	Greater Parramatta Olympic Peninsula River Release Pipeline 100% Concept Design Drawings River Release Pipeline (drawings only)	IA319500-EF-X-90- DRG-ALL	27 May 2025
Jacobs (2025k)	Greater Parramatta and Olympic Peninsula Water Cycle Management Project Groundwater Impact Assessment	IA319500-00-T-J-RPT-00-19 Revision C.	13 August 2025
AAJV 2016	Wentworth Point – Concept Design Geotechnical and Environmental Investigation Report	AAJV-233727-396-Geo	16 September 2016
GHD (2025)	Desktop Study – Camellia Pumping Station to NSOOS, Greater Parramatta, Olympic Peninsula Water Cycle Management	12673348 Rev A	24 November 2025

Reference	Title	Document No	Date of Issue
Aurecon (2025)	Greater Parramatta and Olympic Peninsula Water Cycle Management, Surface Water and Geomorphology Assessment	Revision D	01 September 2025

Note:

* Final version of this report will be appended to the EIS.

3.2 Other sources

The contamination assessment also involved the collation and review of publicly available information to provide baseline information for the study area. These sources include:

- Bureau of Meteorology website (climate information).
- Department of Land and Water Conservation, 1998. Acid Sulphate Soil Risk Mapping.
- Hydrogeological Landscapes of NSW and the ACT Dataset (DPIE, 2016).
- Geoscience Australia, Liquid Fuel Sites Database.
- NSW Government Planning Portal (NSW Government, 2025).
- NSW EPA Register of Notified Contaminated Sites under Section 60 of the CLM Act.
- NSW EPA Contaminated Land: Records of Notices under the CLM Act.
- NSW EPA Public Register of licensed, delicensed and former activities under the POEO Act.
- NSW Government Database of Former Gasworks Sites.
- Department of the Environment and Energy's National Waste Management Database (Australian Government).
- NSW EPA PFAS Investigation Database.
- NSW Government eSPADE 2.2 web application ([eSPADE v2.2](#)).

4. Proposed work

The following section provides a summary of the project's proposed work and the construction methodology to be used. The tables were adapted from the Groundwater Impact Assessment (Jacobs 2025) and include whether any soil and land contamination assessments were undertaken in the area.

The project is split into three main areas:

- The WRRF.
- The River Release pipeline.
- Brine and Transfer pipelines:
 - Between WRRF and Camellia pumping station.
 - Camellia pumping station.
 - Brine alignment (between Camellia pumping station and NSOOS).

4.1 WRRF

A summary of proposed works at the WRRF (based on the Camellia WRRF Reference Design Report, dated 7 March 2025), is provided in Table 4.1.

Prior to excavation work, it is understood that part of the ground surface at the WRRF will be raised with an average of 1.7 m of virgin excavated natural material (VENM) and imported tunnel spoil (sourced from tunnel construction and reused under a suitable resource recovery order (RRO)) (approved under part 5.1 assessment under the EP&A Act). The land being raised is where all infrastructure for the WRRF is to be built and therefore will result in minimal disturbance of the contaminated land underneath. Where construction elements are located within the land raised extent, the excavation depth included in Table 4.1 is relative to the top of the raised surface. In the southern area of the site where the land is not being raised, the following elements are planned:

- Ground mounted solar panels in the south western corner.
- River release pipelines entry portals in the southern area.
- Spoil stockpiles from the trenches along the alignment in the south eastern area.
- Excess of the VENM/ENM and imported tunnel spoil material used to raise the WRRF southern area.

Table 4.1 Summary of proposed works at the Camellia-Rosehill WRRF

Project Element	Design Summary	Is groundwater intersected?	Contamination investigation undertaken
Two Foul Water Pumping Stations (FWPS)	Excavation depth of approximately 6.8 m below the top of the raised surface. Approximate footprint 5 m by 5 m.	Yes	Yes – part of the site wide WRRF DSI.
Water retaining structures, including: <ul style="list-style-type: none"> – Primary Settlement Tank (PST) Stage 1 – PST Stage 2 – Bioreactor Stage 1 – Bioreactor Stage 2 – Membrane Bioreactor (MBR) 	Excavation depth of 1.7 m below the top of the raised surface.	No. Excavation is not anticipated to intercept groundwater.	VENM and imported tunnel spoil under RRO are only anticipated to be encountered.
First Flush Tank	Excavation depth of 1.7 m below the top of the raised surface.	No. Excavation is not anticipated to intercept groundwater.	VENM and imported tunnel spoil under RRO are only anticipated to be encountered.

Project Element	Design Summary	Is groundwater intersected?	Contamination investigation undertaken
Electrical pits	14 larger pits with a design footprint of 2.4 m by 2.4 m and 8 smaller pits with a design footprint of 1.2 m by 1.2 m. Proposed excavation depth of 1.5 m below the top of the raised surface.	No. Excavation is not anticipated to intercept groundwater.	VENM and imported tunnel spoil under RRO are only anticipated to be encountered.
Electrical conduits	1.5 m wide trenched excavation to a depth of 1.5 m below the top of the raised surface.	No. Excavation is not anticipated to intercept groundwater.	VENM and imported tunnel spoil under RRO are only anticipated to be encountered.
Two river release pipeline HDD pits Located toward the south-west corner of WRRF site	HDD pits are currently situated outside of the proposed land raising area, and as such the base of the excavation is anticipated to sit at 2 metres below ground level (m bgl) Approximate footprint of 15 m by 4 m.	Yes.	Yes – part of the site wide WRRF DSI.
Brine pipeline and transfer main HDD pits (three launch) Located toward the north-west corner of WRRF site	Three pits for the launch of: – Brine pipeline – Transfer main 1 – Transfer main 2 Proposed location is within the raised surface extent and as such the maximum excavation depth of all pits is 2 m below the top of the raised surface. Approximate footprint of 15 m by 4 m.	No. Excavation is not anticipated to intercept groundwater.	Yes – part of the site wide WRRF DSI.
Additional connecting pipelines	Pipelines connecting the FWPS, water retaining structures and the first flush tank. The current construction design indicates all excavation activities shall be contained within the raised surface layer.	No. Excavation is not anticipated to intercept groundwater.	VENM and imported tunnel spoil under RRO are only anticipated to be encountered.

4.2 River release pipeline

Construction of the river release pipelines involves both open trenching and trenchless methods. The open trenching method involves excavating from the surface to the required depth and then backfilling. It involves high surface disruption and may intersect groundwater, which would necessitate dewatering. The trenchless method involves the installation of pipes without continuous surface excavation. There is minimal surface disruption and it does not usually require dewatering. A summary of the proposed work along the river release pipeline is provided in Table 4.2. Table 4.2 summarises project components, all will include interaction with soils and in some instances with groundwater, it also highlights whether contamination investigations have been undertaken.

Design details are based on the 100% Concept Design, dated 27 May 2025 and are subject to change in the Detailed Design phase.

Table 4.2 Summary of proposed works along the river release pipeline (indicative)

Project Element	Location	Design Summary	Is groundwater intersected?	Intrusive contamination investigation undertaken
Open trench	Carnarvon Street to Silverwater Road	Approximately 1375 m of open trench, to a maximum depth of 5 m Maximum trench width 2.2 m	Yes	Yes – part of the river release pipeline DSI
Open trench	Silverwater Road to Pierre De Coubertin (PDC) Park	Approximately 1374 m of open trench, to a maximum depth of 5 m Maximum trench width 2.2 m	Yes	Yes – part of the river release pipeline DSI
Open trench	SOPA POD A Carpark to SOPA POD C Carpark	Approximately 662 m of open trench, to a maximum depth of 6 m Maximum trench width 2.2 m	Yes	Yes – part of the river release pipeline DSI
Open trench	Meadowbank Park to John Whitton Bridge	Approximately 829 m of open trench, to a maximum depth of 7 m Maximum trench width 2.2 m	Yes	Yes – part of the river release pipeline DSI
Two HDD pits	South-west corner of WRRF site	Refer Section 4.1	Yes	Yes – part of the site wide WRRF DSI
Two HDD pits	Carnarvon Street,	Proposed excavation depth of 2 m Approximate footprint of 15 m by 4 m	No. Excavation is not anticipated to intercept groundwater.	Yes – part of the river release pipeline DSI
Two HDD pits	SOPA Pod A Carpark	Proposed excavation depth of 2 m Approximate footprint of 15 m by 4 m	No. Excavation is not anticipated to intercept groundwater.	Yes – part of the river release pipeline DSI
Micro-tunnelling shafts (launch and receival)	East and west sides of Silverwater Road	Proposed excavation depth of 10 m Approximate footprint of 12 m x 4 m	Yes	No – area could not be accessed during the DSI
Two HDD pits	PDC Park	Proposed excavation depth of 2 m Approximate footprint of 15 m by 4 m	Yes	Yes – part of the river release pipeline DSI
One HDD cofferdam pit	SOPA Pod C Carpark	Proposed excavation depth of 6.5 m Approximate footprint of 50 m by 4 m	Yes	Yes – part of the river release pipeline DSI
Two HDD pits	Meadowbank Park	Proposed excavation depth of 2 m Approximate footprint of 15 m by 4 m	Yes	Yes – part of the river release pipeline DSI

Project Element	Location	Design Summary	Is groundwater intersected?	Intrusive contamination investigation undertaken
HDD sections (i.e., tunnels)	WRRF to Carnarvon Street PDC Park to SOPA Pod A Carpark SOPA Pod C Carpark to Meadowbank Park	Twin 800 OD HDPE PN25 pipes	No. HDD methodology is to use sufficient pressure to prevent groundwater ingress during drilling.	Yes – part of the river release pipeline DSI
Micro-tunnelled sections (i.e., actual tunnels)	Silverwater Road	1350 ID concrete jacking pipe	No. Microtunnel construction methodology is considered impermeable to groundwater inflow.	No – area could not be accessed during the DSI
River release structure	Parramatta River, Meadowbank	Temporary cofferdam at Parramatta River. Eight smaller pipelines to extend out underneath the sandstone sea wall and along the riverbed. The pipelines would be varying lengths, with the longest extending approximately 130 m.	No. Construction methodology considered impermeable to groundwater inflow.	Yes - Birch, G.F. and Batley, G. (2025) sediment assessment

4.3 Brine and transfer pipelines (between WRRF and NSOOS)

4.3.1 WRRF to Camellia pumping station

Construction of the brine and transfer pipelines between the WRRF and Camellia pumping station involves both open trenching and trenchless methods. The transfer pipelines consists of twin outside diameter (OD) 800 pressure nominal (PN) 25 pipes and the brine pipeline of one OD630 PN25 pipe.

A summary of proposed work along the brine and transfer pipelines between the WRRF site and Camellia pumping station is provided in Table 4.3. Design details are based on the 100% Concept Design, dated 23 May 2025 and are subject to change in the Detailed Design phase.

Table 4.3 Summary of proposed works along the brine and transfer pipelines, between the WRRF and Camellia pumping station

Project Element	Location	Design Summary	Is groundwater intersected?	Intrusive contamination investigation undertaken
Open trench	North-west of Rosehill Gardens Racecourse to Camellia pumping station	Approximately 220 m of open trenching, to a maximum depth of 3.5 m. The trench is proposed to contain both the brine pipeline and transfer pipelines, and is designed to be 2.8 m wide	Yes	Yes – part of the brine and transfer pipelines DSI

Project Element	Location	Design Summary	Is groundwater intersected?	Intrusive contamination investigation undertaken
HDD pits (three launch)	North-west corner of WRRF site	Refer to Section 4.1	No. Excavation is not anticipated to intercept groundwater.	Yes – part of the brine and transfer pipelines DSI
HDD pits (three retrieval)	North-west of Rosehill Gardens Racecourse	Three pits for the launch or receipt of: <ul style="list-style-type: none"> – Brine pipeline – Transfer main 1 – Transfer main 2 Proposed maximum excavation depth of all pits is 2 m below ground surface	No. Excavation is not anticipated to intercept groundwater.	Yes – part of the brine and transfer pipelines DSI
HDD sections (i.e., tunnels)	North-west corner of WRRF site to north-west of Rosehill Gardens Racecourse	Tunnelled sections for: <ul style="list-style-type: none"> – Brine pipeline – OD630 PN25 pipe – Transfer main 1 – OD800 PN25 pipe – Transfer main 2 - OD800 PN25 pipe. 	No. HDD methodology uses sufficient pressure to prevent groundwater ingress during drilling.	Yes – part of the site wide WRRF DSI.

4.3.2 Brine alignment (between Camellia pumping station and the NSOOS)

Proposed work along the brine alignment involves relining the existing DN750 brine pipeline between Camellia pumping station and the existing NSOOS. Design information was limited at the time of this assessment. It is understood that the works involve excavation of 21 pits along the existing brine pipeline to allow access for the relining equipment. This was based on the need for a structural relining which means a conservative approach has been taken for the assessment of groundwater interaction.

The excavation depth of the pits was assumed to be 1 m below the existing pipe invert level. Pipe invert levels at the location of access pits were provided by Sydney Water. The footprint of excavations was assumed to be 15 m by 4 m, in line with the assumed footprint of shaft excavations at the other GPOP WCM project sites. Table 4.4 summarises the details of the proposed access pits. No intrusive contamination investigations were undertaken here as part of this project. An investigation was completed in 2018 by Sydney Water (Ensure JV) which found asbestos contamination south of the Parramatta River (refer to Section 6.6).

Table 4.4 Summary of proposed brine alignment excavation works (between Camellia pumping station and the NSOOS)

Project Element	Approximate chainage (m)	Ground surface level (mAHD)	Existing pipe invert level (m AHD)	Adopted excavation depth (m bgl) ¹	Assumed footprint	Is groundwater intersected?	Intrusive contamination investigation undertaken
Brine - Pit 1	0	19.5	15.2	5.3	15 m by 4 m	Yes	No
Brine - Pit 2	3	19.5	15.2	5.3	15 m by 4 m	Yes	No
Brine - Pit 3	11	19.5	15.3	5.2	15 m by 4 m	Yes	No
Brine - Pit 4	34	19.5	15.3	5.0	15 m by 4 m	Yes	No
Brine - Pit 5	53	19.4	15.4	4.7	15 m by 4 m	Yes	No

Project Element	Approximate chainage (m)	Ground surface level (mAHD)	Existing pipe invert level (m AHD)	Adopted excavation depth (m bgl) ¹	Assumed footprint	Is groundwater intersected?	Intrusive contamination investigation undertaken
Brine - Pit 6	61	19.2	15.5	4.7	15 m by 4 m	Yes	No
Brine - Pit 7	70	19.1	15.5	3.4	15 m by 4 m	Yes	No
Brine - Pit 8	100	17.8	15.4	3.8	15 m by 4 m	Yes	Yes ²
Brine - Pit 9	443	18.0	15.2	4.8	15 m by 4 m	Yes	No
Brine – Pit 10 (aerial crossing)	485	17.0	13.2	N/A – Above ground	15 m by 4 m	No. No excavation proposed.	No
Brine – Pit 11 (aerial crossing)	596	17.6	19.9	N/A – Above ground	15 m by 4 m	No. No excavation proposed.	No
Brine - Pit 12	629	16.4	19.9	4.7	15 m by 4 m	Yes	No
Brine - Pit 13	654	20.0	16.3	8.0	15 m by 4 m	Yes	No
Brine - Pit 14	777	23.3	16.3	7.3	15 m by 4 m	Yes	No
Brine - Pit 15	930	24.3	18.1	6.6	15 m by 4 m	Yes	No
Brine - Pit 16	1002	26.7	21.0	7.5	15 m by 4 m	Yes	No
Brine - Pit 17	1028	23.7	17.2	6.9	15 m by 4 m	Yes	No
Brine - Pit 18	1182	23.1	17.2	6.7	15 m by 4 m	Yes	No
Brine - Pit 19	1307	26.2	20.5	6.8	15 m by 4 m	Yes	No
Brine - Pit 20	1673	31.7	25.9	5.6	15 m by 4 m	Yes	No
Brine - Pit 21	1760	33.5	28.9	5.9	15 m by 4 m	Yes	No

Notes:

1. Adopted excavation floor depth was assumed to 1 m below the existing pipe invert level.
2. Contamination investigation undertaken in 2018 by Sydney Water (Ensure) at this location.

4.4 Camellia pumping station

The existing Camellia pumping station is to be upgraded to divert wastewater to the WRRF. Upgrades would include the installation of new pumps to deliver wastewater flows to the new WRRF while the remaining pumps would pump excess existing flows and brine produced by the WRRF to the NSOOS via existing pressure mains. New connections would be installed to divert the wastewater into the transfer pipeline. The existing site sheds would be replaced with a new electrical switch room along the eastern boundary of the site.

Relining of the brine pipeline and connection of the transfer pipelines at the existing pumping station Camellia pumping station involves open trenching. Table 4.5 summarises the proposed open trenching that allows connection between the new brine and transfer pipelines and the existing wet well structures at Camellia pumping

station. Design details are based on the 100% Concept Design, dated 23 May 2025 and are subject to change in the Detailed Design phase.

Table 4.5 Summary of proposed excavation works at Camellia pumping station

Project Element	Location	Design Summary	Is groundwater intersected?	Intrusive contamination investigation undertaken
Open trench	Connection of the transfer main to existing Camellia pumping station wet well.	Approximately 41 m of open trenching, to a maximum depth of 6.5 m. Trenching is proposed to be approximately 3 m wide.	Yes.	Yes – part of the brine and transfer pipelines DSI.
Open trench	Relining of brine pipeline to existing Camellia pumping station wet well.	Approximately 38 m of open trenching, to a maximum depth of 6 m. Trenching proposed to be approximately 2.6 m wide.	No. Excavation is not anticipated to intercept groundwater.	Yes – part of the brine and transfer pipelines DSI.

Information detailed in the Groundwater Impact Assessment (Jacobs, 2025k) indicates the following:

- At SPM-BH-101 which is close to Camellia pumping station, the groundwater observations were made during geotechnical drilling, noting that SPM-BH-101 is not a groundwater well, and that the groundwater depth is assumed.
- Jacobs report that there is potential for groundwater interaction during excavation of the open-trenched section from the Rosehill Gardens Racecourse overflow carpark to Camellia pumping station, with interception of groundwater estimated to be up to 0.5 m below the groundwater table.
- The connection of the transfer main to the existing wet well infrastructure at Camellia pumping station was considered likely to interact with groundwater.

Based on this, there is the potential for interception of groundwater during the construction of the brine pipeline to the existing wet well.

5. Assessment methodology

5.1 Overview

The methodology for this soil and contaminated land impact assessment is presented in the following sections. The tasks carried out as part of the overall project's contamination assessment to meet the requirements of the SEARs includes:

- Undertaken PSIs and DSIs across the project footprint (this has been completed by Jacobs (See Section 3.1). The reports were prepared and/or reviewed by a certified environment practitioner – Site contamination scheme (CEnvP (SC)) and accompanied by an Interim Audit Advice or a Site Audit Statement from an NSW EPA accredited Site Auditor certifying the appropriateness of the assessments (Rebeka Hall of Geosyntec Consultants). A Summary of the scope of the PSIs and DSIs is provided in Appendix D.
- Review of relevant legislation, policy and guidelines to address SEARs and agency comments.
- Desktop review of all available existing information to gain an understanding of the existing environment (Section 6). This includes the PSIs and DSIs completed as part of the project, previous environmental reports (where available), published information, selected historical aerial photographs, and NSW EPA public records.
- Site inspection of the pipeline alignment and the WRRF to ground truth the information gained from the desktop review and the potential contamination within the project footprint (Section 6.3) and surrounding study area.
- Summary of all the areas of environmental interest (AEIs) that have been selected. The summary included the history of the AEI and the main contaminants of potential concern (COPCs) and whether the AEI will impact the project (Section 6.6).
- A high level prioritisation exercise to identify the AEIs with respect to contamination and assessment of potential impacts from the construction and operation activities of the proposed project (Section 7) to human health and ecological receptors. This included a conceptual site model (CSM) which qualitatively assesses the potential risk from identified AEIs.
- An assessment into potential impacts from other projects within the project footprint (Cumulative impact assessment, section 7.3).
- Identification of mitigation measures and/ or management measures for contamination required during the construction and operation phases. As part of these measures, an assessment of whether there is a requirement for further investigation and/or remediation (Section 8).
- Monitoring requirements during construction and operations.

5.2 Site inspections

The site inspections were conducted to provide an insight of the proposed project and ground truth areas of concern, further detail is provided in section 6.3. A photographic record of the site walkover is provided in Appendix C.

5.3 Criteria adopted

5.3.1 Areas of environmental interest (AEIs)

The potential contamination sources are referred to as AEIs which were identified as an outcome of the assessment completed during the PSIs that were undertaken as part of this project (Jacobs 2025c, 2025h). Where further assessment of AEIs was required, intrusive investigations were then undertaken as part of the DSIs where it was determined based on risk to the project (Jacobs 2024a, 2025d, 2025i). The results of these intrusive investigations were assessed by comparison with adopted Site Assessment Criteria (SAC) which were selected (in the DSIs) to address potential health and environmental exposure risks associated with soil and groundwater

contamination (if present) within the project footprint. The SAC are a set of health and ecological based soil and groundwater investigation levels and further information is provided in Appendix B.

The intrusive investigations involved the collection of samples of environmental media (i.e., soil, groundwater and sediments) that were subsequently analysed for the presence of COPCs. The analytical test results of the COPCs were compared against SAC which are considered to be appropriate for the proposed land use and main potential receptors of concern (i.e., construction workers, operational staff and on-site terrestrial ecosystems of value – if present). That is, the SAC have been set at levels that provide confidence that contaminant concentrations below the SAC will not adversely affect human health and/or on-site terrestrial ecosystems.

5.3.2 Risk ranking for AEIs

The impact assessment is based on the CSM for the project footprint. The CSM identifies the linkages between the AEIs and receptors and the pathways through which the contamination can migrate through the environment. The receptors for this assessment include human, environmental and the built environment. The human receptors are the construction and maintenance workers and current and future users of the surrounding sites. The environmental receptors include flora and fauna of the area, surface water bodies and groundwater. The built environment receptors include buildings and structures.

The qualitative risk assessment (Australian/New Zealand ISO standard on risk management, (derived from AS/NZS ISO 3100:2009)) applies a rating matrix to determine the qualitative contamination impact risk. The risk is assessed by estimating the likelihood of the linkages between AEIs and sensitive receptors occurring and the foreseeable consequences of that exposure and their impacts on the construction and operation.

The likelihood ratings are defined in Table 5.1.

Table 5.1 Likelihood ratings

Likelihood rating	Description
Rare	Has not occurred in the past five years OR may occur in exceptional circumstances, i.e., less than 10 per cent chance of occurring in the next 24 months if the risk is not mitigated.
Unlikely	May have occurred once in the last five years OR has a 10 to 30 per cent chance of occurring in the future if the risk is not mitigated.
Possible	Has happened during the past five years but not in every year OR has a 40 to 60 per cent chance of occurring in the next 24 months if the risk is not mitigated.
Likely	Has happened at least once in the past year and in each of the previous five years, OR has a 60 to 90 per cent chance of occurring in the next 24 months if the risk is not mitigated.
Almost certain	Has happened several times in the past year and in each of the previous five years OR has a greater than 90 per cent chance of occurring in the next 24 months if the risk is not mitigated.

The consequence definitions applicable to human, environmental and built environment receptors are shown in Table 5.2.

Table 5.2 Consequences definitions

Classification	Human Health	Ground / surface water	Ecological	Built Environment
Severe	Irreversible damage to human health or death	Substantial pollution of sensitive water resources	Major change to the number of one or more species or ecosystems	Irreparable damage to buildings, structures or the environment
Moderate	Non-permanent effects to humans	Substantial pollution of non-sensitive water resources or small-scale pollution	Change to population densities of non-sensitive species	Damage to sensitive buildings, structures or the environment
Mild	Slight short-term health effects to humans	Slight pollution to non-sensitive water resources	Some changes to population densities but with no negative effects on the function of the ecosystem	Easily repairable effects of damage to buildings or structures

Classification	Human Health	Ground / surface water	Ecological	Built Environment
Negligible	No measurable health effects to humans	Insubstantial pollution to non-sensitive water resources	No major changes to population densities in the environment or in any ecosystem	Very slight non-structural damage or cosmetic harm to buildings or structures

After consideration of the likelihood and consequences, the overall risk ratings are assessed in accordance with Table 5.3.

Table 5.3 Risk ranking matrix

Consequence	Likelihood				
	Rare	Unlikely	Possible	Likely	Almost Certain
Severe	Low	Low to moderate	Moderate to high	Very high	Very high
Moderate	Negligible to low	Low	Moderate	Moderate to high	High
Mild	Negligible	Low	Low	Low to moderate	Moderate
Negligible	Negligible	Negligible	Negligible to Low	Low	Low

Risk ratings are defined as follows:

- **Negligible** – The presence of the identified source does not give rise to the potential to cause major harm.
- **Low** – It is possible that harm could arise to a specific receptor from an identified source, though this is likely to be mild.
- **Moderate** – It is possible that harm could arise to a specific receptor, but it is unlikely that such harm would be major.
- **High** – A specific receptor is likely to experience major harm from an identified source without remedial action.
- **Very High** – There is a high probability that severe harm could arise to a specific receptor from an identified source without appropriate remedial action.

The nominated risk ranking for each of the AEIs will be the highest level risk identified among all of the identified receivers. The receptor/s with the highest risk ranking for the AEI have been provided in brackets with the ranking.

5.4 Impact assessment

The impact assessment incorporated the significance of the risk rating to assess the impacts on construction and operation. In addition, mitigation measures (if required) were developed to minimise contamination migration and impact human health and the environment.

The proposed activities associated with the project construction and operation were reviewed to identify the activities that had the potential to impact or change the soil, sediment, soil vapour, ground gases and groundwater. These activities are provided in Section 7.

5.4.1 Pipelines

Pipeline infrastructure will be primarily below ground and therefore potential impacts to soil quality and contamination associated with the pipelines are expected to be associated with the construction phase where stripping, grubbing and earthworks would be required.

Potential soil and contamination impacts associated with the construction of the pipeline sections, pipeline relining (existing rising main between Camellia pumping station and the NSOOS) and ancillary works have been quantitatively assessed using desktop and intrusive site investigation data where the data exists. The scope of these reports is summarised in Appendix D.

5.4.2 WRRF

The WRRF would require a range of process infrastructure such as tanks, bioreactors and digestors. The operation of the WRRF would also require ancillary facilities such as an administration building and associated car park, chemical storage and stormwater infrastructure. As part of the site environmental management works, a large portion of the WRRF site will have been raised to about 1.7 m with VENM and imported tunnel spoil under resource recovery orders prior to any construction activities.

During the construction of the WRRF the majority of the structures and buildings will be built in this land raised material. However, there will be some services and foundations that may be installed below this raised level. A DSI (Jacobs 2025a) for soil, groundwater, surface water and vapour were undertaken to provide for quantitative impact assessment. Potential contamination impacts associated with the construction of the facility and ancillary works have been quantitatively assessed using desktop and intrusive site investigation data. The scope of these reports is summarised in Appendix D.

5.4.3 Camellia pumping station

The relining of the brine pipeline at the pumping station and the connection of the transfer pipelines at the existing pumping station, will involve open trenching. Therefore, potential impacts to soil and contamination associated with open trenching are expected to be with the construction phase, where stripping, grubbing and earthworks would be required.

Potential soil and contamination impacts associated with the construction of the pipeline connection, pipeline relining (Brine) and ancillary works have been quantitatively assessed using desktop and intrusive site investigation data where the data exists. The scope of these reports is summarised in Appendix D.

5.4.4 River release structure

The river release structure involves eight smaller pipelines that extend underneath the sandstone sea wall and along the Parramatta River's riverbed. The pipelines would vary in length, with the longest extending about 130m. Diffusers would release water to enable mixing.

Disturbance of sediments associated with the construction and the operation have been quantitatively assessed using desktop and intrusive site investigation data where the data exists. The scope of these reports is summarised in Appendix D. In addition, the construction and operational impact of the river release structure on surface water at the Parramatta River has been assessed in the Surface Water and Geomorphology Assessment (Aurecon, 2025).

5.5 Cumulative impacts

The key potential cumulative impact associated with soil and contaminated land is related to land disturbance near these other projects proposed or being undertaken within the area as shown on Figure 5.1. The following criteria were used to determine which projects to include in the cumulative impact assessment:

- The cumulative search area was delineated based on where impacts are expected: within the Camellia Precinct, Sydney Olympic Park, Wentworth Point, Meadowbank Park, Silverwater, and nearby swim sites with a 1 km buffer applied to the impact assessment area and pipeline alignments to capture any impacts on the surrounding road network (see Figure 5.1).
- Modifications or new projects that received their most recent approval within the last five years were considered.
- Projects where the construction of the project overlaps with GOP WCM construction were considered. Where timeframes are unknown, projects were considered relevant.



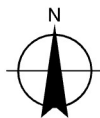
Legend

- Cumulative impact search area
- Camellia-Rosehill WRRF
- Pipelines
- Roads
- Waterways

Nearby projects construction start year

- 2022
- 2024
- 2025
- 2026
- Not provided / TBC

1:44,000 @ ISO A4
 0 300 600
 Metres



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

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Cumulative impact area

FIGURE 5.1

6. Existing environment

The following section outlines the existing environment, including soils, groundwater and contamination related information for the project footprint.

6.1 Project footprint identification

Relevant project footprint information is summarised in Table 6.1.

Table 6.1 Project footprint identification

Council	Parramatta City Council – Brine pipeline, Transfer pipelines, WRRF, Camellia pumping station, river release pipeline to the southern side of the Parramatta River at Wentworth Point Ryde City Council – River release pipeline at Meadowbank
Land zoning	The project footprint is situated over numerous land use zones under the <i>Parramatta Local Environmental Plan 2023 and Ryde Local Environmental Plan 2014</i> as presented in Figure 6.1 and as follows: <ul style="list-style-type: none"> – R2 Low density residential – E4 General industrial – SP2 Roads and Rail infrastructure facility – E3 Productivity Support – E5 Heavy Industrial – W1 Natural Waterway (Duck River) – E4 General industrial – R3 Medium density residential – R4 High density residential – C2 Environmental Conservation – C3 Environmental Management zone – RE1 Public recreation.
Current and historical land uses	The project footprint traverses multiple land uses. These include residential, light industrial, heavy industrial and recreational areas. <ul style="list-style-type: none"> – The WRRF: This element is mainly located in Camellia where the land use is heavy industrial. This area has a history of mixed industrial development dating back to the 1880s. Industrial development has included oil refining, tannery, meatworks, lumber yard, and facilities manufacturing asbestos products, plasterboard, bricks, roof tiles, chrome chemicals, chlorinated hydrocarbons, bitumen, rubber tyres, paints, arsenic-based herbicides, food products, paints, plastic pipes, and pharmaceuticals. Other industries have included solid and liquid waste storage, recycling and treatment, and concrete recycling operations. Many of these industrial facilities have been or are subject to Environment Protection Licences (EPLs) issued by the New South Wales Environment Protection Authority (EPA) (Jacobs 2024a). – Brine and transfer pipelines: <ul style="list-style-type: none"> • To the north of Parramatta River, this element is mainly located in Dundas and Parramatta where the land use is a combination of residential, commercial and light industrial. There is open space and recreational land associated with the Western Sydney University (WSU) campus which is adjacent to the project footprint close to the Parramatta Light Rail trackway. Historically this area has been used for agricultural, residential commercial and industrial land use. • To the south of Parramatta River the proposed alignment extends across the western portion of Camellia and Rosehill. Camellia has an extensive history of industrial land use with known associated contamination issues. The western portion of Rosehill is occupied by Rosehill Gardens Racecourse which has been present since at least 1930. – River release pipeline: The land use through Silverwater is mainly commercial and industrial with some residential along Carnarvon Street. Both sides of Silverwater Road and adjoining streets are mainly commercial and light industrial with limited open space and recreational areas. Newington is primarily residential with some commercial premises located close to Silverwater. Sydney Olympic Park is mainly open space and recreational land use. Historically

	Newington was used as an armoury and Sydney Olympic Park was utilised for heavy industries including abattoirs, chemical manufacture, quarrying and landfilling. Wentworth Point consists of high density residential and some commercial/light industrial. There has been an extensive history of land reclamation and industrial land use in this suburb. Meadowbank consists of a public recreation and residential land use.
Surrounding land use	A variety of land uses adjacent to the project footprint include: <ul style="list-style-type: none"> – Light industrial. – Heavy industrial. – Residential. – Urbansurf recreation centre. – Car Parking. – Landfilled waste mounds (managed). – Open space and recreational land use.

6.2 Environmental setting

6.2.1 Climate

The climate of the project footprint is considered warm, mild, and temperate. In the summer, the temperatures average a high of 28.6°C and a low of 16.4°C. In winter, highs centre around 17.5°C, while lows drop to 6.3°C.

High rainfall tends to arrive in late summer and early autumn with the highest total of rain occurring in February. The annual mean rainfall of 975.6 mm.

Table 6.2 summarises statistical rainfall data from the Bureau of Meteorology (BOM) site for the Parramatta North (Masons Drive) (#066124) station (1965 to 2025).

Table 6.2 Climate information summary

Season	Mean maximum temperature range	Mean rainfall range
Spring	21.8 to 25.5°C	49.8 to 83.3 mm
Summer	27.6 to 28.6°C	71.2 to 125.8 mm
Autumn	20.6 to 26.3°C	66.8 to 121.4 mm
Winter	17.5 to 19.2°C	50.1 to 89.4 mm

6.2.2 Topography

The elevation across the project footprint is shown in Figure 6.2.

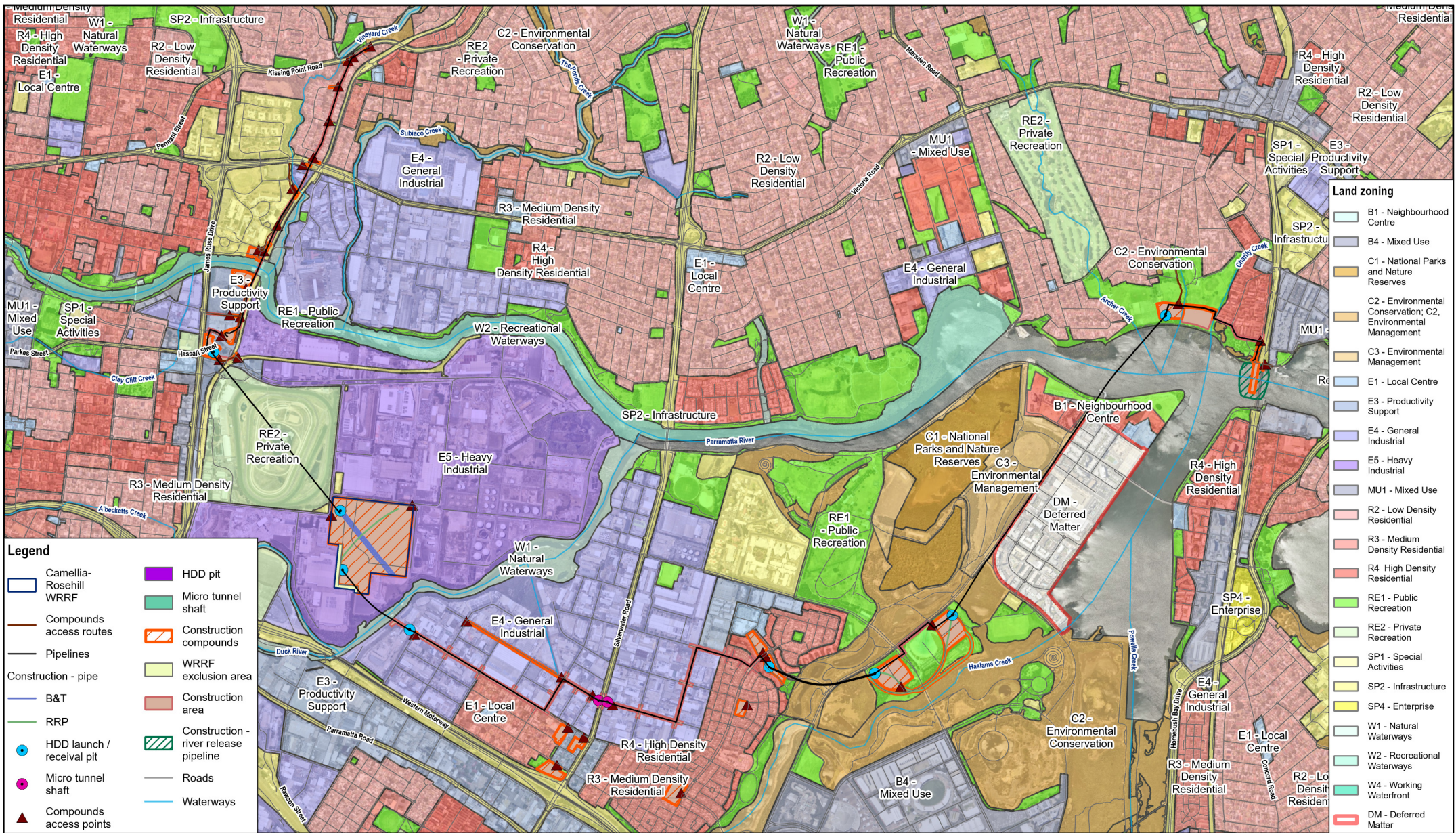
Brine and transfer pipelines alignment

The brine and transfer pipelines alignment originates from the WRRF facility in Camellia, runs under Rosehill Gardens Racecourse towards Parramatta River. The brine and transfer alignment and WRRF site lie on a peninsula between the Parramatta River and the Duck River. The alignment extends to the north of the Parramatta River on the eastern side of Western Sydney University campus to Kissing Point Road, in the suburb of Dundas, where it connects to the existing NSOOS.

The elevation at the western side of the WRRF is between 4 and 5 m AHD. At the northern end of Camellia and close to the Parramatta River the elevation is 3.31 m AHD (borehole INF-BH-102). Across the Parramatta River, the topography slopes upward to where the brine and transfer pipelines meets the NSOOS at Kissing Point Road, which is approximately at an elevation of 29 m AHD.

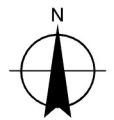
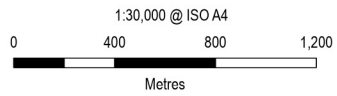
WRRF

The topography of the Camellia peninsula is relatively flat, and generally gently falls to the south towards Duck River with an elevation ranging between 4 and 5.3 m AHD.



Land zoning	
	B1 - Neighbourhood Centre
	B4 - Mixed Use
	C1 - National Parks and Nature Reserves
	C2 - Environmental Conservation; C2, Environmental Management
	C3 - Environmental Management
	E1 - Local Centre
	E3 - Productivity Support
	E4 - General Industrial
	E5 - Heavy Industrial
	MU1 - Mixed Use
	R2 - Low Density Residential
	R3 - Medium Density Residential
	R4 - High Density Residential
	RE1 - Public Recreation
	RE2 - Private Recreation
	SP1 - Special Activities
	SP2 - Infrastructure
	SP4 - Enterprise
	W1 - Natural Waterways
	W2 - Recreational Waterways
	W4 - Working Waterfront
	DM - Deferred Matter

Legend	
	Camellia-Rosehill WRRF
	Compounds access routes
	Pipelines
	Construction - pipe B&T
	RRP
	HDD launch / receival pit
	Micro tunnel shaft
	Compounds access points
	HDD pit
	Micro tunnel shaft
	Construction compounds
	WRRF exclusion area
	Construction area
	Construction - river release pipeline
	Roads
	Waterways



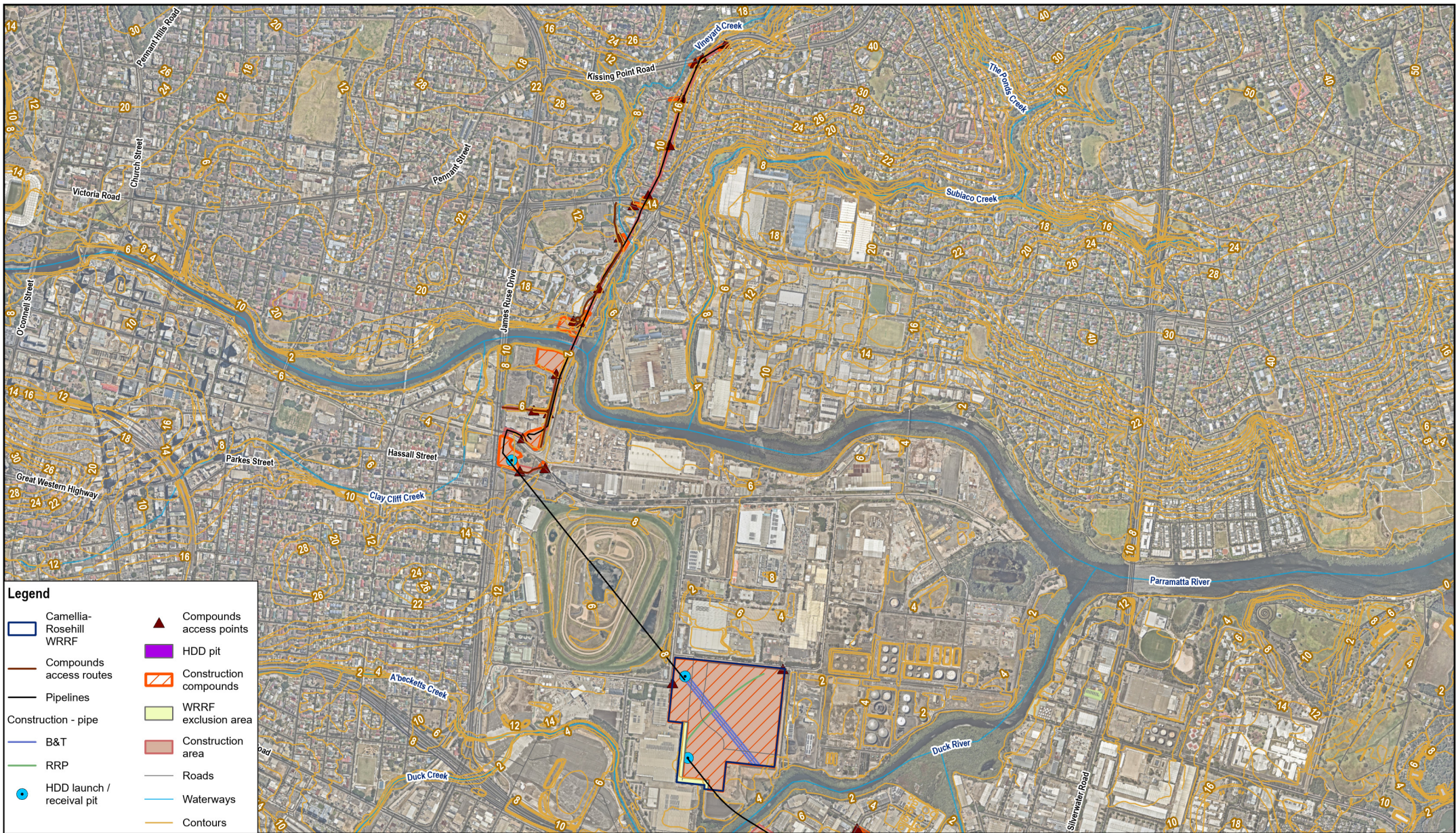
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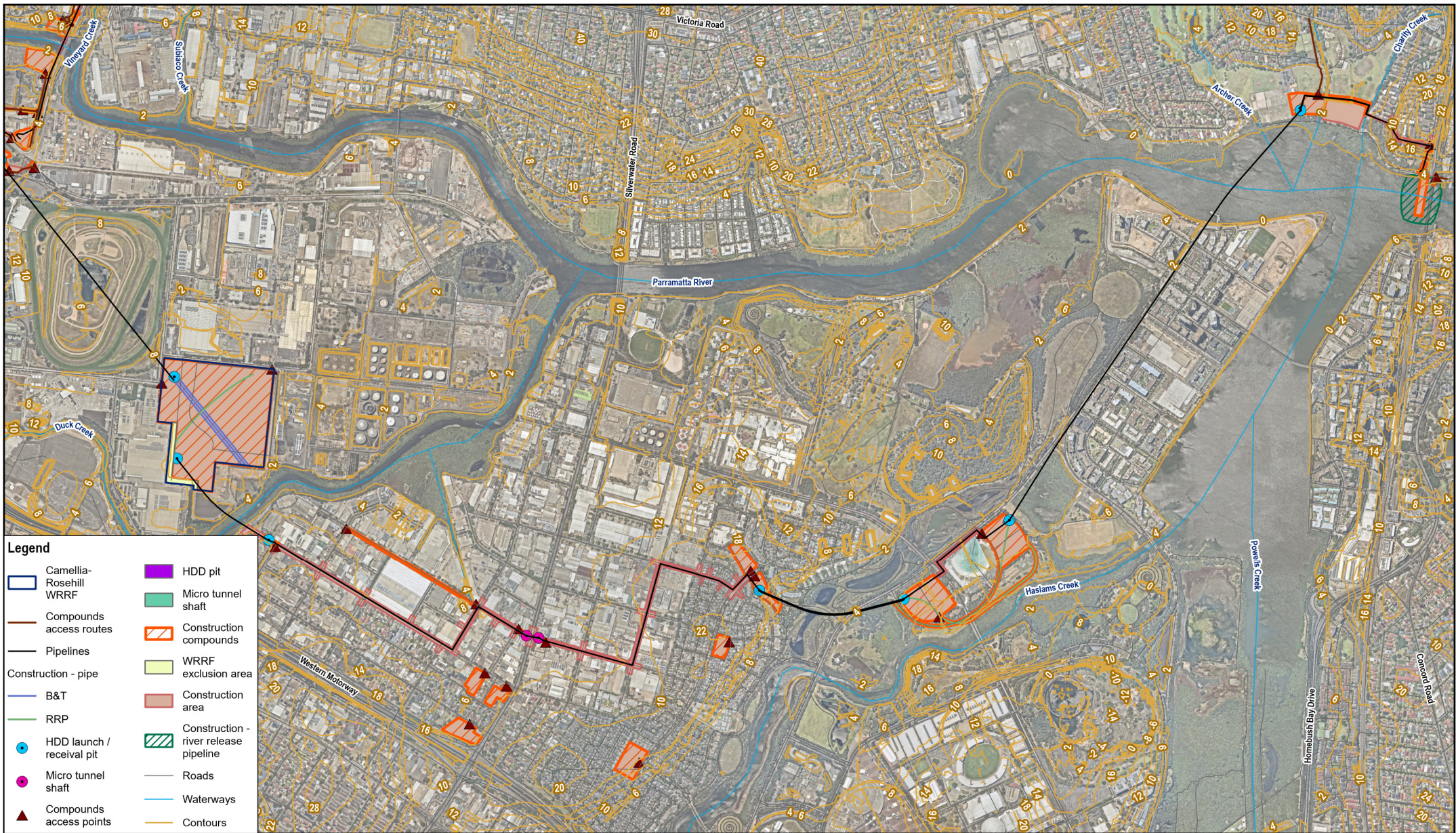
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Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

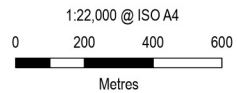
Land zoning

FIGURE 6.1





- Legend**
- Camellia-Rosehill WRRF
 - Compounds access routes
 - Pipelines
 - Construction - pipe B&T
 - RRP
 - HDD launch / receive pit
 - Micro tunnel shaft
 - Compounds access points
 - HDD pit
 - Micro tunnel shaft
 - Construction compounds
 - WRRF exclusion area
 - Construction area
 - Construction - river release pipeline
 - Roads
 - Waterways
 - Contours



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

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Elevation

FIGURE 6.2

River release pipeline

The topography of Carnarvon Road towards Silverwater Road to the east, is gently undulating. There is a slope up from Duck River at the western end of Carnarvon Road to an elevation of 8.8 m AHD, based on a review of site investigation bore logs (Jacobs, 2025i). The elevation ranges from 2.27 m AHD to 11.06 m AHD along Derby Street to the junction of Day Street North.

At Newington, the elevation peaks at 18.05 m AHD before falling to 3.92 m AHD to the north west in the car park adjacent to Hill Road, beside Urbansurf, Sydney Olympic Park.

Along Hill Road towards Burroway Road and Parramatta River, the project footprint is generally flat with gentle undulations. At the southern end of Wentworth Point the elevation is 2.54 m AHD rising to 5.4 m AHD and dropping again to 1.9 m AHD at foreshore with the Parramatta River. A review of borehole logs provided in a site investigation report (AAJV 2016) on Hill Road (prepared for Sydney Water) indicates that surface elevation ranges from 3.81 m AHD at the southern end of Hill Road to a low of 2.17 m AHD at the northern end of Hill Road, close to Burroway Road.

There are areas of significantly higher elevation associated with the landforms at Sydney Olympic Park (Woo-La-Ra and Silverwater Marker) to the immediate west of the project site.

To the north across the Parramatta River, the elevation of the project footprint in Meadowbank Park ranges from 2.29 to 2.83 m AHD. The highest elevation of the project footprint in Meadowbank is 18.65 m AHD which reduces down to 7.33 m AHD close to the foreshore with Parramatta River at John Whitton Bridge.

6.2.3 Hydrology

The Surface water features across the project footprint are shown in Figure 6.3.

Brine and transfer pipelines alignment

From the northern extent of the project footprint to the Parramatta River there is a mixture of land use with open space, roadways, footpaths and buildings. It is expected that precipitation onto the sealed areas and urban fabric is managed via the local stormwater network (e.g., kerbside drains, stormwater pits) and discharges to the local watercourses (i.e., Parramatta River, Duck River and smaller tributaries).

Where there are open areas, such as those at WSU campus and Rosehill Gardens Racecourse, precipitation is expected to infiltrate into the soils and surface soils and/or evaporate from the surface. There may be some overland flow, particularly during heavy rainfall, which is expected to either dissipate, evaporate, or eventually infiltrate into the soils.

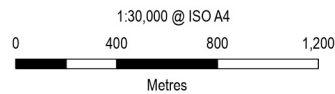
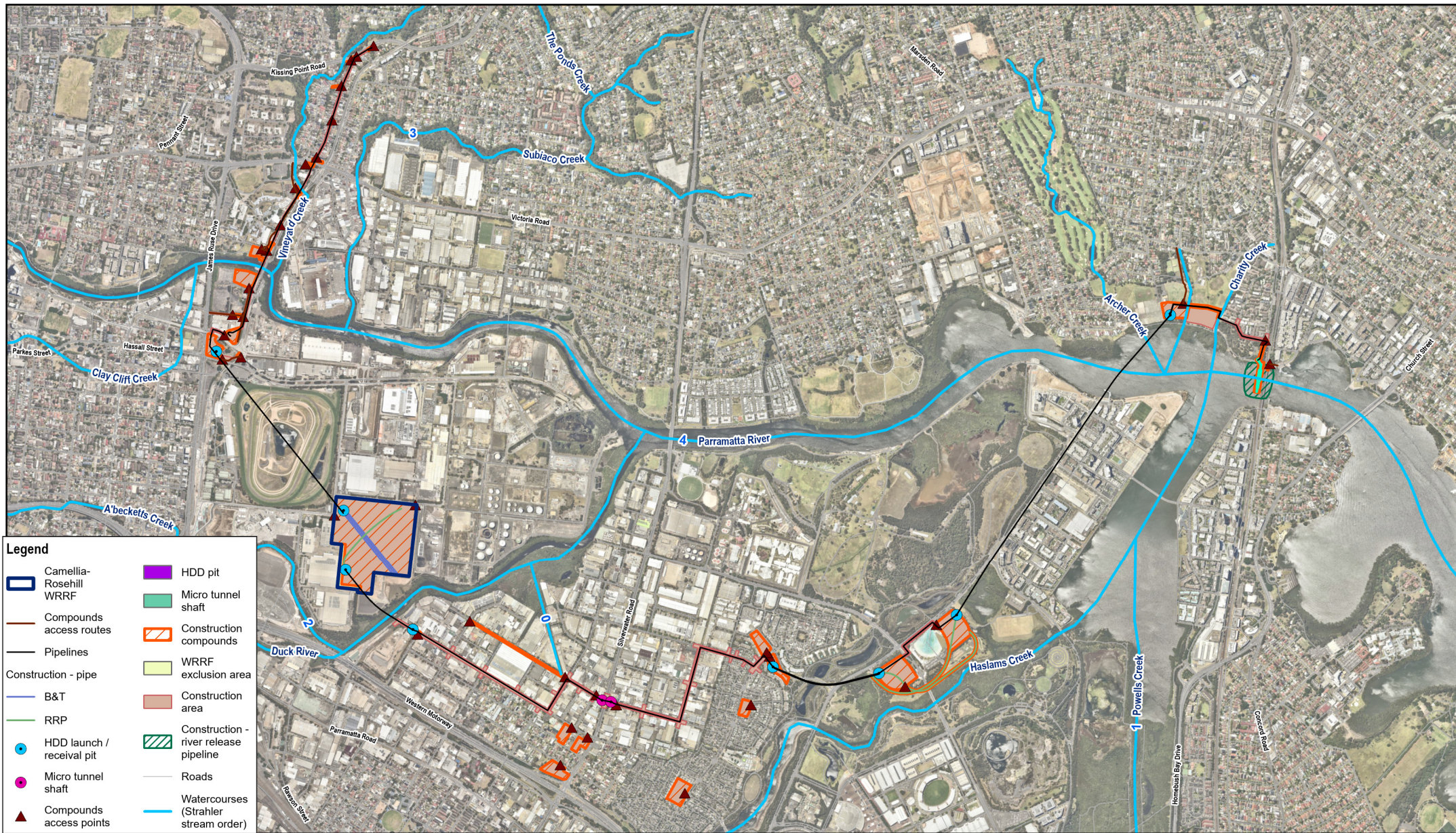
WRRF

The WRRF site was undergoing land raising at the time of the site walkover (5 August 2025) and stormwater was observed to be managed by the use of a series of on-site detention basins. The project footprint at the WRRF is relatively flat and precipitation is expected to infiltrate where the permeability of the soils allows, pond in onsite depressions and excavations or be redirected to the onsite basins. The closest watercourse is Duck River which is located approximately 100 m to the south of the WRRF and there may be some migration of surface flows towards it.

Prior to the construction of the WRRF, a 1.7 m thick cover layer will be placed across the footprint and precipitation will be managed by a formal drainage network including first flush tank, pollutant trap, box drains in addition to bulk earthworks that will allow for minimal fall across the WRRF site to facilitate stormwater drainage. On-site detention will not be occurring on the WRRF post development.

River release pipeline alignment

The river release pipeline alignment is covered by a variety of land use types, which consist of both unsealed (i.e., open space and recreational areas, waterways) and sealed areas (commercial/industrial and residential land use, footpaths and roadways). From Silverwater to Newington, the land coverage is dominated by sealed surfaces where precipitation is managed via the formal stormwater network (e.g., kerbside drains, stormwater pits) and discharges to the local stormwater system and adjacent waterways (i.e. Haslams Creek, Duck River and Narawang Wetlands).



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

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Surface water features

FIGURE 6.3

From the eastern side of Newington towards Hill Road (Sydney Olympic Park) there is an increase in open space and recreational areas and the riparian corridor of Haslams Creek and Narawang Wetlands. Precipitation falling onto the unsealed areas of the project footprint is expected to infiltrate directly onto the soils and subsoils, flow overland and/or discharge directly into the local watercourses.

In Wentworth Point there is a significant portion of the land that is covered by sealed surfaces (i.e., roadways, paths, buildings and other covered surfaces). Precipitation is managed via the formal stormwater network (e.g., kerbside drains, stormwater pits) and discharges to the local storm water system and adjacent waterways (i.e., Homebush Bay and Parramatta River).

To the west of Hill Road is the Woo-La-Ra and Silverwater Marker, which are large landfilled and capped waste mounds, where their topography slopes towards the project footprint. A drainage channel is located along the length of Hill Road between the project footprint and these mounds which would minimise potential overland flows onto the project footprint.

The project footprint at Meadowbank is dominated by Meadowbank Park, which is open space and recreational parkland. The eastern section of the project footprint has some sealed surfaces (i.e., footpaths) and vegetation coverage (i.e., trees and bush) with some soft cover. Precipitation falling onto the project footprint in Meadowbank Park is expected to infiltrate directly into the soils and subsoils, flow overland and/or discharge directly into the local watercourses (e.g., Parramatta River). On the eastern side of the project footprint, it is expected that precipitation is managed via a formal stormwater management network and/or discharges into the Parramatta River.

6.2.4 Sediments

Sediments within the Parramatta River contain contamination from historical industrial activity along the foreshore at Rhodes and Wentworth Point. These contaminants may include heavy metals, hydrocarbons, dioxins and furans that have accumulated in the sediment over time and can pose risks to aquatic life and water quality.

The sediments upstream and downstream in the Parramatta River near the John Witton Bridge were assessed as part of the site investigations undertaken for the project. The investigation included the collection of samples from 3 depths within the profile to understand the potential for surface resuspension, possible deeper disturbance and local contamination. The sediment size that included clay and very fine silt in all samples collected suggested a common source and /or a similar transport mechanism for these materials over an extended period of time. Concentrations of zinc and furans/dioxins were contained in surficial sediment and exceeded the sediment quality guidelines.

6.2.5 Soil

6.2.5.1 Soil landscapes

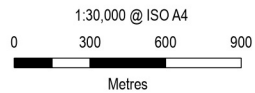
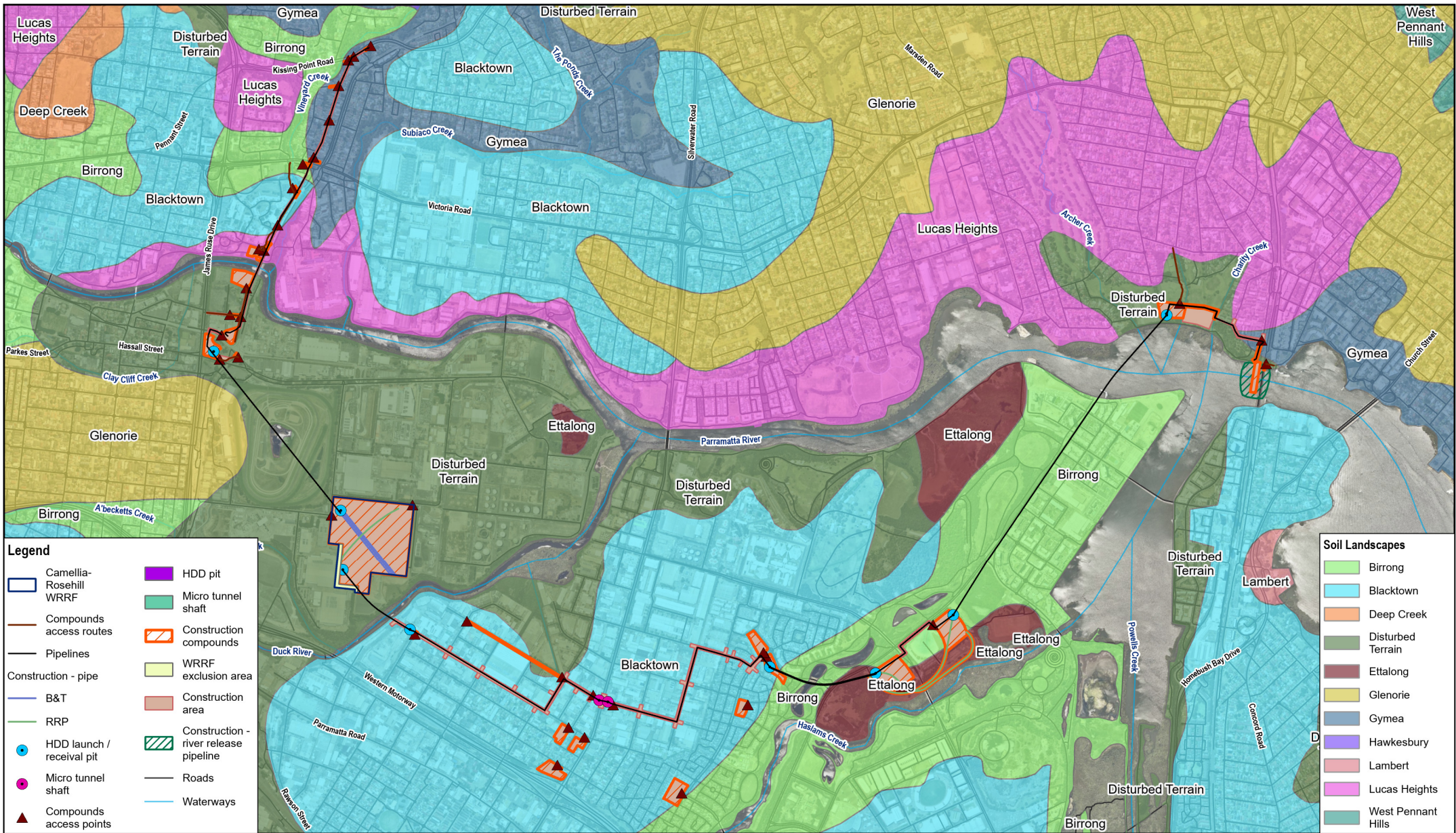
Based on a review of information and mapping presented on the online mapping portal eSPADE² (accessed July 2025), there are several soil landscape types situated on the project footprint and study area, as shown on Figure 6.4 and summarised in Table 6.3.

² eSPADE v2.2

Table 6.3 Soil landscapes summary

Soil landscape (ref)	Description	Location within study area
GyMEA (9130gy)	<p>Undulating to rolling rises and low hills on Hawkesbury Sandstone (medium to coarse grained quartz sandstone with minor shale and laminate lenses).</p> <p>Moderately inclined slopes and localised outcrops. Soil profile generally extends to 1.0 m depth along drainage lines, less on crests.</p> <p>Limitations noted as localised steep slopes, high soil erosion hazard, rock outcrops, shallow highly permeable soils and very low fertility.</p>	<p>Brine and transfer pipelines Alignment: Present across the majority of the proposed brine and transfer pipelines alignment north of the Parramatta River along eastern Parramatta and into the suburb of Dundas.</p>
Blacktown (9130bt)	<p>Gently undulating rises on Wianamatta Shales and Hawkesbury Shale with broad rounding crests and ridges with gently inclined slopes.</p> <p>Shallow to moderately deep soil profiles (less than 1.0 m) on crests and upper slopes. Deeper soil profiles (up to 3.0 m) on lower slopes with poor drainage.</p> <p>Mainly intensive residential, light and heavy industrial land uses. Limitations identified as low to very low fertility, moderate erodibility and seasonal waterlogging. It is noted that existing erosion is non-existent due to the prevalence of urban fabric i.e., concrete, tiles, bitumen or turf.</p>	<p>Brine and transfer pipelines Alignment: Occupies most of WSU campus at eastern Parramatta and the project site along the Parramatta Light Rail line north of Parramatta River.</p> <p>River release pipeline Alignment: Covers the majority of the suburbs of Silverwater and Newington.</p>
Lucas Heights (9130lh)	<p>Generally located on ridge and plateau surfaces on the Mittagong Formation (interbedded shale, laminite and fine to medium grained quartz sandstone).</p> <p>Soil profile can be up to 1.5 m depth, vegetation has been extensively cleared and existing erosion is generally low. Correlates with some remaining bushland along the Parramatta River.</p> <p>Limitations noted as low fertility, moderately erodible, moderate erosion hazard for non-concentrated flows and high for concentrated flows.</p>	<p>Brine and transfer pipelines Alignment: Present on the lower slopes of Parramatta, north of and adjacent to the Parramatta River.</p>
Disturbed Terrain (9130xx)	<p>Described as being present on level plain to hummocky terrain which has been extensively impacted by human activity. This includes the complete removal or burial of soil, artificial fill, dredged estuarine sand and mud, demolition rubble, industrial and household waste.</p> <p>Typical land type previous to human activity were swamps, estuaries and wetlands. Also includes areas of cut and fill i.e., disused quarries, areas levelled for industrial use.</p> <p>Limitations can be dependent on nature of fill material that is present, mass movement hazard, impermeable soil, poor drainage, very low fertility and toxic materials.</p>	<p>Present across the entire area of the project footprint at WRRF and Meadowbank.</p>
Birrong (9130g)	<p>The Birrong soil landscape consists of level to gently undulating alluvial floodplains which drain the Wianamatta shales, specifically catchments Haslams Creek and parts of the flood plain at Parramatta River.</p> <p>The geology is dominated by silt and clay sized alluvial materials. The major land use is recreation and landfilling has occurred in many locations. Limitations are noted as localised flooding, high soil erosion hazard, saline subsoil, seasonal waterlogging, very low soil fertility.</p>	<p>River release pipeline Alignment: This is present across the eastern portion of Newington and to the east towards Hill Road. It also covers the entire suburb of Wentworth Point.</p>

Soil landscape (ref)	Description	Location within study area
Ettalong (9130et)	<p>The Ettalong soil landscape consists of fresh water and back plain swamps on the foreshores of Parramatta River. The geology is described as Quaternary sandy peats, peats and mud. Biological activity and slow decomposition rates account for the accumulation of organic matter with a permanent water table reported to be present within 30 cm of the ground surface.</p> <p>Filling and landfilling are common with playing fields, vacant land, or development occurring. Limitations are noted as flooding, a permanently high water table, and extremely acidic organic soil of low fertility.</p>	<p>River release pipeline Alignment:</p> <p>This is present on and adjacent to Hill Road to the south west of Wentworth Point. It is partially present in the car park to the immediate south west of Urbansurf, adjacent to Hill Road.</p>



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

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Soil landscapes

FIGURE 6.4

6.2.5.2 Acid sulfate soils

Acid sulfate soils (ASS) and potential acid sulfate soils are naturally occurring soils that contain iron sulfides. On exposure to air, iron sulfides oxidise and create sulfuric acid resulting in the mobilisation of aluminium, iron and manganese from the soils. Acid sulfate soils typically occur in coastal environments at elevations less than 10 m AHD (DLWC, 1998). Inland acid sulfate soils can be formed in extended periods of drought in inland riverine systems but require very specific climatic factors and sources of sulfate, with their presence limited to the lower levels of the river channel and bottom sediments.

ASS risk mapping accessed through the NSW Planning Portal spatial viewer³ and information detailed in the DSIs completed for the project (Jacobs, 2024a, 2025d, 2025i) were reviewed to provide relevant detail regarding the potential for ASS to be present in the project footprint.

A description of the classes is provided in Table 6.4 and the locations of these classes across the study area are present on Figure 6.5.

This project is a State Significant Infrastructure (SSI) and therefore there is no consent required for disturbance of the soil regarding the ASS class. However, for information purposes the consent required for each of the classes is provided in this Section and Table 6.4.

Table 6.4 ASS class description

ASS Class	Description ⁴
Class 1	Highest risk. Development consent is required for all works on or close to the natural surface. Any disturbance, such as shallow excavation, may trigger acid generation. Works by which the water table is likely to be lowered present an environmental risk.
Class 2	High risk. Development consent is required for works below the natural ground surface. Excavation or drainage works that extend below the surface may expose these soils.
Class 3	Moderate risk. ASS may occur at depth. Development consent is required for works that lower the water table by more than 1 metre below the natural surface.
Class 4	Low risk. ASS is unlikely to occur at depth. Development consent is required for works that lower the water table by more than 2 metres below the natural surface.
Class 5	Very low risk. Ass is generally absent. Development consent is only required for works that lower the water table by more than 2 metres below the natural surface.
Disturbed Terrain	Land that has been altered from its natural state through activities such as excavations, fillings, drainage and construction.

Brine and transfer pipelines alignment

The project footprint extending from the northern bank of the Parramatta River to the NSOOS pipeline is classified as 'Class 5', which indicates that ASS are not typically present. To the south of the Parramatta River, including north Camellia to the WRRF, the project footprint is situated in an area classified as 'Class 4' which indicates that ASS are likely to be present beyond 2 metres below the natural ground surface. At these areas any works that are likely to lower the water table by more than two meters below the natural ground surface also require consent.

Field data

ASS results discussed in the brine and transfer pipelines DSI (Jacobs, 2025d) were related to the field screening of natural soils at two locations (INF-BH-101 and INF-BH-102) along the brine pipeline and transfer pipelines (samples were collected from depths beyond 3.3-3.5 m bgl). Jacobs report that the pH prior to addition of peroxide (pHFOX) ranged from 4.6 to 8 pH units. The range changed to 3.9 to 5.8 pH units after the addition of peroxide with the exception of one sample at 11-11.5 m bgl which measured 2.2 pH units. Chromium reducible sulfur (CRs) analysis was undertaken on this sample with results showing a net acidity of 38 mole H+/t and 0.06 %S that exceeded the action criteria specified in the National Acid Sulfate Soil Guidance (ANZG 2018). The outcomes of this assessment indicate that it is possible that PASS are present in the natural soils given the exceedance of the adopted action criteria.

³ NSW Planning Portal Spatial Viewer

⁴ As the project is SSI, Development Consent is not required in relation to management of ASS on the project site.

Jacobs reports that no visual indicators of ASS were observed at the investigation locations during the drilling and soil sampling. Further, Jacobs reports that the ASS data collected is considered to be limited and should be considered indicative only.

WRRF

At the WRRF, the project footprint is situated in an area classified as 'Class 4' which indicates that ASS are likely to be present beyond two metres below the natural ground surface. At these areas any works that are likely to lower the water table by more than two meters below the natural ground surface also require development consent.

Field data

Soil samples were initially field screened for pH and pHFOX using peroxide. Based on the results of the field screen, samples were then analysed for CRs which was undertaken on soils from seven sampling locations. The soils that were sampled included suspected fill materials, alluvial and residual soils with results indicating that soils ranging in depths from 1.5 m bgl to 12.95 m bgl are considered to be ASS.

River release pipeline alignment

The project footprint through Silverwater and Newington is located in an area is classified as 'Class 5' which indicates that ASS are not typically present.

On the eastern end of Newington and the northern end of Wentworth Point these areas are classed as 'Class 2' which indicates that ASS are likely to be present below the natural ground surface. In addition, if any works that are likely to lower the water table also require development consent.

Along Hill Road towards Wentworth Point, the area is identified as 'disturbed terrain' which means that soil disturbance prevented the identification of the landform and therefore the identification of ASS/PASS. It is, therefore, possible that ASS may occur at these locations.

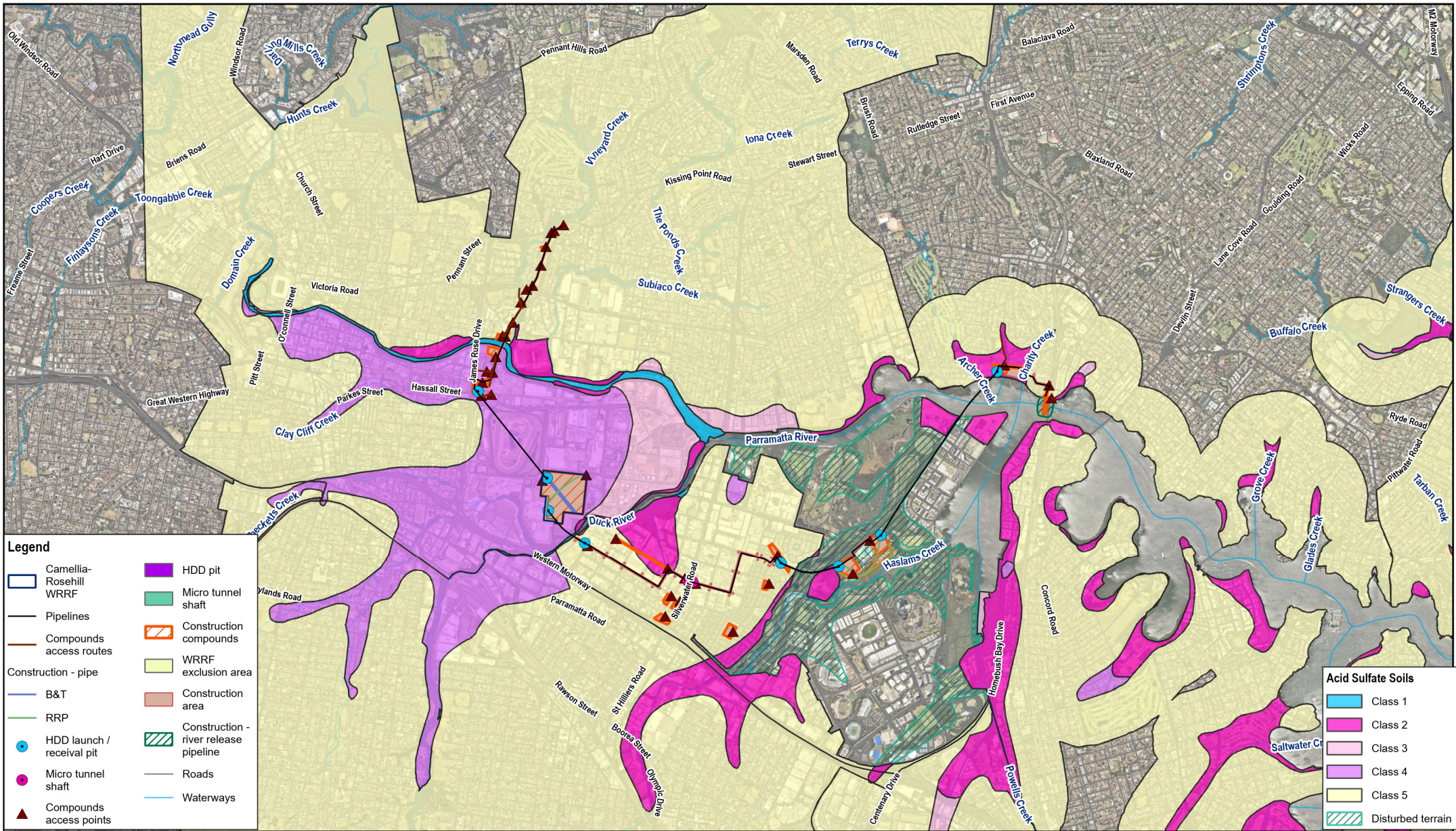
At Meadowbank Park, the project footprint is located in an area classed as 'Class 2' which indicates that ASS are likely to be found below the natural ground surface. In addition, if any works that are likely to lower the water table also require development consent. To the east and adjacent to John Whitton Bridge, the area is classed as 'Class 5' which indicates that ASS are not typically present.

Field data

As reported by Jacobs (2025i) ASS sampling was completed as part of the geotechnical investigation along the river release pipeline alignment where field screening or Suspension Peroxide Oxidation Combined Acidity & Sulfur (SPOCAS) laboratory analysis was undertaken at seven sampling locations.

Results from field pH screening and SPOCAS testing indicate the potential presence of ASS along the river release pipeline at four locations. Three of these locations (RRP-BH-111, RRP-BH-116 and RRP-BH-129) are situated alongside the proposed open trenched sections of the alignment, while one location (RRP-BH-118) overlies a proposed HDD section.

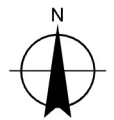
During the DSI fieldwork, Jacobs reported that visual indicators of PASS (e.g., shells, odour, change in colour) were observed in soils along the project footprint. These soils were not sampled; however, Jacobs indicated that based on the observations, PASS may be present and that additional sampling was recommended.



- Legend**
- Camellia-Rosehill WRRF
 - Pipelines
 - Compounds access routes
 - Construction - pipe**
 - B&T
 - RRP
 - HDD launch / receival pit
 - Micro tunnel shaft
 - Compounds access points
 - HDD pit
 - Micro tunnel shaft
 - Construction compounds
 - WRRF exclusion area
 - Construction area
 - Construction - river release pipeline
 - Roads
 - Waterways

- Acid Sulfate Soils**
- Class 1
 - Class 2
 - Class 3
 - Class 4
 - Class 5
 - Disturbed terrain

1:55,000 @ ISO A4
 0 400 800 1,200
 Metres
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56



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Acid sulfate soils

FIGURE 6.5

6.2.5.3 Salinity

The accumulation of salts in the soil surface and groundwater in non-irrigated areas is known as dryland salinity. Dryland salinity is commonly caused by the mobilisation of salts in the soil profile by surface water or groundwater through groundwater recharge (or deep drainage), groundwater movement or groundwater discharge. Dryland salinity is also potentially caused by the exposure of naturally saline soils, including hypersaline clays. Similarly, soils with an exchangeable sodium percentage greater than six per cent, referred to as sodic soils, are also associated with dryland salinity.

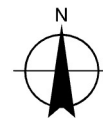
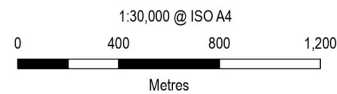
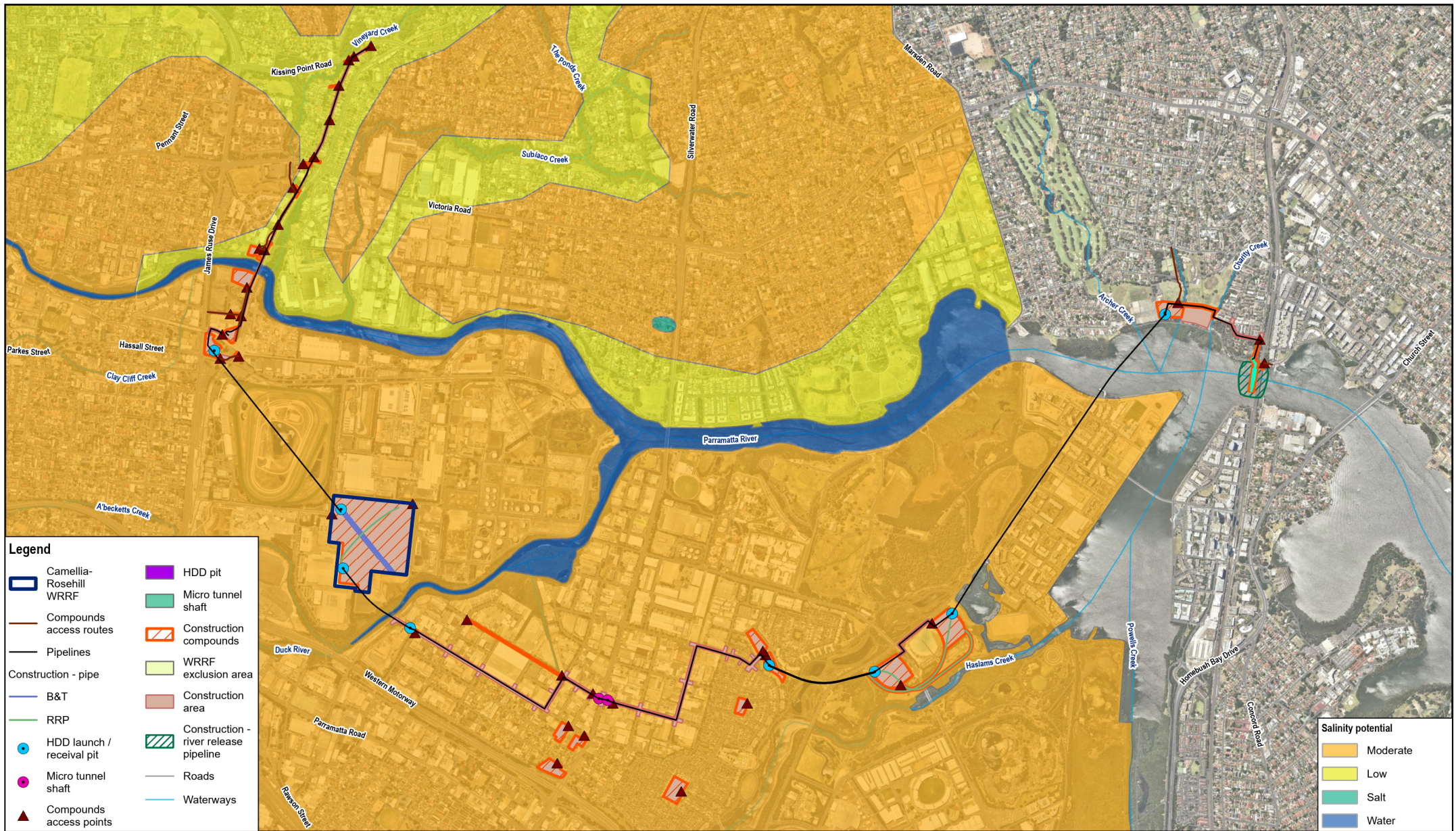
A review of the Hydrogeological Landscapes of NSW and the Australian Capital Territory dataset (DPE, 2022) accessed via eSPADE⁵ revealed that there are several landscapes that the project footprint is situated within, as summarised in Table 6.5. The salinity hazard risk for the project footprint is shown in Figure 6.6.

Table 6.5 Hydrogeological landscapes (HGL) relevant to the project footprint

HGL	Relevant project footprint	Salinity information
Hawkesbury Sandstone	NSOOS at Dundas to WSU campus at Parramatta	Very low salinity risk – largely due to shallow sandy soils and deeply fractured bedrock. Salts are flushed from the porous sandstone matrix, which prevents accumulation at the surface. Saline effects are possible within the Sydney urban catchment, possibly due to a decrease in deep-rooted vegetation, alteration to natural drainage patterns, leakage of standing water bodies and irrigation of sports grounds, parks and gardens.
Bankstown	Eastern side of WSU campus adjacent to Parramatta Light Rail line. Silverwater and Newington	High salinity risk – frequent small to moderate cyclic salt sites occur within urban structures. Some larger sites also occur along drainage lines and colluvial slopes. Saline groundwater discharging at the base of colluvial slopes and salt cycling are significant process. Low permeability soils above alluvial areas restrict downward movement of water which means salts in upper soil materials can be mobilised and concentrated at the surface. Salinity processes are driven by interactions between the water use characteristics of vegetation, physical soil properties, and hydrogeological processes within this HGL. Saline effects are possible within Sydney urban catchment possibly due to decrease in deep rooted vegetation, alteration to natural drainage patterns, leakage of standing water bodies and irrigation of sports grounds, parks and gardens.
Parramatta/Georges River	Camellia and WRRF site Eastern side of Newington and Sydney Olympic Park (Hill Road)	Moderate salinity risk – the salt sites are situated on the flat lying land and is primarily driven by shallow cyclic flows, estuarine and acid sulfate influences. Land salinity is high due to the tidal influence on the extensive flood and alluvial plains with some ponding along Parramatta River, periodic wetting and drying of the flood and alluvial plains allow for the cycling of salts. Saline effects are possible within the Sydney urban catchment, possibly due to a decrease in deep-rooted vegetation, alteration to natural drainage patterns, leakage of standing water bodies, and irrigation of sports grounds, parks, and gardens.
Not covered by dataset	Wentworth Point and Meadowbank	Moderate salinity risk*.

* No further information provided in relation to the salinity risk from dataset reviewed.

⁵ eSPADE v2.2



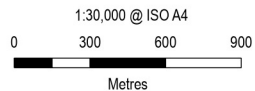
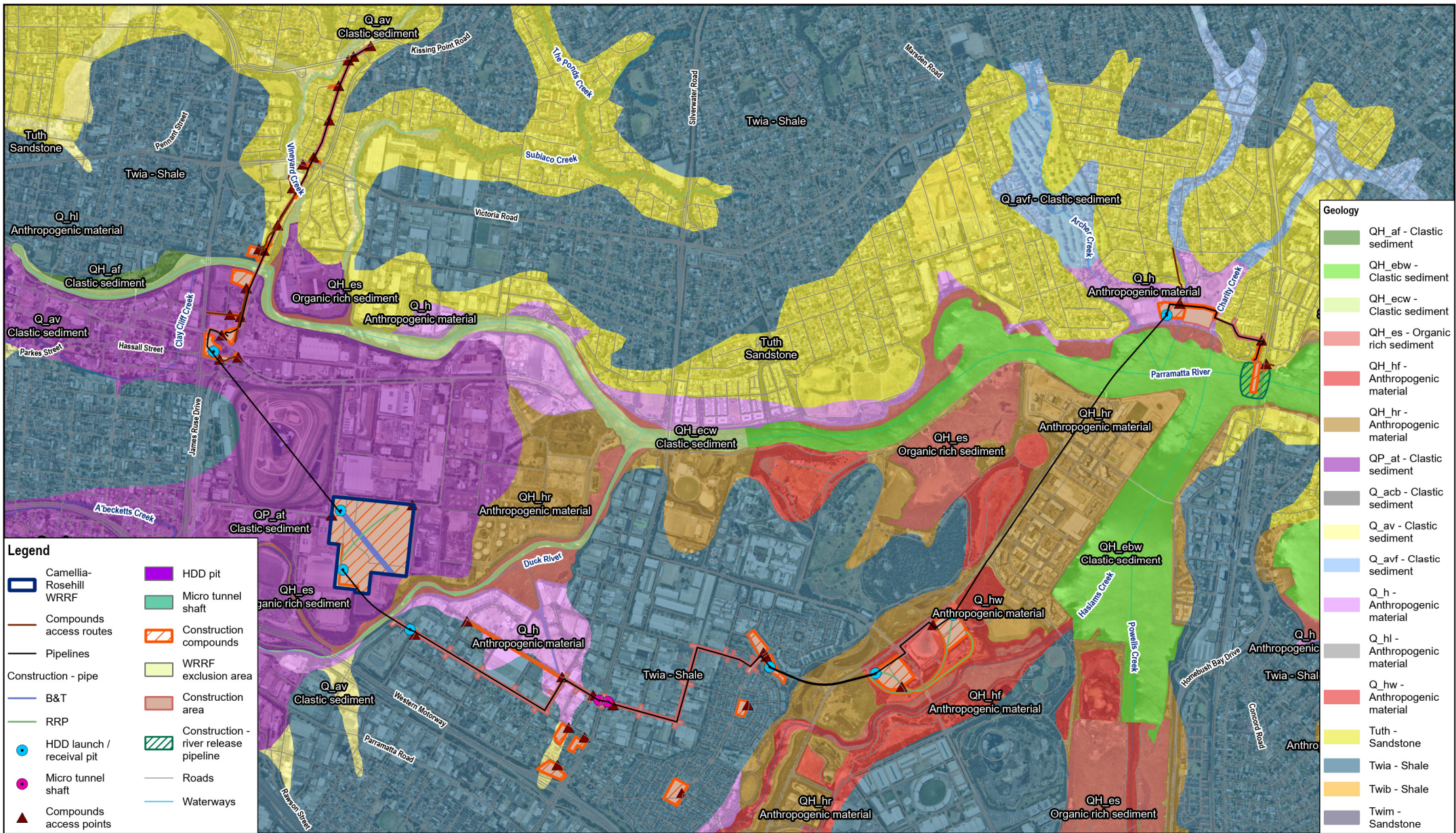
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Map Projection: Transverse Mercator
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 Grid: GDA2020 MGA Zone 56

Salinity hazard

FIGURE 6.6



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Regional surface geology

FIGURE 6.7

6.2.6 Geology

6.2.6.1 Regional geology

Based on a review of the project footprint and the Sydney 1:100,000 Sydney Geological Map (Geological Survey of NSW, 1983) there are two main geology profiles across the project footprint: Ashfield shale to the north of the Parramatta River and Hawkesbury Sandstone to the south of the Parramatta River. The regional surface geology for the project footprint is shown on Figure 6.7.

To the north of the Parramatta River (brine and transfer pipelines alignment), the geology is identified as Hawkesbury Sandstone and is described as 'medium to coarse-grained quartz sandstone, very minor shale and laminate lenses' of the Wianamatta Group.

On either side of the Parramatta River, where the brine and transfer pipelines crosses from north to south, the surface geology changes to quaternary sediments described as 'silty to peaty quartz sand, silt, and clay. ferruginous and humic cementation in places. Common shell layers'.

The geology on the WRRF site is described as 'man-made fill. Dredged estuarine sand and mud, demolition rubble, industrial and household waste' overlying layers described as 'sand, clay, and peat, variably ferruginous'.

On the south eastern side of Duck River the geology is Ashfield Shale described as 'black to dark-grey shale and laminate' of the Wianamatta Group. This continues through the suburbs of Silverwater and Newington towards Sydney Olympic Park where it changes to man-made fill overlying Quaternary sediments which follow the path of Haslams Creek and into Wentworth Point.

Where the project footprint is located in Meadowbank, the geology is identified as man-made fill overlying Quaternary sediments at Meadowbank Park with 'medium to coarse grained quartz sandstone very minor shale and laminate lenses' of the Wianamatta Group.

6.2.7 Hydrogeology

Hydrogeological information has been obtained from a review of the DSIs (Jacobs, 2024a, 2025d, 2025i) and the Groundwater Impact Assessment (Draft) prepared by Jacobs for this project (Jacobs, 2025k). This information is used as part of the general environmental setting of the project and it is used to assess the impact of the project during construction and operation where contamination in groundwater may be intersected. Detailed information on the hydrogeological regime at the project site is provided in the Groundwater Impact Assessment (Jacobs, 2025k).

Brine and transfer pipelines alignment

A site investigation was not undertaken on the project footprint to the north of the Parramatta River to the NSOOS. As such there is no site investigation data related to the groundwater regime in this area. Jacobs (2025d) reported there are two monitoring bores located approximately 60 m to the east of the project footprint where it crosses Vineyard Creek. The groundwater levels (assumed to be standing water levels (SWL)) were reported as 2.7 m bgl and 3.2 m bgl.

Table 6.6 presents a summary of the groundwater well details obtained from publicly available information as provided by Jacobs (2025d). It was assumed that the groundwater flow direction is to the south towards Parramatta River.

Table 6.6 WaterNSW database well detail summary

NSW Bore ID	Easting	Northing	Ground surface elevation	Groundwater level		Groundwater observed within
	m	m	m AHD	m bgl	m AHD	
GW111347	317582	6257123	12.1	3.21	8.89	In clay ALLUVIUM
GW111349	317569	6257063	11.55	2.68	8.87	In sandy clay ALLUVIUM

Jacobs indicate that there is the potential for shallow groundwater to be present at the project footprint as part of a perched water system in the surficial residual soils or alluvium of Vineyard Creek.

Three groundwater wells were installed by Jacobs during the DSI in the area extending from the south bank of the Parramatta River to the WRRF, the details of which are summarised in Table 6.7. The depth to groundwater was reported to range from 3 m bgl to 6.4 m bgl within the alluvium soils with groundwater flow direction assessed to be towards Duck River to the south-south-east.

Table 6.7 Brine and transfer pipelines groundwater well details summary – Jacobs installed

Well ID	Easting	Northing	Ground surface elevation	Groundwater level		Groundwater observed within
	m	m	mAHD	mbgl	mAHD	
INF-BH-102	316964	6256163	3.3	3	0.3	In sandy clay ALLUVIUM
INF-BH-103	317297	6255758	7.2	3.2	4	At interface of clay ALLUVIUM sandy clay ALLUVIUM
SPM-BH-101	317089	6256211	4.2	6.4	-2.2	In clay ALLUVIUM

WRRF

There were multiple groundwater wells installed across the footprint of the WRRF as part of the geotechnical investigation and DSI completed by Jacobs (2024a), the details of which are summarised in Table 6.8.

The depth to groundwater was observed to range from 0.6 m bgl at WRRF-GW109 in the north, to 5 m bgl at WRRF-GW107 in the central north. The groundwater was reported to be present in the fill material or alluvial sediments (alluvium) underlying the WRRF.

Groundwater flow direction, based on contour mapping prepared as part of the site investigations, was assessed to be towards Duck River to the south-south-east (refer to Figure 6.8). The estimated hydraulic gradient was reported to be low, between 0.003 and 0.011 m/m (Jacobs, 2024k).

Table 6.8 WRRF groundwater well details summary – Jacobs installed

Well ID	Easting	Northing	Ground surface elevation	Groundwater level		Groundwater observed within
	m	m	mAHD	mbgl	mAHD	
WRRF-BH102	317704	6255158	4.1	1.4	3.7	In clay ALLUVIUM
WRRF-BH103	317806	6255271	5.0	1.0	3.0	In clay ALLUVIUM
WRRF-BH104	317991	6255248	5.0	1.8	3.2	In clay ALLUVIUM
WRRF-BH105	317884	6255163	4.9	1.5	2.6	In clay ALLUVIUM
WRRF-BH106	317929	6255091	5.0	3.9	1.1	In clay ALLUVIUM
WRRF-GW101	318076	6255250	5.0	1.1	3.9	In clay ALLUVIUM
WRRF-GW107	318159	6255194	5.1	5.0	0	In clay ALLUVIUM
WRRF-GW108	318161	6255086	5.0	0.9	4.1	Typically in clay ALLUVIUM, occasionally in clay FILL
WRRF-GW109	318013	6254868	4.8	0.6	4.4	In silty clay FILL
WRRF-GW110	318026	6254996	5.2	1.4	2.7	In clay FILL
WRRF-GW111A	318142	6255089	5.2	1.9	3.3	In clay ALLUVIUM (assumed)
WRRF-GW112	317697	6255064	4.0	1.8	2.8	In sandy clay FILL

Well ID	Easting	Northing	Ground surface elevation	Groundwater level		Groundwater observed within
	m	m	mAHD	mbgl	mAHD	
WRRF-GW113	317894	6255268	5.0	3.6	1.0	In clay ALLUVIUM
WRRF-GW114	317756	6254900	4.6	2.5	2.3	In clay ALLUVIUM
WRRF-GW115	317973	6254868	4.6	3.2	1.7	In clay ALLUVIUM
WRRF-GW116	317894	6254748	5.3	3.9	1.4	In clay ALLUVIUM
WRRF-GW117	317739	6254810	4.1	1.0	3.9	Typically in clay ALLUVIUM, occasionally in clay FILL
WRRF-GW118	317892	6254847	5.0	2.3	2.9	In clay ALLUVIUM

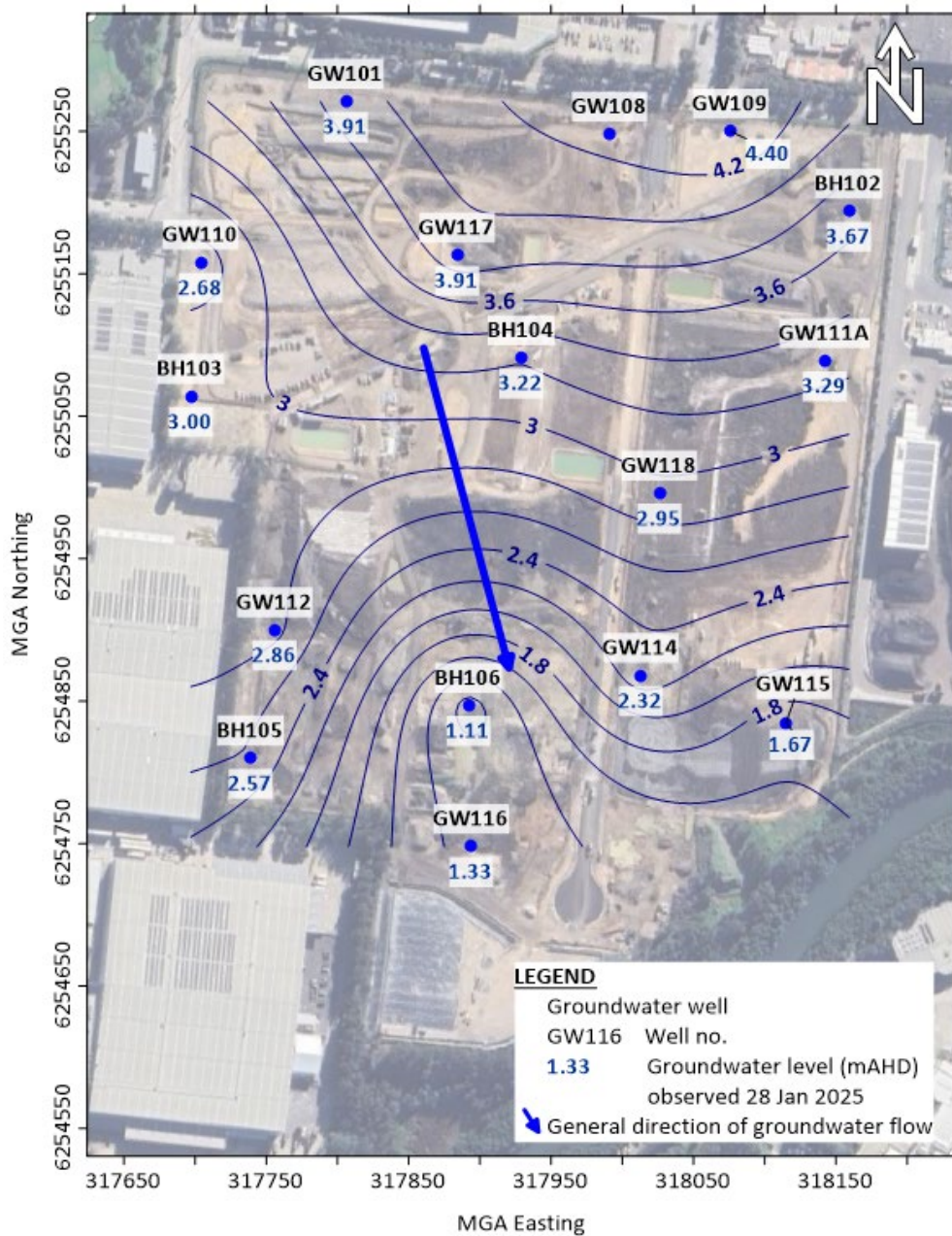


Figure 6.8 Groundwater contour mapping – WRRF (excerpt from Jacobs, 2025k)

River release pipeline alignment

Jacobs completed a DSI (2025i) for the river release pipeline alignment that included the installation of nine groundwater wells in the eastern section of the project footprint from SOPA Pod A carpark and the end point at Meadowbank. Groundwater levels were reported to generally range from 1.5 m bgl to 2.4 m bgl with the exception of two locations where depth to groundwater was observed to be 6.0 m bgl and 9.0 m bgl.

Jacobs reported that the groundwater level was observed in the fill or alluvial materials which was indicative of a perched aquifer system in those areas of reclaimed land and/or anthropogenic fill material which are extensive in this area. Jacobs report that in the western section of the project footprint, from the SOPA Pod A carpark to the WRRF, groundwater was observed in two groundwater wells installed during the DSI (February 2025).

Jacobs reported that depth to groundwater along this section of the project footprint is considered to range from 1.5 m from the base of the fill material (1.7 m bgl) to 3.5 m bgl. This was based on the outcomes of a previously completed investigation in 2009 by Douglas Partners.

A summary of the groundwater details for the wells installed during the DSI is presented in Table 6.9.

Table 6.9 River release pipeline Groundwater details summary – Jacobs installed

Well ID	Easting	Northing	Ground surface elevation	Groundwater level		Groundwater interpreted within
	m	m	m AHD	m bgl	m AHD	
RRP-BH-102	318167	6254459	9.3	3.5	5.8	Highly weathered siltstone
RRP-BH-108	319193	6254104	3.5	5.1	-1.6	Highly weathered siltstone
RRP-BH-119	320874	6254251	5.1	9.0	-3.9	In clay ALLUVIUM
				6.1	-1	
RRP-BH-123	321222	6254557	4.4	2.4	2	In sandy clay ALLUVIUM
RRP-BH-124	321302	6254613	3.9	2.3	1.6	In sandy clay/silty sand FILL
				1.9	2	
RRP-BH-126	321812	6255394	5.4	6	-0.6	In clay ALLUVIUM
RRP-BH-127	322168	6255871	1.9	2	-0.1	In sandy clay FILL, at interface with sandy clay marine deposits
RRP-BH-128	322578	6256430	2.8	2	0.8	In sand FILL, 0.5 m above interface with clayey sand marine deposits
				2.1	0.7	
RRP-BH-130	322871	6256325	1.6	1.5	0.1	At interface of silty sand FILL and sandstone

6.3 Site inspections

A site walkover of sections of the pipeline alignment, construction compounds, the WRRF and nearby land uses were undertaken on 27 July and 5 August 2025. These inspections were undertaken at the WRRF and publicly accessible lands and the observations are summarised in this section.

6.3.1 Brine and transfer pipelines

To the north of Parramatta River, the portion of the Brine pipeline that is to be relined is located in a residential area and this area was not inspected. The pipeline then crosses Victorica Road and is within the eastern portion of the WSU campus grounds. This area was inspected and the access pits within the WSU campus would be along Railway Road. The presence of contamination in this area would be very limited and likely to be associated with fill material. The eastern portion of the WSU campus consisted mainly of open space, car parking access roads and a footpath adjacent to the Parramatta Light Rail line.

The pipelines were observed to resurface close to the Parramatta River and run alongside the Parramatta Light Rail over the bridge at this location towards Camellia.

On the southern side of the Parramatta River, the pipelines was observed to go underground again. To the west of this location was an open area which was covered with concrete hardstand (individual slabs were observed). A soil drum was observed partially submerged in the ground close its boundary and a series of standpipes were observed across this site. The site appeared to have been former industrial land use which was now disused. It was noted that this site was situated at a similar elevation to where the pipeline alignment was proposed. This area has a high potential for asbestos and unexpected finds.

6.3.2 WRRF

At the time of the site inspection, the surface of the WRRF site was currently being raised. The area consisted of unsealed surfaces with the exception of the entrance and truck washing bay. Stormwater was observed to be managed by the use of a series of on-site detention basins at the time of the site inspection. The contractor's compound was located at the western centre of the site.

The existing potable water pipeline running diagonally through the site had been marked out with orange flags. Sydney Water indicated that this area will not be raised until the pipeline has been decommissioned. The southern side of the entrance to the site had an asbestos area marked out with tape.

The southern area of the WRRF has been split into three main areas as shown on Figure 6.9. The area marked in purple is where the facility and infrastructure are to be built. This is the area where the land was being raised with VENM and imported tunnel spoil. The southern area of the WRRF is to remain at the current level that was observed during the site inspection. A network of groundwater wells was observed across the WRRF site and it was reported that these were being maintained for future use.

Off-site, to the south of the proposed WRRF boundary a buried waste area was observed which was referred to as the "Southern Buried Waste Area". This area had been used to place contaminated material and waste generated from other areas of the Clyde refinery site. It was also indicated that the area had recently been subject to construction works to formalise the cover/capping layer and boundary of the waste materials.

6.3.3 River release pipelines

Duck River to the south of the WRRF and at the western end of Carnarvon Street could not be accessed during the site inspection. The elevation was observed to be relatively flat and vegetation was observed along the banks of Duck River.

The western end of Carnarvon Street was lined with a mixture of industrial and commercial properties, of note being MET Recycling that receives and recycles building waste materials. The MET Recycling site is located on a former landfill, and an active gas flare was visible from the road at the time of the site inspection. There was also a series of monitoring well installations observed on both sides of Carnarvon Street adjacent to MET Recycling. It was not clear if these were used for gas and/or groundwater monitoring.

After the junction of Carnarvon Street and Stubbs Street, the land use on the southern side consisted of mix of commercial/light industrial and residential.

Vore and Derby Streets were commercial / light industrial with a BP service station observed on the corner of Derby Street and Silverwater Road. The property located 103-105 Silverwater Road is a known contaminated site and currently owned by Sydney Metro. The site was observed to be vacant at the time of the site inspection.

The land use through Derby St and Day Street North on the eastern side of Silverwater Road was observed to be dominated by commercial and light industrial premises. Of note were several car repair garages, crash repairs and a foundry located close to the junction of Day Street North and Fariola Street. There was also a large building located on the eastern side of Day Street North which had signage for hazardous chemicals present on site; however, the nature of this business was not obvious nor was there branding on the building or front gates.

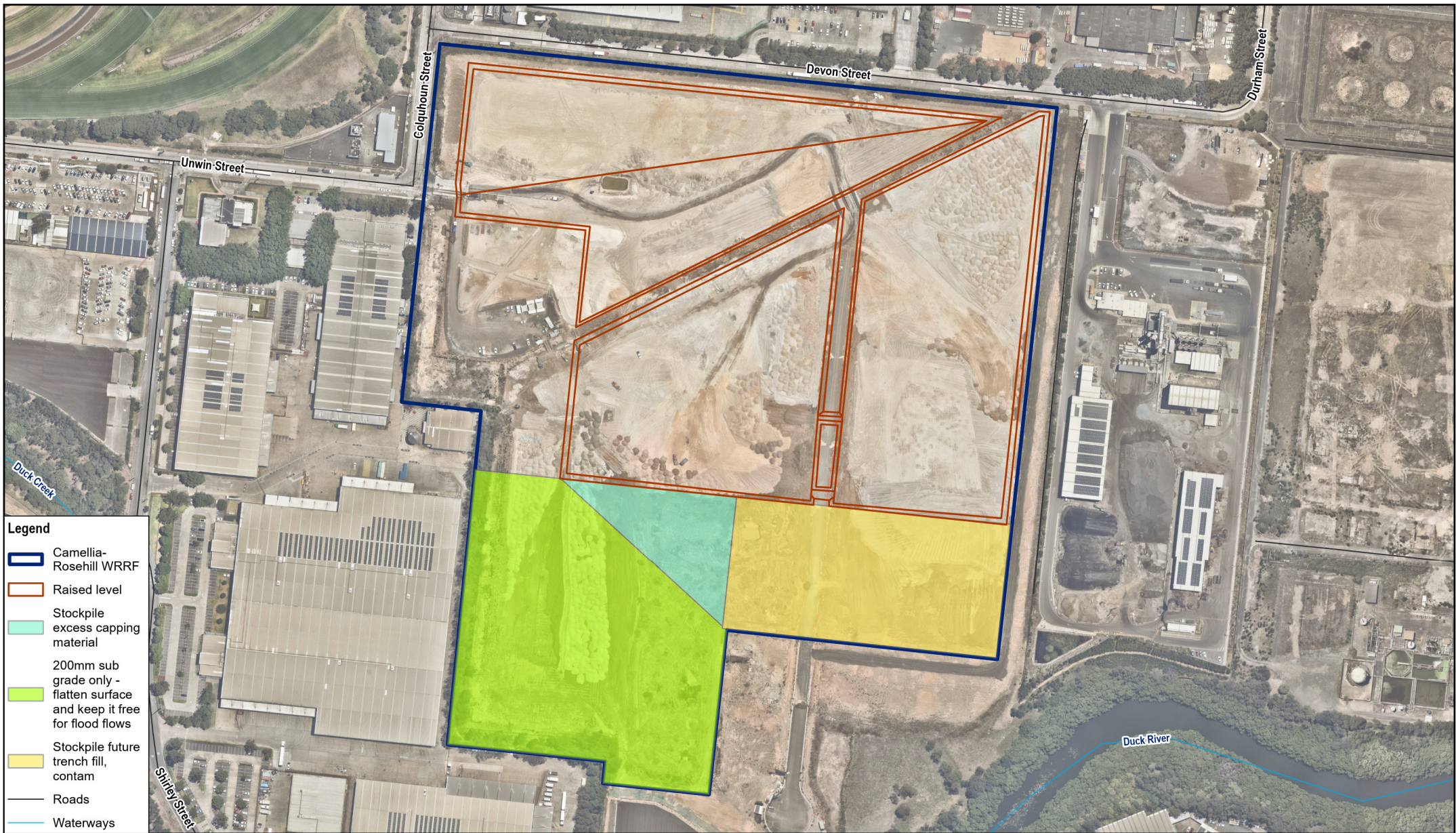
Newington was observed to be dominated by residential properties and associated green/open space where the project footprint is located. On the eastern end of Newington where the project alignment intersects with Hill Road there was a wetland on either side of Avenue of Oceania. Further to the north east, along Hill Road, Urbansurf was

observed, which had a large car park on either side. Both of these car parks are identified for use as part of the project.

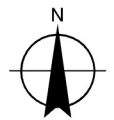
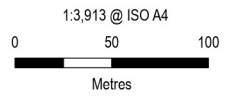
Wentworth Point was observed to be largely high density residential with some light industrial units located on the eastern side of Hill Road. Hill Road is situated between Woo-La-Ra landfill to the west and mainly high density residential to the east. A number of monitoring wells were observed along Hill Road (assumed to be mainly groundwater wells with a gas well identified outside apartment complex at the northern end of Hill Road). The topography was observed to be relatively level along the pathway and Hill Road.

There is a vegetation buffer between Woo-La-Ra landfill and the footpath, which runs north to south on the western side of Hill Road. A drainage channel also exists, which runs north to south along the pathway. The drainage channel would restrict surface run-off originating from the landfill surface from migrating to the pathway and Hill Road. Anthropogenic material was observed at some locations along the pathway and vegetation.

The project footprint located in Meadowbank was not inspected as the land use is parkland/recreational land use which mainly consists of open grassland and vegetation. Information presented in the PSI (Jacobs 2025h) indicates that there was no evidence of contamination observed nor were industrial activities reported to be present.



- Legend**
- Camellia-Rosehill WRRF
 - Raised level
 - Stockpile excess capping material
 - 200mm sub grade only - flatten surface and keep it free for flood flows
 - Stockpile future trench fill, contam
 - Roads
 - Waterways



Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

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WRRF layout

FIGURE 6.9

6.4 Regulatory information summary

The following summary is sourced from the relevant PSIs and DSIs undertaken for the project. This information from the searches has been combined in the following sub-sections. The information presented in the following sections has been used to inform the AElS.

6.4.1 NSW EPA records

6.4.1.1 Contaminated sites – notified sites

The NSW EPA maintains a "List of NSW contaminated sites notified to the EPA" under Section 60 of the *CLM Act*. Inclusion on this list indicates that the notifiers consider a site are contaminated and warrant reporting to NSW EPA. The contamination at a given site may or may not be significant enough to warrant regulation by the NSW EPA and following review of relevant site information, the NSW EPA makes a determination as to whether or not the site warrants regulation. A search of this list indicated that there are 22 premises within 500 m of the project footprint that have been notified to the NSW EPA as presented in Table 6.10.

Table 6.10 Contaminated sites notified to the NSW EPA under CLM Act

Site name	Address	Type	Management class	Location on project (distance from project footprint)
Rheem Australia	1 Alan Street, Rydalmere	Other industry	Contamination currently regulated under the CLM Act	Brine and transfer pipelines Alignment (115 m to the south east)
United Petroleum Service Station	262-272 Victoria Road, Rydalmere	Service station	Regulation under CLM Act not required	Brine and transfer pipelines Alignment (310 m to the east)
BP Service Station	265 Victoria Road, Rydalmere	Service station	Regulation under CLM Act not required	Brine and transfer pipelines Alignment (360 m to the east)
James Hardie Factory (former, eastern portion)	1 Grand Avenue, Camellia	Other industry	Ongoing maintenance required to manage residual contamination (CLM Act)	Brine and transfer pipelines Alignment (40 m to the east)
Council Reserve	11B Grand Avenue, Camellia	Metal industry	Regulation under CLM Act not required	Brine and transfer pipelines Alignment (350 m to the east)
Former Akzo Nobel Site	4 Grand Avenue, Camellia	Chemical industry	Contamination currently regulated under CLM Act	WRRF (360 m to the north)
Viva Clyde Western Remediation Area	Durham Street, Rosehill	Other petroleum	Regulation under CLM Act not required	WRRF (on-site)
James Hardie Australia and former James Hardie lands	8 and 10 Colquhoun Street, Camellia	Landfill	Ongoing maintenance required to manage residual contamination (CLM Act)	WRRF (32 m to the north)
Former Shell Clyde Refinery	Durham Street, Camellia	Other petroleum	Contamination currently regulated under CLM Act	WRRF (on-site – current WRRF site, and also occupied a large portion to the east and north east of the WRRF)
4 Tennyson Street	4 Tennyson Street, Clyde	Other industry	Regulation under CLM Act not required	WRRF (350 to the south west)

Site name	Address	Type	Management class	Location on project (distance from project footprint)
Clyde Stabling and Maintenance Facility	Unwin Street, Clyde	Other industry	Contamination currently under assessment and being managed by the planning process (EP&A Act)	WRRF (29 m to the south west)
Former Silverwater Landfill	Carnarvon Road, Silverwater	Landfill	Contamination currently regulated under CLM Act	River release pipeline Alignment (5 m to the south)
Former Ajax Chemical Factory	9 Short Street, Auburn	Other industry	Contamination currently regulated under CLM Act	River release pipeline Alignment (500 m to the south west)
Vacant property	103-105 Silverwater Road, Silverwater	Other industry	Regulation under CLM Act not required	River release pipeline Alignment (adjacent to the south)
Storage facility	54-58 Derby Street, Silverwater	Unclassified	Regulation under CLM Act not required	River release pipeline Alignment (adjacent to the south)
Former printing facility	46-58 Derby Street, Silverwater	Other industry	Regulation under CLM Act not required	River release pipeline Alignment (adjacent to the south)
Haslams Creek South Area 3	Kronos Hill, Kevin Coombes Avenue, Sydney Olympic Park	Landfill	Contamination currently regulated under CLM Act	River release pipeline Alignment (400 m to the south)
Kronos Hill landfill	Kevin Coombes Avenue, Sydney Olympic Park	Landfill	Ongoing maintenance required to manage residual contamination (CLM Act)	River release pipeline Alignment (170 m to the south)
Former TNT Express	23 Bennelong Parkway, Wentworth Point	Other petroleum	Regulation under CLM Act not required	River release pipeline Alignment (60 m to the east)
Woo-La-Ra landfill	Hill Road, Sydney Olympic Park	Landfill	Ongoing maintenance required to manage residual contamination (CLM Act)	River release pipeline Alignment (adjacent to the west)
RMS Western Precinct	14A-14E and 16 Hill Road, Sydney Olympic Park	Other petroleum	Regulation under CLM Act not required	River release pipeline Alignment (50 m to the north west)
RMS Eastern Precinct	3-7 Burroway Road, Wentworth Point	Other petroleum	Regulation under CLM Act not required	River release pipeline Alignment (200 m to the east)

The sites detailed above have been considered further in section 7 with those that are in close proximity or overlap with the project footprint likely to have a higher risk with respect to contamination. Of particular relevance are Viva Clyde Western Remediation Area, Former Shell Clyde Refinery, Former Silverwater Landfill, storage facility and former printers at 54-58 and 46 to 58 Derby Street and the remediated lands at Sydney Olympic Park.

6.4.1.2 Contaminated land record of notices

The NSW EPA maintains a list of sites that appear on the register for Contaminated Land: Record of Notices which are issued under Section 60 of the *CLM Act*. The record of notices is a public record of sites notified to the NSW EPA for contamination and it is maintained under Section 58 of the *CLM Act*. The record of notices includes sites/premises that require regulation by the NSW EPA. The record of notices includes details of management

orders (e.g., voluntary management proposals, preliminary investigation orders), site audit statements and actions taken by the NSW EPA under sections 35 or 36 of the EHC Act 1985.

A search of this register identified nine premises within 500 m of the project footprint as being subject to current or prior notice, as summarised in Table 6.11.

Table 6.11 Contaminated land record of notices

Site name	Address (distance from project site)	Closest project element	Notices related to the site	Key information
Former Shell Clyde Refinery	Durham Street, Camellia (on-site – current WRRF site, and also occupied a large portion to the east and north east of the WRRF)	WRRF	3 current and 3 former	<p>Contamination is related to the use of this site for petroleum related activities.</p> <p>Contaminants include TRHs, BTEX, PAHs, lead, hexavalent chromium and PFOS in groundwater. LNAPL has been found on the site.</p> <p>NSW EPA declared that the site was significantly contaminated on 8 June 2016 (#20131110) due to the presence of COPCs listed above that presented a risk to Duck River and Parramatta River (including sediments). This notice was repealed for certain areas of the site that have been remediated (including the WRRF area) on 29 July 2022 (#20224418) where the NSW EPA were satisfied that the site no longer required regulation under the CLM Act. However, areas to the south and east of the WRRF remain part of the declaration.</p> <p>This site has been subject to investigation and remediation with NSW EPA accredited Site Auditor involvement. SASs have been prepared which determined that the land was suitable for ongoing commercial/industrial land use.</p>
James Hardie Factory (former eastern portion)	1 Grand Avenue, Camellia (40 m to the east)	Brine and transfer pipelines Alignment	1 former	<p>This site is contaminated with asbestos and arsenic present in the fill material throughout the site. Zinc, phenol and PAHs are also present in groundwater underlying the site.</p> <p>The site has been subject to remediation under a Voluntary Remediation Proposal (VMP) as the contaminants were found at concentrations that posed a significant risk of harm to human health and the environment.</p> <p>The VMP was prepared by Sydney Water in August 2000 and remediation was to include capping of the entire site, regular inspection and maintenance of the surface cover, annual groundwater monitoring and implementation of a 'safe work plan'.</p>

Site name	Address (distance from project site)	Closest project element	Notices related to the site	Key information
Former Akzo Nobel site	4 Grand Avenue, Rosehill (360 m to the north)	WRRF	3 Current and 22 former	<p>The site was declared significantly contaminated on 14 February 2003 (#21035) due to the presence of a range of contaminants including volatile chlorinated hydrocarbons and chromium in soil and groundwater, with the potential for offsite migration via groundwater flow to the Parramatta River.</p> <p>There have been amendments and repeals to this since then. NSW EPA published a 'notice to amend Approved Voluntary Management Proposal' (#20244421) on 27 May 2024 as the final remediation components under the VMP had been completed. The remaining aspect of the VMP was the provision of a SAS for the land suitability.</p> <p>The site has been subject to remediation under a VMP and NSW EPA Accredited Site Auditor involvement.</p>
James Hardie Australia and former James Hardie lands	8 and 10 Colquhoun Street, Camellia (32 m to the north)	WRRF	4 current and 10 former	<p>The NSW EPA, under the Environmentally Hazardous Chemicals Act (EHC) deemed this site to be contaminated as it was environmentally degraded as a result of carrying out a prescribed activity (disposal of asbestos waste) (notice #525/3019 12 April 1999).</p> <p>This site has an Ongoing Maintenance Order (OMO) (#20222805) on 13 April 2023 due to filling that has been undertaken on this site which included asbestos containing materials. It is noted that the site has been capped.</p> <p>A site specific LTEMP was prepared and provided to NSW EPA on 30 November 2020 for the management of residual contamination.</p> <p>Of note, the OMO requires that the LTEMP includes airborne asbestos monitoring during all excavations and biannual hazardous ground gas monitoring at the site.</p>

Site name	Address (distance from project site)	Closest project element	Notices related to the site	Key information
Former Silverwater Landfill	Carnarvon Road, Silverwater (adjacent to the south)	River release pipeline Alignment	1 current and 6 former	<p>NSW EPA declared that this site was significantly contaminated on 4 September 2019 (#20181103) due to the presence of hazardous ground gases (including methane and carbon dioxide). The site is a former landfill and the contamination is associated with the decomposition of waste materials. The NSW EPA indicated that there are potential risks to off-site receptors including occupants of buildings and intrusive maintenance workers.</p> <p>As such regulation of this site was required due to the presence of hazardous ground gases on the site and perimeter monitoring wells, where there was a potential risk to offsite receptors, including intrusive maintenance workers.</p> <p>The site is currently being managed under an Environmental Management Plan (EMP).</p>
Storage facility	54-58 Derby Street, Silverwater (adjacent to the south)	River release pipeline Alignment	2 former	<p>NSW EPA issued a Preliminary Investigation Order (#20151001) (PIO) and an amendment of that order (#20154408). The site had been used by numerous commercial printing facilities.</p> <p>The PIO was in relation to contaminants found on the adjacent site (trichloroethene in groundwater), 103-105 Derby Street and it was suspected that the origin of the contamination was a former printing facility at this site.</p> <p>The amendment to the PIO was for an extension of the deadline to undertake investigation at the site and provide a report to the NSW EPA.</p> <p>There are no further details on the NSW EPA website in relation to this site.</p>
Haslams Creek South Area 3	At Kronos Hill, Kevin Coombes Avenue, Sydney Olympic Park (400 m to the south)	River release pipeline Alignment	2 current and 3 former	Information obtained from online sources in relation to the location of the various engineered landfills which are managed by the Sydney Olympic Park Authority (SOPA) under Maintenance of Remediation Order (#28040).
Kronos Hill Landfill	Kevin Coombes Avenue, Sydney Olympic Park (170 m to the south)	River release pipeline Alignment	2 current and 13 former	The waste materials contained within the landfills are significantly contaminated. with a range of contaminants including hydrocarbons, PAHs and heavy metals.
Woo-La-Ra Landfill	Hill Road, Sydney Olympic Park ((adjacent to the west)	River release pipeline Alignment	2 current and 4 former	Sydney Olympic Park Authority (SOPA) to implement the updated Remediated Lands Management Plan (2022).

Relevant sites detailed in Table 6.11 have been considered further in Section 7 with respect to contamination as they could pose a contamination risk to the project. These are Former Shell Clyde Refinery, Former Silverwater Landfill (MET Recycling), storage facility and former printers at 54-58 and 46 to 58 Derby Street and the remediated lands at Sydney Olympic Park.

6.4.2 Former gasworks

Based on the search, there are no former gasworks within a surrounding study area.

6.4.3 PFAS investigation and management sites

Lotsearch (2024), as part of the Jacobs PSIs (2025c, 2025h) conducted a search of premises/sites that are a part of the NSW EPA, Defence or Airservices PFAS investigation programs⁶. No PFAS investigation of Management Program Areas were identified within the study area.

6.4.4 Waste management sites

A database of waste management sites and liquid fuel sites is maintained by Geoscience Australia via a web-based service platform. A review of this information indicated that there are nine premises within the study area of the project footprint, as summarised in Table 6.12.

Table 6.12 Waste Management Facilities Summary

Site	Address	Class	Operational Status	Location in relation to project footprint
Woolworths Supermarket	28-29 Oak Street, Rosehill	Soft plastics	Operational	145 m to south west of brine and transfer pipelines Alignment
MET Recycling (former Silverwater landfill)	134 Carnarvon Street, Silverwater	Not classified	Operational	Adjacent to the south of River release pipeline Alignment
Downer Reconomy Rosehill	1A Unwin Street, Rosehill	Construction and demolition waste	Operational	Adjacent to the east of WRRF
Cardinal Group Waste Facility	Corner Newton Street North and Carnarvon Street, Silverwater	Not classified	Operational	Adjacent to the south of River release pipeline Alignment
Sterihealth NSW Waste Facility	2-16 Wilbin Street, Silverwater	Not classified	Operational	Adjacent to the north of River release pipeline Alignment
Cleanaway Daniels, Matrix and Incineration Facility	2-16 Wilbin Street, Silverwater	Clinical waste	Operational	Adjacent to the north of River release pipeline Alignment
RBM Plastic Extrusions Plastics	32-40 Derby Street, Silverwater	Recycling	Operational	Adjacent to the south of River release pipeline Alignment
Bingo Transfer Station	19-23 Fariola Street, Silverwater	Drop off	Operational	250 m to the west of River release pipeline Alignment
Coles Soft Plastics Drop off	3 Burroway Road, Wentworth Point	Drop off	Operational	220 m to the north east of River release pipeline Alignment

In relation to the assessment of impact, the MET Recycling (former Silverwater Landfill) has been considered further given its proximity to the project footprint and nature of the contamination associated with its former use i.e., presence of subsurface hazardous gas.

⁶ [The NSW Government PFAS Investigation Program | EPA](#)

6.4.5 Liquid fuel sites

A database of liquid fuel sites is maintained by Geoscience Australia via a web-based service platform⁷. A review of this information indicated that there are five premises within the study area, as summarised in Table 6.13. The BP Petrol Station and Shell Fuel Refinery/Terminal have been considered further in Section 7 due to their proximity to the project footprint.

Table 6.13 Liquid Fuel Facilities Summary

Site	Address	Operational Status	Location in relation to project footprint
Shell Fuel Refinery	Durham Street, Rosehill	Closed	On site and adjacent, WRRF
Shell Fuel Terminal*	Durham Street, Rosehill	Operational	Adjacent to the east of WRRF
BP Petrol Station	Corner Hassall Street and James Ruse Drive, Rosehill	Operational	70 m to the west of the brine and transfer pipelines
Speedway Parramatta – Petrol Station	127A Alfred Street, Parramatta	Operational	430 m to the west of the brine and transfer pipelines
Caltex Petrol Station	1 Avenue of the Americas, Newington	Operational	145 m to the north of the river release pipeline

Notes:

* former Shell owned, now owned by Viva Energy Australia Pty Ltd.

6.4.6 Environmental Protection Licences

The NSW EPA maintains a public register of premises subject to an Environment Protection Licence (EPL) under the *Protection of the Environment Operations Act 1997* (the POEO Act). The register includes current, former, surrendered and delicensed activities.

Information presented in the PSIs prepared by Jacobs as part of this project (Jacobs, 2025c, 2025h) indicates that there are a wide range of premises that are or have been registered and regulated by the NSW EPA under the POEO Act. Those premises which were assessed to have a high potential for contamination are summarised in Table 6.14 below. Of these the Viva Clyde Fuel Terminal in Camellia has been considered further in section 7 as this site has been included in relevant tables above related to the presence of contamination that may impact the project.

Table 6.14 Premises with an EPL, assessed as high potential for contamination

Premises, address	Activity	Status	Location relative to the project footprint
Viva Clyde Fuel Terminal, Durham Street, Camellia	Non-thermal treatment of hazardous and other waste and petroleum products storage	Current	On site, WRRF*
Sydney Trains, Haymarket – Train network	Railway systems activities (likely to be associated with operation of light rail)	Current	On site, brine and transfer pipelines Alignment
CPB Contractors, Train network	Package 4, Parramatta - Railway infrastructure construction (>=50,000T & track to be constructed >10 km & <30 km)	Current	On site, brine and transfer pipelines Alignment
Great River City Light Rail, Light rail network	Package 5, Parramatta - Railway infrastructure construction (<50,000T)	Current	On site, brine and transfer pipelines Alignment
Basell Polyolefins, Durham Street, Rosehill	Chemical storage waste generation, Plastic resins production	Surrendered	On site, WRRF

⁷ [Geoscience Australia Portal](#)

Premises, address	Activity	Status	Location relative to the project footprint
Luhrmann Environment Management / Robert Orchard / Sydney Weed & Pest Management, Waterways Throughout NSW	Other Activities / Non-Scheduled Activity - Application of Herbicides**	Surrendered	Network of features, on site.

* Whilst this is listed as current, the WRRF site owned by Sydney Water does not have an active EPL.

** It is noted that the application of herbicide activities is usually undertaken on a local government area wide basis and unlikely to have been a direct impact on the investigation area.

6.5 Summary of the Camellia Peninsula and WRRF

6.5.1 Camellia Peninsula

Camellia, located in western Sydney, has a rich and complex industrial legacy that has shaped its environmental profile. The area’s industrialisation began in the 1880s and has included a wide range of heavy and light industries. Key Historical Industries include:

- The Clyde Refinery commenced operations in 1926, operated by Shell (now Viva Energy). The refinery received and refined crude oil piped from the Gore Bay terminal until refining activities ceased in 2012. After closure, the site continued as a terminal for the storage and distribution of finished petroleum products. The refinery site was subdivided and underwent staged remediation, notably as part of the “Western Area Remediation Project” (see Jacobs 2024a).
- Chemical Manufacturing; Companies such as Akzo Nobel (4 Grand Avenue, Rosehill) operated chemical manufacturing and storage facilities, including chrome chemicals, chlorinated hydrocarbons, and arsenic-based herbicides. The Akzo Nobel site was declared significantly contaminated in 2003 (Notice #21035) due to volatile chlorinated hydrocarbons and chromium in soil and groundwater.
- Asbestos and Building Materials; James Hardie (1 Grand Avenue, Camellia; 8 and 10 Colquhoun Street, Camellia) manufactured asbestos-containing materials, plasterboard, bricks, and roof tiles. The James Hardie sites have a history of asbestos and arsenic contamination and have been subject to ongoing maintenance and capping under regulatory orders.
- Other Industries:
 - Tanneries, meatworks, lumber yards, bitumen and rubber tyre manufacturing, paints, food products, plastic pipes, and pharmaceuticals have all operated in Camellia.
 - Solid and liquid waste storage, recycling, and treatment have been common, with concrete recycling and landfilling activities also present.

6.5.2 WRRF

The WRRF has a complex history; further detail is provided below.

The proposed WRRF was formerly utilised as a crude oil refinery (part of the Clyde Refinery) in 1926. Operations primarily comprised the receipt and refining of crude oil and finishing product piped from the Gore Bay terminal until the cessation of refining activities in 2012. Since the completion of refining operations, the former Clyde Refinery has been partially utilised as a terminal, which primarily involves the receipt, storage and distribution of finished petroleum products. The refinery was then subdivided and remediated in stages. The area associated with the WRRF is the “Western area remediation project”.

Site audit statements (SAS) and site audit reports (SAR) have been prepared by the site auditor (Andrew Kohlrusch of GHD) for the following audit areas comprising the Western Remediation Area which includes areas within and adjacent to the WRRF site:

- Stage 1 audit area – located adjacent and to the east (hydraulically cross gradient) of the Camellia WRRF.

- Stage 2 audit area (AA1): Proposed lots 51 to 55 and adjoining proposed road - located within the northern portion of the Camellia WRRF.
- Stage 2 audit area (AA2): Proposed lots 59, 60, 63, and adjoining proposed road - located within the central and south western portion of the Camellia WRRF (portion of Lot 63 present within the Camellia WRRF site).
- Stage 2 audit area (AA3): Proposed lots 56, 58, 61, 62, and adjoining proposed road - covers the eastern portion of the Camellia WRRF (portion of Lot 62 present within the Camellia WRRF site).
- Stage 2 audit area (AA4): Proposed lot 64 (subject area of this audit) - located adjacent off-site and to the south and hydraulically down gradient of the Camellia WRRF.

All or parts of Stage 2 audit areas AA1, AA2 and AA3 are located within the WRRF site.

The regulation history for the area was provided in the DSI (Jacobs 2025a) and based on the information that was reviewed the SASs and SARs for the respective audit areas have detailed that all areas are suitable for commercial/industrial land uses subject to implementation of area specific LTEMPs. The main application (but not limited to) of the long term environmental management plan (LTEMP) for AA1, AA2 and AA3 was for the management of the following:

- Hydrocarbon impacted soils – limited to aesthetic considerations (presence of hydrocarbon staining and/or odours) which may be identified during future intrusive works.
- Below ground infrastructure still remains.
- While asbestos has not been identified above the criteria for the proposed land-use, the long history of industrial land use and surrounding industries, it cannot be precluded that asbestos could be an unexpected find during further intrusive excavations.

NSW EPA declared that the site was significantly contaminated on 8 June 2016 (#20131110) due to the presence of contaminants that presented a risk to Duck River and Parramatta River (including sediments). The declared area (including the Camellia WRRF site) was subject to remediation works in accordance with the conditions of consent (State Significant Development (SSD) 9302 & SSD10459) and subject to regulation under EPL No. 570 (Condition U1 – Soil and Groundwater Monitoring). Based on a review of available reports including SAS's and SAR's, the NSW EPA was satisfied that it no longer has reason to believe that contamination of the land to which this notice applies (including the Camellia WRRF site) is significant enough to warrant regulation under the Contaminated Land Management Act 1997. The repeal notice was issued by the NSW EPA in July 2022 for areas AA1 to AA3 only. The off-site area AA4, located to the south, is still declared a significantly contaminated site.

To the south of the proposed WRRF boundary is a buried waste area. This area is referred to as the “Southern Buried Waste Area” and was used to place contaminated material and waste generated from other areas of the Clyde refinery site. This remedial work was undertaken by ERM and audited by Andrew Kohlrusch of GHD⁸. This material includes ACM and refinery waste and tar-like materials have also been identified.

The WRRF is underlain by fill materials to a maximum depth of 4.7 m bgl, or between 1 m to 3 m in depth on average. Within the fill material excavated from the majority of sample locations (Jacobs, 2024a), visual contamination (odours, staining and aesthetic issues) was observed. Most fill materials excavated contained a quantity of construction wastes, namely concrete, plastic, steel, glass and bitumen with strong anthropogenic odorous, discoloured materials and product inflows observed within isolated locations across the area.

The land was raised in certain areas of the WRRF as shown in Figure 6.9. The existing ground level, prior to the addition of to the land raises, will be graded to provide a slope of 0.05%, with a level of 5.100 m RL at the northern boundary to 4.806 m RL at the southern boundary (ref: IA319500-00-T-C-MEM-00-01_01_Subgradeplane memo).

The addition of 1.7 m depth of VENM and imported tunnel spoil will provide a finished ground level of 6.800 m RL at the northern boundary to 6.506 m RL at the southern boundary.

⁸ Site Audit Statement Stage 2 Area – Part Lot 100 in DP1168951

6.6 Summary of existing contamination

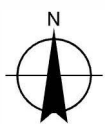
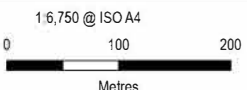
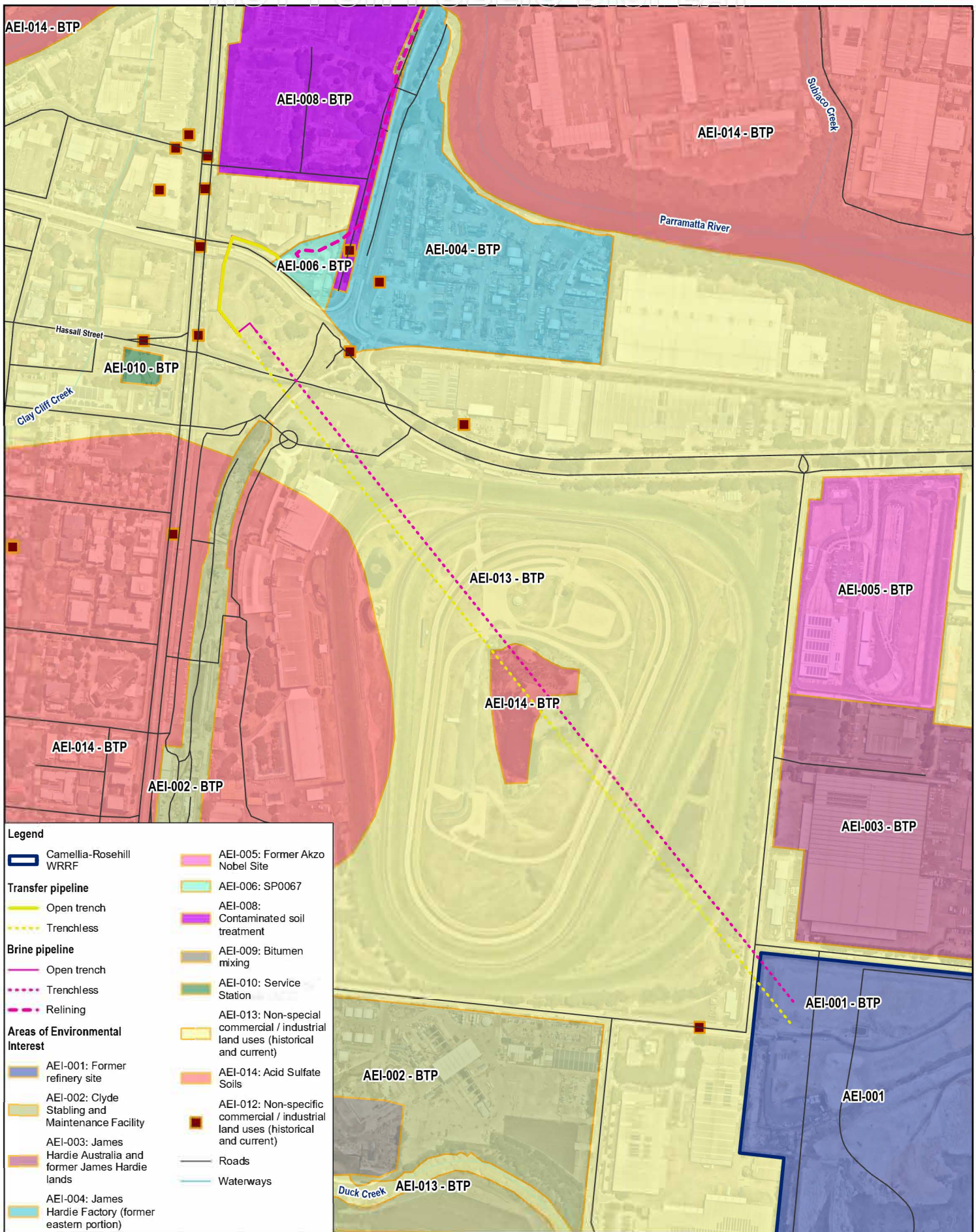
The PSIs and DSIs selected the areas of environmental interest (AEIs) based on the searches undertaken in Section 6.4.1 to 6.4.6 and site investigation activities (scope summaries are provided in Appendix D). These identified AEIs are potential contamination risks to the project. These AEIs have been reviewed and approved by an accredited Site Auditor and are known or have potential contamination present within and/or adjacent to the project footprint. The locations of the AEIs are presented in Figure 6.10 and Figure 6.11.

The AEIs were selected for the brine and transfer pipelines, the WRRF and the river release pipelines areas and are presented in Table 6.15. The table provide a brief summary of the site history and the main contaminants of potential concern (COPCs) for the property based on the details of the PSIs and DSIs.

Potential contamination exposure risk has been assumed if the environmental media will be encountered during the construction, and if:

- Contaminated soil, groundwater, soil vapour and/or ground gases is present (based on the investigations) within the alignment to the extent that there may be a risk to construction/operation.
- Contaminated media have the potential to migrate (e.g. groundwater, soil vapour, gases) has the potential to migrate into the alignments and WRRF during construction/operation.

If the risk is identified the AEI is carried forward in the impact assessment in Section 7. Where an AEI is unlikely to represent a contamination exposure risk it will not be carried into the impact assessment undertaken in Section 7.

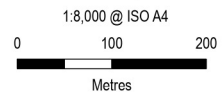
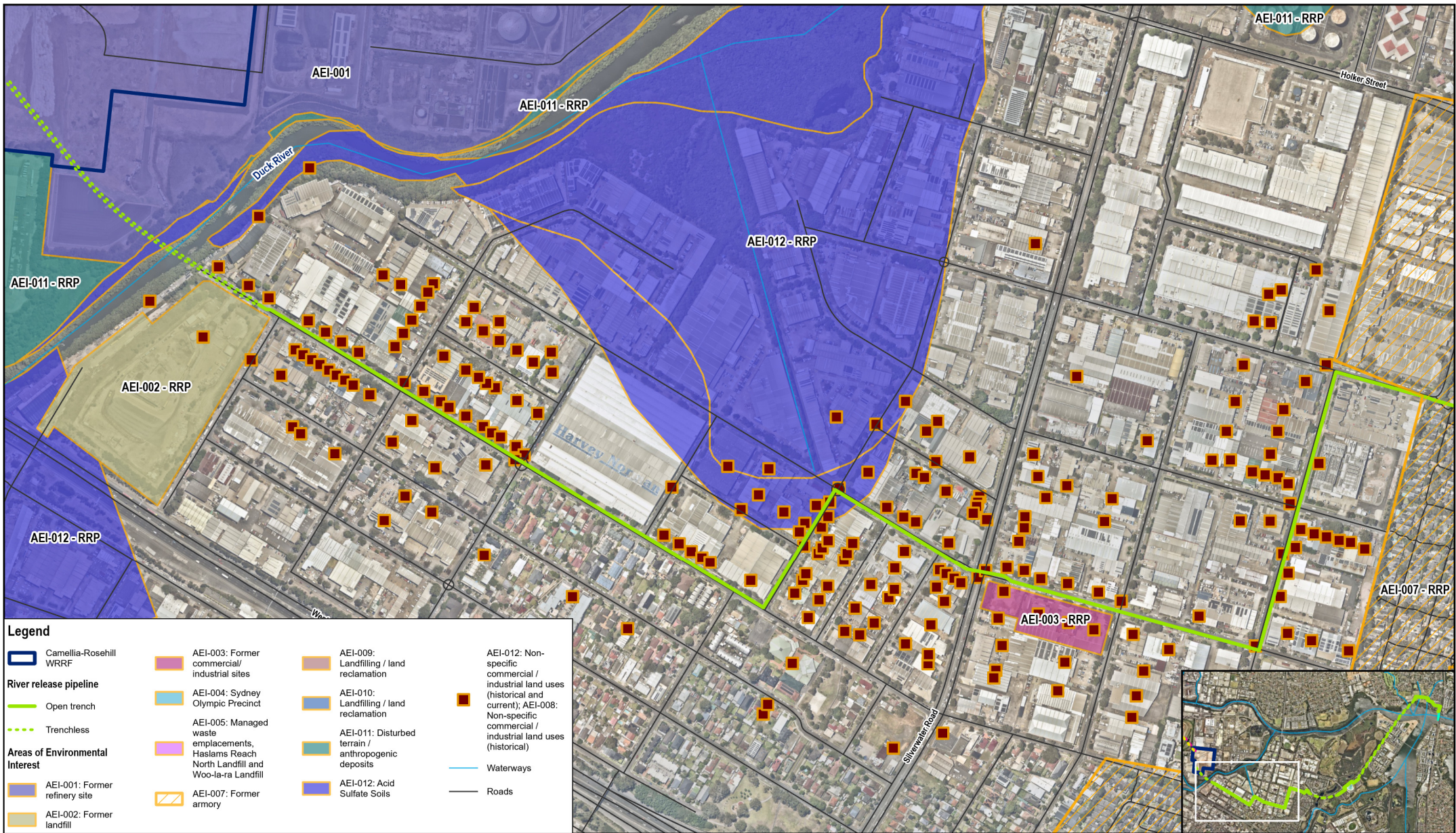


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**Brine and transfer pipelines:
 Areas of Environmental Interest**

FIGURE 6.10



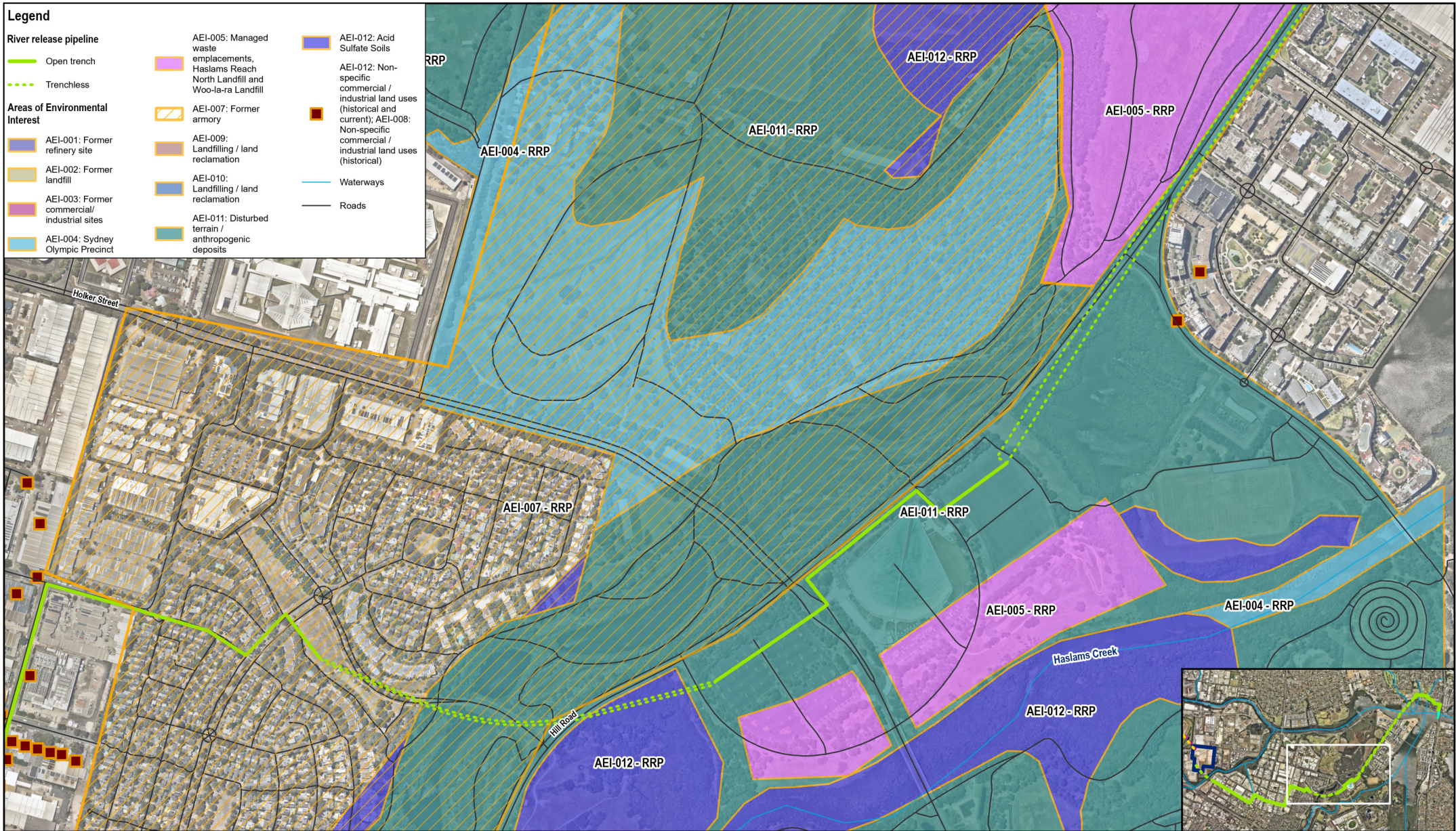
Map Projection: Transverse Mercator
 Horizontal Datum: GDA2020
 Grid: GDA2020 MGA Zone 56

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River release pipelines:
 Areas of Environmental Interest

FIGURE 6.11



Legend

River release pipeline

- Open trench
- Trenchless

Areas of Environmental Interest

- AEI-001: Former refinery site
- AEI-002: Former landfill
- AEI-003: Former commercial/ industrial sites
- AEI-004: Sydney Olympic Precinct
- AEI-005: Managed waste emplacements, Haslams Reach North Landfill and Woo-la-ra Landfill
- AEI-007: Former armory
- AEI-009: Landfilling / land reclamation
- AEI-010: Landfilling / land reclamation
- AEI-011: Disturbed terrain / anthropogenic deposits
- AEI-012: Acid Sulfate Soils
- AEI-012: Non-specific commercial / industrial land uses (historical and current); AEI-008: Non-specific commercial / industrial land uses (historical)

Waterways
Roads

1:8,000 @ ISO A4
0 50 100
Metres

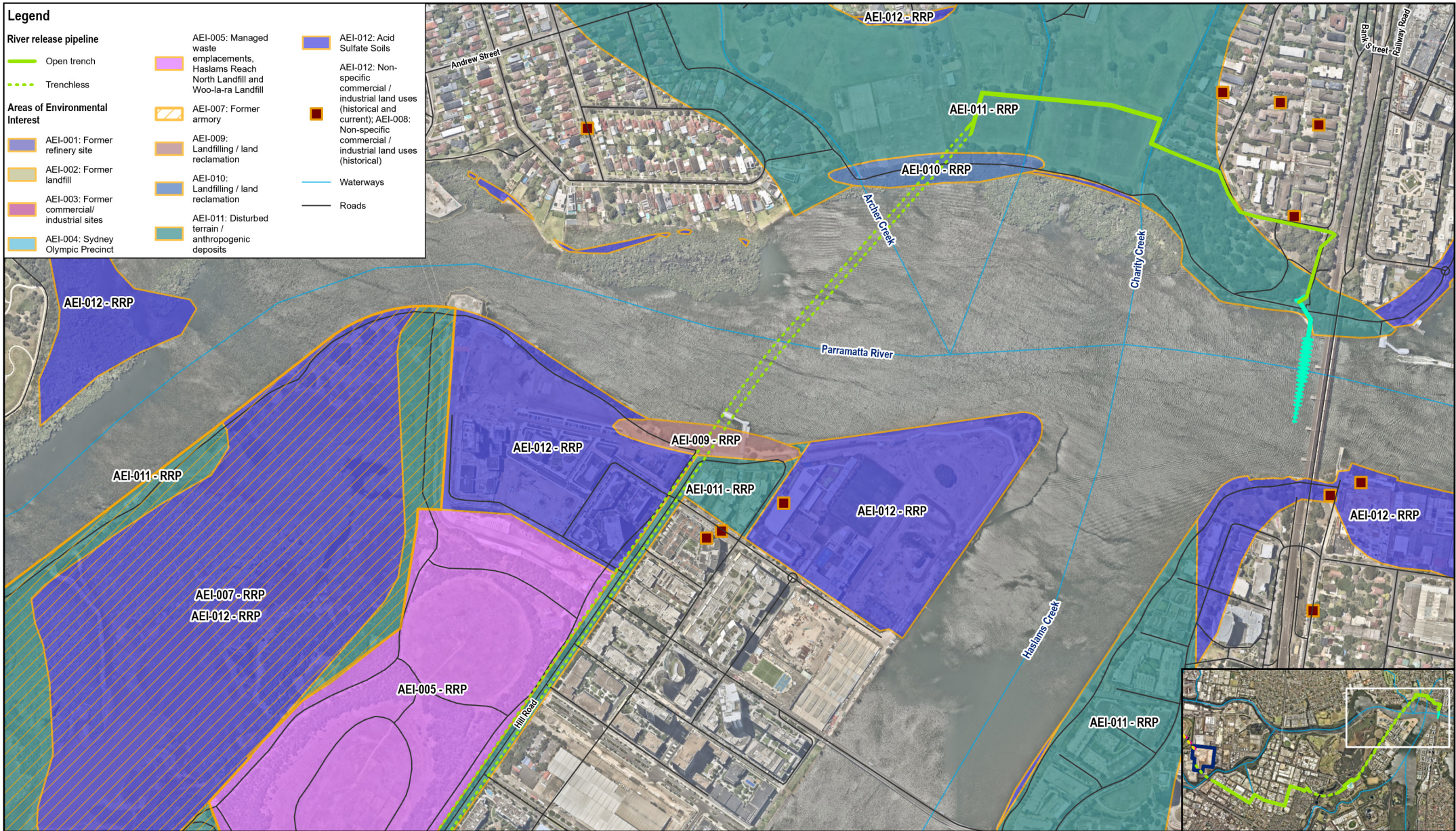


Sydney Water Corporation
Sydney Water GOPP WCM SSI
Soil and Land Contamination Impact Assessment

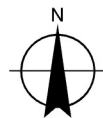
Project No. 12673348
Revision No. 0
Date. 15/12/2025

River release pipelines:
Areas of Environmental Interest

FIGURE 6.11



1:8,000 @ ISO A4
0 50 100
Metres



Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56

Sydney Water Corporation
Sydney Water GOP WCM SSI
Soil and Land Contamination Impact Assessment

Project No. 12673348
Revision No. 0
Date. 15/12/2025

River release pipelines:
Areas of Environmental Interest

FIGURE 6.11

Table 6.15 Identified AEIs and project impact potential

AEI and associated infrastructure ID	Name and proximity to the project footprint	History	Main COPCs	Will the AEI have an impact to the project?
Brine and transfer pipelines				
AEI-001 – BTP	Former Clyde Refinery Within and adjacent to the alignment	Former refinery operations. Historical development, waste disposal, spills and leaks from former refining operations. Known soil, groundwater and soil vapour contamination. Area also contains disturbed terrain (AEI-013 – BTP) and areas of ASS (AEI-014 – BTP)	Asbestos Heavy metals LNAPL* TRH BTEX PAHs PFAS	Yes – known contamination is present within the alignment and may represent a contamination exposure risk during construction and operation.
AEI-002 – BTP	Clyde stabling and maintenance facility Adjacent to the alignment	Contamination is currently under assessment and being managed via the planning process (EP&A Act). Assumed to potentially include groundwater contamination.	TRH BTEX PAHs Chlorinated solvents PFAS Heavy metals	No – soil contamination is located outside of the alignment and is unlikely to represent an exposure risk. Groundwater is hydraulically cross-and/or down gradient of the alignment.
AEI-003-BTP	James Hardie Australia and former James Hardie lands Adjacent to the alignment	Known soil contamination in the form of asbestos. No known groundwater contamination	Asbestos	No – soil contamination is located outside of the alignment and is unlikely to represent an exposure risk. No groundwater contamination has been reported to the site. The contamination known to be present (asbestos) does not represent a leaching risk to groundwater.
AEI-004-BTP	James Hardie factory (former eastern portion) Adjacent to the alignment	Known soil and groundwater contamination	Asbestos TRH BTEX PAHs Chlorinated solvents PFAS Heavy metals	No – soil contamination is located outside of the alignment and is unlikely to represent an exposure risk. Groundwater is hydraulically cross-and/or down gradient of the alignment.
AEI-005-BTP	Former Akzo Nobel Site Adjacent to the alignment	Former chemical manufacturing, fuel and solvent storage and handling. Known soil and groundwater contamination	Hexavalent Chromium Lead TRH BTEX PAHs PFAS	No – soil contamination is located outside of the alignment and is unlikely to represent an exposure risk. Groundwater is hydraulically cross-and/or down gradient of the alignment.
AEI-006-BTP	Camellia Pumping Station Within the BTP alignment	Sydney Water pumping station. Known soil contamination and potential asbestos waste disposal area.	Asbestos (bonded and fibrous) ASS PFOS	Yes – excavation of soil with potential contamination. No groundwater contamination is known.

AEI and associated infrastructure ID	Name and proximity to the project footprint	History	Main COPCs	Will the AEI have an impact to the project?
AEI-007-BTP	Waste storage, recovery of general waste, petrochemical production – Downer Adjacent to the alignment	Processing of reclaimed asphalt pavement and repurposing of materials such as asphalt, concrete and other construction waste. Contamination is present in soil, groundwater and soil vapour.	TRH BTEX Heavy metals PAHs PAHs VOCs (volatile organic compounds) Asbestos	No – soil contamination is located outside of the alignment and is unlikely to represent an exposure risk. Groundwater and vapour are hydraulically cross- and/or down gradient of the alignment.
AEI-008 – BTP	Contaminated soil treatment (Abacus Camellia) Adjacent to the alignment	The site was a former James Hardie land. The site has an EPL, and soil treatment through aeration and bioremediation is being conducted.	TRH BTEX VOCs (volatile organic compounds)	No – soil contamination is located outside of the alignment and is unlikely to represent an exposure risk. Groundwater and vapour are hydraulically cross- and/or down gradient of the alignment.
AEI-009 – BTP	Bitumen mixing (Emoleum Road Services) Adjacent to the alignment	This site operates bitumen mixing and asphalt production facilities. Potential for soil and groundwater contamination.	Possible soil and groundwater contamination	No – soil contamination (if present) on the site is unlikely to represent an exposure risk. Groundwater and soil vapour contamination (if present) is located hydraulically cross- and/or down gradient of the alignment.
AEI-010 – BTP	Service station Adjacent to the alignment 75 m north west.	Service Station is an active site with hydrocarbons from leaks and/or spills from refuelling activities and infrastructure. Possible soil, groundwater and soil vapour contamination	TRH BTEX Heavy metals	Yes – soil contamination (if present) on the site is unlikely to represent an exposure risk. Groundwater and soil vapour contamination (if present) could potentially migrate into open excavations.
AEI-011 – BTP	Service station Alfred St Parramatta 415 m north west of alignment	Service station	Possible soil and groundwater contamination	No – soil contamination (if present) on the site is unlikely to represent an exposure risk. Groundwater and soil vapour contamination (if present) is located hydraulically cross- and/or down gradient of the alignment.
AEI-012 – BTP	Non-specific commercial/industrial land uses (historical and current) Camellia, Clyde and Rosehill Adjacent to the BTP pipeline (Camellia pumping station to WRRF)	General historical and industrial land use could potentially have contaminated soil, soil vapour and groundwater exceeding the relevant assessment criteria across the area.	Potential: TRH BTEX PAHs OCP, OPP, PCB Phenols VOCs PFAS heavy metals asbestos	Yes – Soil is required to be excavated at HDD entry point and open trench area near the Camellia pumping station. Soil is unlikely to be excavated during the HDD construction, as the depth of the HDD is spatially separated from soil contamination sources. Groundwater may ingress into open excavations at the HDD entry point and the open trench area near the Camellia pumping station. For the HDD section – groundwater contamination sources are located hydraulically cross- and/or down gradient of the alignment except for the WRRF and this is covered in a separate AEI (AEI-001 – BTP).

AEI and associated infrastructure ID	Name and proximity to the project footprint	History	Main COPCs	Will the AEI have an impact to the project?
AEI-013 – BTP	Areas of disturbed terrain and anthropogenic deposits within the entire length of the BTP alignment.	Areas of disturbed terrain and filling with the potential across the length of the alignment. Contamination may be present in soil, soil vapour and groundwater exceeding the relevant assessment criteria across the area.	Potential: TRH BTEX PAHs OCP, OPP, PCB Phenols VOCs PFAS heavy metals asbestos	Yes – Soil is required to be excavated at HDD entry point and open trench area near the Camellia pumping station. Soil is unlikely to be excavated during the HDD construction, as the depth of the HDD is spatially separated from soil contamination sources. Groundwater may ingress into open excavations at the HDD entry point and the open trench area near the Camellia pumping station. For the HDD section – groundwater contamination sources are located hydraulically cross- and/or down gradient of the alignment except for the WRRF and this is covered in a separate AEI (AEI-001 – BTP).
AEI-014 – BTP	Acid sulfate soils	ASS is known to be present beneath the WRRF and at the open trench area between the camellia pumping station and the HDD entry points.	ASS	Yes – Potential and actual ASS could be intersected during excavation and dewatering during the construction.
Proposed pipeline access pipes – BTP	Area between the Camellia pumping station and the NSOOS	Asbestos (friable and bonded) is known to be present in the fill in the alignment area south of the Parramatta River to the Camellia pumping station. The area to the north of the Parramatta River contamination status is unknown	No investigations were undertaken in this area as part of this project.	Yes – Asbestos is known to be present and could be intersected during excavation during construction. Previous investigations encountered asbestos contamination in soils to the south of the Parramatta River.
WRRF				
AEI-001	Former Clyde Refinery All of the WRRF	The site was part of the former Clyde refinery. Potential sources of contamination at the site include the refinery's historical operations, contamination associated with fill materials imported to support development, residual contamination from the former aqueous film forming foam (AFFF) tank, asbestos in historical building structures, and redundant pipelines.	Asbestos Heavy metals LNAPL* TRH BTEX PAHs PFAS	Yes – known contamination is present within the alignment and may represent a contamination exposure risk during construction and operation.

AEI and associated infrastructure ID	Name and proximity to the project footprint	History	Main COPCs	Will the AEI have an impact to the project?
AEI-003 – BTP	James Hardie Australia and former James Hardie lands Adjacent to the WRRF (north)	Known soil contamination in the form of asbestos. No known groundwater contamination	Asbestos	No – soil contamination is located outside of the WRRF and is unlikely to represent an exposure risk. No groundwater contamination has been reported to the site. The contamination known to be present (asbestos) does not represent a leaching risk to groundwater.
AEI-005 – BTP	Former Akzo Nobel Site 360 m north of the WRRF	Former chemical manufacturing, fuel and solvent storage and handling. Known soil and groundwater contamination	Hexavalent Chromium Lead TRH BTEX PAHs PFAS	No – soil contamination is located outside of the alignment and is unlikely to represent an exposure risk. Groundwater is hydraulically cross gradient of the WRRF. According to the GWIA (Jacobs, 2025K) the HDD pits are located within the capping extent toward the north-west corner of the WRRF. The excavation depth of 2 m below the top of capping is not anticipated to reach the groundwater level and there will be no drawdown of the groundwater table.
AEI-007 - BTP	Waste storage, recovery of general waste, petrochemical production – Downer Adjacent to WRRF (East)	Processing of reclaimed asphalt pavement and repurposing of materials such as asphalt, concrete and other construction waste. Contamination is present in soil, groundwater and soil vapour.	TRH BTEX Heavy metals PAHs VOCs (volatile organic compounds) Asbestos	No – soil contamination is located outside of the WRRF and is unlikely to represent an exposure risk. Groundwater and vapour are hydraulically cross- and/or down gradient of the WRRF.
River release pipeline				
AEI-001 – RRP	Former Clyde Refinery South-west corner of WRRF to Carnarvon Street	The site was part of the former Clyde refinery. Potential sources of contamination at the site include the refinery's historical operations, contamination associated with fill materials imported to support development, residual contamination from the former AFFF tank, asbestos in historical building structures, and redundant pipelines.	B(a)P LNAPL TRH BTEX VOCs PFOS Heavy metals Methane Carbon dioxide ASS	Yes – known soil, groundwater, soil vapour and ground gas contamination are present within the WRRF / alignment and may represent a contamination exposure risk during construction and operation.
AEI-002 – RRP	MET Recycling Facility (EPL 20948) Adjacent to the alignment	Former landfill. Depth of waste is unknown and possibly up to 10 mbgl. The current NSW EPA regulation under the <i>CLM ACT</i> is associated with ground gases.	Heavy metals Nutrients PFOS Methane Carbon dioxide	Yes – known soil, groundwater and ground gas contamination are present immediately adjacent to the alignment and may represent a contamination exposure risk during construction and operation.
AEI-003 – RRP	Former commercial industrial sites Adjacent to the alignment	Former commercial/industrial sites. The site was a commercial printing facility.	Chlorinated hydrocarbons TRH	Yes – known soil and groundwater contamination are present immediately adjacent to the alignment and may represent a contamination exposure risk during construction.

AEI and associated infrastructure ID	Name and proximity to the project footprint	History	Main COPCs	Will the AEI have an impact to the project?
AEI-004 – RRP	Sydney Olympic Precinct. SOPA POD A Carpark to SOPA POD C Carpark Within and adjacent to the alignment	The Sydney Olympic precinct lands are associated with historical land uses, including but not limited to brickworks, abattoirs, and landfilling/land reclamation.	Asbestos (friable) B(a)P ASS PFOS Heavy metals Nutrients Ground gases	Yes – known soil and groundwater contamination are present immediately adjacent to the alignment and may represent a contamination exposure risk during construction and operation.
AEI-005 – RRP	Managed waste emplacements, Haslams Reach north and Woola-ra Landfill SOPA Pod C Carpark to Meadowbank Park Adjacent to the alignment	Managed waste emplacements. Depth of landfilling at the managed waste emplacements is not known. The leachate at these sites is managed by a leachate system which collects leachate for treatment and disposal at the Lidcombe waste facility.	PFOS Nutrients Ground gases	Yes – known soil and groundwater contamination are present immediately adjacent to the alignment and may represent a contamination exposure risk during construction and operation.
AEI-006 – RRP	Non-specific commercial/ industrial landuses (historical and current) Silverwater Adjacent to the alignment	This includes commercial/ industrial properties with the potential for localised contamination areas from Carnarvon Street through to PDC Park	Asbestos (ACM/PACM) Heavy metals PFAS PASS	Potential – there is a potential for localised contamination in these areas adjacent to the alignment and may represent a contamination exposure risk during construction.
AEI-007 – RRP	Former armory Within and adjacent to the alignment	Historical use of the area as a general armory.	ASS	Potential – there is a potential for ASS in this area adjacent to the alignment and may represent an exposure risk to oxygen during construction.
AEI-008 – RRP	Non specific commercial/ industrial land uses (historical) SOPA and Wentworth point Adjacent to the alignment	Historical commercial/industrial use including brickworks and an abattoir.	PFAS Nutrients	Potential – soil contamination is located outside of the alignment and is unlikely to represent an exposure risk. Groundwater contamination has been reported at the site.
AEI-009 – RRP	Landfilling and land reclamation Wentworth Point Within and adjacent to the alignment	Historical land filling and reclamation.	Asbestos TRH BTEX PAHs Heavy metals Nutrients PFAS Ground gas ASS	Potential – soil, groundwater and ground gas contamination is located within the alignment and may represent a contamination exposure risk during construction.

AEI and associated infrastructure ID	Name and proximity to the project footprint	History	Main COPCs	Will the AEI have an impact to the project?
AEI-010 – RRP	Landfilling and land reclamation Meadowbank Park Within and adjacent to the alignment	Meadowbank Park historically had landfilling and land reclamation.	B(a)P PACM PFAS Nutrients Ground gases	Potential – soil, groundwater and ground gas contamination are located within the alignment and may represent a contamination exposure risk during construction.
AEI-011 – RRP	Disturbed terrain / anthropogenic deposits within and adjacent to the alignment – WRRF, SOPA, Wentworth Point and Meadowbank.	Areas of disturbed terrain and filling with the potential across the length of the alignment at WRRF, SOPA, Wentworth Point and Meadowbank. Contamination may be present in soil, soil vapour and groundwater exceeding the relevant assessment criteria across the area.	Potential: TRH BTEX PAHs OCP, OPP, PCB Phenols VOCs PFAS heavy metals asbestos ASS and PASS	Yes – Soil is required to be excavated at HDD entry point and open trench areas. Soil is unlikely to be excavated during the HDD construction, as the depth of the HDD is spatially separated from soil contamination sources. Groundwater may ingress into open excavations at the HDD entry point and the open trench areas. For the HDD section – groundwater contamination sources are located hydraulically cross- and/or down gradient of the alignment except for the WRRF and this is covered in a separate AEI (AEI-001 – RRP).
AEI-012 – RRP	Acid sulfate soils Within and adjacent to the alignment	ASS is known to be present beneath the WRRF and at the open trench area between the camellia pumping station and the HDD entry points.	ASS	Yes - Potential and actual ASS could be intersected during excavation and dewatering during the construction.
	Dioxins from Parramatta River and Homebush Bay	Parramatta River has a legacy industrial activity particularly from the manufacture of chlorinated pesticides. Contamination is present in the surficial sediments at the Bridge. Despite remedial efforts, residual contamination remains in the sediments of Homebush Bay and the broader Parramatta River estuary.	Dioxins/furans and zinc ASS	Yes – sediment contamination and potential ASS are located within the alignment and may represent a contamination exposure risk during construction and operation.

* - LNAPL – light non-aqueous phase liquid. LNAPL is a product like oil and fuel that is lighter than water and therefore it sits on top of the groundwater. This can release harmful vapours as well as contaminate soil and the groundwater.

7. Impact assessment

The following section has been divided into the three major segments of the project footprint. These include:

- The river release pipeline.
- The WRRF.
- The brine and transfer pipeline including the Camellia pumping station.

The AEs that were identified as a project risk in Section 6.6 have been carried into the impact assessment. These AEs have the potential to harm human health and/or the environmental receptors during the project's construction and/or operation without appropriate controls being implemented. They have been summarised in Table 7.1 to Table 7.3 and the risk ranking provided. The risk ranking has been completed in accordance with the criteria adopted in Section 5.3.

The construction methodologies to be used for the project footprint are understood to be the following:

- Open trenches.
- Horizontal directional drilled (HDD) (i.e., trenchless construction); These involve entry and exit pits. HDD methodology uses sufficient pressure to prevent groundwater ingress during drilling.
- Micro tunnel shafts.
- Micro tunnelling; construction methodology considered impermeable to groundwater inflow.
- Pipeline relining.
- Series of pit excavations along the relining of the Brine pipeline.
- Cofferdam (temporary, only in Parramatta River at Meadowbank).

Table 7.1 Contamination risk ranking (without controls or remediation) – Brine and transfer pipelines alignment

AEI and other features with location	Proposed construction summary	Contamination	Potential for contamination to be intersected	Exposure pathway	Sensitive Receptors	Risk Ranking
Proposed pipeline access pits – BTP Camellia pumping station to NSOOS	21 pits along the existing pipeline to allow for the relining of the pipeline. Pits assumed to be 1 m below the existing pipe invert level with an approximate footprint of 15 m x 4 m	No investigations were undertaken as part of the DSI. There is the potential for fill material to include asbestos and other anthropogenic material. Pits B8 to B6 are adjacent to a former contaminated site and therefore have a higher potential for contaminated media to be present. There is the potential for ASS from pit B9 to the south where it joins Camellia pumping station.	Soil will be intersected to gain access to the pipeline. Groundwater will be intersected as part of the construction at most of the pits (with the exception of Brine pit 10 and Brine pit 11- See Table 4.4).	Construction workers and future maintenance workers could be exposed via ingestion, inhalation and dermal contact. The environment could be exposed to contamination via groundwater migration through preferential pathways.	Construction workers Parramatta River	Moderate to high (human health)
AEI-001 – BTP: Former Clyde Refinery North west corner of the WRRF	Brine pipeline and transfer main HDD pits (three launch pits for the pipelines) Located toward the north-west corner of WRRF site. Proposed location is within the raised level extent and as such the maximum excavation depth of all pits is 2 m below the top of the raised level. Approximate footprint of 15 m by 4 m.	Contamination is present at concentrations exceeding the relevant assessment criteria across the area for soil (including asbestos in fill) and ASS. Groundwater within the north west corner of the WRRF is not anticipated to be intercepted as part of the pipeline construction works. Soil vapours in the north west corner were below screening criteria.	Soil contamination throughout the profile, starting at depths of 1.7 mbgl (underneath the new raised layer). Potential and actual ASS could be intersected.	Construction workers and future maintenance workers could be exposed via ingestion and dermal contact. Generation of dust and inhalation. Excavation and oxidisation of ASS and generation of acidity in soils. This will generate acidic run-off water and possible migration into nearby surface water bodies.	Construction workers Future maintenance workers Current and future commercial workers both on-off-site Duck River	Very High (Human health, ecological)
AEI-006 – BTP: Camellia pumping station Grand Avenue, Rosehill	For the transfer main, approximately 41 m of open trenching, to a maximum depth of 6.5 m. Trenching is proposed to be approximately 3 m wide for connection. For the brine main, approximately 38 m of open trenching, to a maximum depth of 6 m. Trenching is proposed to be approximately 2.6 m wide.	Contamination is present in soil (asbestos) and potentially in groundwater, exceeding the relevant assessment criteria across the area. ASS and PASS are present in the area.	Soil contamination is known to be present in the fill material around the AEI (asbestos). Potential and actual ASS could be intersected. Groundwater is unlikely to be intersected as part of the construction for the transfer pipeline but is likely to be intersected for the brine pipeline trench.	Construction workers and future maintenance workers could be exposed via ingestion and dermal contact. Generation of dust and inhalation. Excavation and oxidisation of ASS and generation of acidity in soils. This will generate acidic run-off water and possible migration into nearby surface water bodies. Construction workers could be exposed through contact with contaminated groundwater, and the environment could be exposed to contamination via uncontrolled releases during construction. Migration through preferential pathways.	Construction workers Future maintenance workers Current and future commercial workers both on-off-site Parramatta River	Very high (Human health, ecological)
AEI-010 – BTP: Service station Jame Ruse Drive, Rosehill	Adjacent to the brine and transfer pipelines project alignment.	Contamination may be present in soil, soil vapour and groundwater exceeding the relevant assessment criteria across the area.	Groundwater may migrate from the site as it is likely to be intersected as part of the brine pipeline trench. This AEI is adjacent to the proposed alignment and therefore the soil will not be intercepted.	Construction workers could be exposed through contact with contaminated groundwater and inhalation.	Construction workers	Low (Human health)
AEI-012 – BTP: Non-specific commercial/industrial land uses (historical and current) Camellia, Clyde and Rosehill	Adjacent to the brine and transfer pipelines project alignment.	Contamination may be present in soil, soil vapour and groundwater exceeding the relevant assessment criteria across the area.	Groundwater is likely to be intersected as part of the brine pipeline trench at Camellia pumping station and the area north west of Rosehill Gardens Racecourse to Camellia pumping station.	Construction workers could be exposed through contact with contaminated groundwater and inhalation.	Construction workers	Moderate (Human health)
AEI-013 – BTP: Areas of disturbed terrain and anthropogenic deposits Areas of disturbed terrain for the entire length of brine and transfer pipelines and anthropogenic deposits within the southern end of the brine and transfer pipelines	Across the brine and transfer pipelines project alignment.	Contamination may be present in soil, soil vapour and groundwater exceeding the relevant assessment criteria across the area.	Groundwater is likely to be intersected as part of the brine pipeline trench at Camellia pumping station and the area north west of Rosehill Gardens Racecourse to Camellia pumping station.	Construction workers could be exposed through contact with contaminated groundwater and inhalation.	Construction workers	Moderate (Human health)

AEI and other features with location	Proposed construction summary	Contamination	Potential for contamination to be intersected	Exposure pathway	Sensitive Receptors	Risk Ranking
AEI-014 – BTP: Acid sulfate soils Known to be present at the WRRF	Areas where the ground is to be disturbed and/or the groundwater table lowered.	Potential and actual ASS could be intersected.	Excavation and oxidation of ASS and generation of acidity in soils and groundwater. This will generate acidic run-off water and possible migration into nearby surface water bodies.	Environmental receptors within receiving surface water bodies.	Duck Creek Parramatta River	Moderate (ecological)

Table 7.2 Contamination risk ranking (without controls or remediation)- WRRF

AEI with location	Proposed Construction Summary	Contamination	Potential for contamination to be intersected.	Exposure pathway	Sensitive Receptors	Risk Ranking
AEI:001: Former Clyde Refinery All of the WRRF	A raised ground level is to cover a large proportion of the site to limit the interaction with the contamination. Two foul water pumping stations are to be excavated to an approximate depth of 6.8 m with an approximate footprint of 5 m x 5 m.	Contamination is present at concentrations exceeding the relevant assessment criteria across the area in soil (including asbestos in fill), soil vapour, ground gases and groundwater.	Soil contamination throughout the profile.	Construction workers and future maintenance workers could be exposed via ingestion, inhalation and dermal contact.	Construction workers Future maintenance workers Current and future commercial worker both on-off-site Duck River	Moderate
			Soil vapour and ground gases are likely to be present during excavation.	Construction workers could be exposed via inhalation. Current / and future commercial/industrial site users (both on-off site).		
			Groundwater will be intersected as part of the construction.	Construction workers could be exposed via contact with contaminated groundwater.		

Table 7.3 Contamination risk ranking (without controls or remediation) - river release pipeline (river release pipeline) alignment

AEI and other features with location	Proposed Construction Summary	Contamination	Potential for contamination to be intersected.	Exposure pathway	Sensitive Receptors	Risk Ranking
AEI:001 – RRP: Former Clyde Refinery South-west corner of WRRF to Carnarvon Street	Proposed excavation depth of pit (2 m) HDD - Approximate footprint of 15 m by 4 m	Contamination is present at concentrations exceeding the relevant assessment criteria in soil (including asbestos in fill), soil vapour, ground gases and groundwater.	Soil contamination throughout the profile. Soil vapour and ground gases are likely to be present during excavation.	Construction workers could be exposed via ingestion and dermal contact.	Construction workers Future maintenance workers Duck River	Very High (Human health, ecological, surface water/groundwater)
			Groundwater will be intersected as part of the construction.	Construction workers could be exposed through contact with contaminated groundwater.		
			Soil vapour and ground gases are likely to be present during excavation.	Construction workers could be exposed via the inhalation of soil vapour. Ground gas could be present in access pits, pipeline alignment, and migration through preferential pathways.		
AEI-002 – RRP: Former landfill, MET Recycling Facility (EPL 20948) Carnarvon Street (western end)	Open trench, to a maximum depth of 5 m Maximum trench width 2.2 m	Contamination is present at concentrations exceeding the relevant assessment criteria soil, groundwater and ground gases. The EPL has requirements for ongoing monitoring gas associated with the former landfill.	Soil contamination throughout the profile during excavation.	Construction workers could be exposed via ingestion and dermal contact.	Construction workers Future maintenance workers Duck River	Moderate to high (Human health, ecological, surface water/groundwater)
			Groundwater will be intersected as part of the construction.	Construction workers could be exposed via contact with contaminated groundwater. The environment could be exposed to contamination via uncontrolled releases during construction. Migration through preferential pathways.		
			Ground gases are likely to be present during excavation.	Ground gas could be present in access pits, pipeline alignment, and migration through preferential pathways.		
AEI-003 – RRP: Former commercial industrial sites West side of Silverwater Road (Derby Street)	Micro-tunnelling shafts (launch and receival). Proposed excavation depth of 10 m Approximate footprint of 12 m x 4 m	This location was unable to be accessed as part of the DSI. However, the site has had previous investigations where contamination has been identified (information was obtained in the PSI).	Soil contamination is known to be present.	Construction workers could be exposed via ingestion and dermal contact.	Construction workers Future maintenance workers	Moderate to high (Human health, ecological, surface water/groundwater)
			Groundwater will be intersected as part of the construction.	Construction workers could be exposed via contact with contaminated groundwater. The environment could be exposed to contamination via uncontrolled releases during construction. Chlorinated hydrocarbons are a dense non aqueous phase liquid (DNAPL) and the excavations associated with the alignment may create a low pressure which could increase preferential flows of contaminated		

AEI and other features with location		Proposed Construction Summary	Contamination	Potential for contamination to be intersected.	Exposure pathway	Sensitive Receptors	Risk Ranking
					groundwater towards and into the proposed excavations.		
				Soil vapour is likely to be present during excavation.	Construction workers could be exposed via the inhalation of soil vapour.		
AEI-004 – RRP: Sydney Olympic Precinct SOPA POD A Carpark to SOPA POD C Carpark (within and adjacent to the alignment)		Open trench approximately 662 m, to a maximum depth of 6 m Maximum trench width 2.2 m	Some of the historical land uses include brickworks, abattoirs, landfilling / land reclamation. Contamination has been identified.	Soil contamination is known to be present as well as ASS.	Construction workers could be exposed via ingestion, inhalation and dermal contact. Excavation and oxidisation of ASS and generation of acidity in soils. This will generate acidic run-off water and possible migration into nearby surface water bodies.	Construction workers Future maintenance workers Narawang Wetlands Haslams Creek	Moderate (Human health, ecological, surface water/groundwater)
				Groundwater will be intersected as part of the construction.	Construction workers could be exposed via contact with contaminated groundwater. The environment could be exposed to contamination via uncontrolled releases during construction. Migration through preferential pathways.		
				Ground gases are likely to be present during excavation.	Ground gas could be present in access pits, pipeline alignment, and migration through preferential pathways.		
AEI-005 – RRP: Managed waste emplacements, Haslams Reach north and Woo-la-ra Landfill SOPA Pod C Carpark to Meadowbank Park		Twin 800 OD HDPE PN25 pipes. HDD methodology to use sufficient pressure to prevent groundwater ingress during drilling.	These areas are former landfills and areas of land reclamation.	It is unlikely that contaminated soil to be intersected.	The entry pits will be adjacent to the former landfills and unlikely to intersect landfill materials.	Construction workers Future maintenance workers	Moderate to high (Human health - ground gases)
				Groundwater is unlikely to due to the HDD construction methodology.	No risk to construction and future maintenance workers as groundwater is unlikely to be intersected. Migration through preferential pathways. HDD tunnelling is at 50 m bgl and will have minimal impact on the leachate gravity drain and vertical cut-off wall at the Woo-la-ra landfill.		
				Ground gases are likely to be present during excavation.	Ground gas could be present in access pits, pipeline alignment, and migration through preferential pathways.		
AEI-006 – RRP: Non specific commercial/industrial landuses (historical and current) Silverwater	Carnarvon Street and Silverwater Road	Approximately 1375 m of open trench, to a maximum depth of 5 m Maximum trench width 2.2 m	These areas are within a large commercial/industrial area. As a result, there is the potential for localised contamination. There is a potential for asbestos and ASS in these areas as the investigations were limited.	Surface soil will contain fill and have the potential to be contaminated and contain asbestos. Soil may contain ASS.	Construction workers could be exposed via ingestion, inhalation and dermal contact. Excavation and oxidisation of ASS and generation of acidity in soils. This will generate acidic run-off water and possible migration into nearby surface water bodies.	Construction workers Future maintenance workers	Moderate (Human health)
	Silverwater Road to PDC Park	Approximately 1374 m of open trench, to a maximum depth of 5 m Maximum trench width 2.2 m		Contaminated groundwater could migrate into the trench.	Construction workers could be exposed through contact with contaminated groundwater, and the environment could be exposed to contamination via uncontrolled releases during construction. Migration through preferential pathways.		
AEI-007 – RRP: Former armoury Two HDD pits within the alignment near PDC park		Two HDD tunnels. Proposed excavation depth of 2 m Approximate footprint of 15 m by 4 m	No contamination was reported in soil and groundwater where the pits are proposed	It is unlikely that contaminated soil to be intersected. ASS may be present or acidic soils. Groundwater will be intersected, however all results were below the assessment criteria.	Excavation and oxidisation of ASS and generation of acidity in soils. This will generate acidic run-off water and possible migration into nearby surface water bodies. This may occur through the groundwater table lowering.	Narawang wetlands	Low to moderate (ecological)
AEI-008 – RRP: Non specific commercial/industrial land uses (Historical) Wentworth point		Twin 800 OD HDPE PN25 pipes	No soil contamination was reported. However, fill was noted. Groundwater contamination may be present.	Surface soil contamination (if present) from sources will unlikely migrate and be exposed during tunnelling at depth. Sufficient pressure to prevent groundwater ingress during the drilling.	Soil contamination is unlikely to be exposed and groundwater not to ingress during drilling and construction. Therefore, unlikely to impact human and environmental receptors due to no SPR linkage.	None	Negligible
AEI-009 – RRP: Landfilling and land reclamation Wentworth Point		Twin 800 OD HDPE PN25 pipes	These areas are former landfills and areas of land reclamation.	Ground gases are likely to be present during excavation.	Ground gas could be present in access pits, pipeline alignment, and migration through preferential pathways.	Construction workers Future maintenance workers	Moderate to high (Human health - ground gases)

AEI and other features with location		Proposed Construction Summary	Contamination	Potential for contamination to be intersected.	Exposure pathway	Sensitive Receptors	Risk Ranking
AEI-010 – RRP: Landfilling and land reclamation Meadowbank Park to John Whitton Bridge		Open trench approximately 829 m, to a maximum depth of 7 m Maximum trench width 2.2 m	These areas are former landfills and areas of land reclamation with soil, groundwater and ground gases contamination.	Surface soil will contain fill and have the potential to be contaminated and contain asbestos.	Construction workers could be exposed via ingestion, inhalation and dermal contact.	Construction workers Future maintenance workers Parramatta River	Moderate to high (Human health)
				Contaminated groundwater could migrate into the trench.	Construction workers could be exposed through contact with contaminated groundwater, and the environment could be exposed to contamination via uncontrolled releases during construction. Migration through preferential pathways.		
				Ground gases are likely to be present during excavation.	Ground gas could be present in access pits, pipeline alignment, and migration through preferential pathways.		
AEI-011 – RRP: Disturbed terrain / anthropogenic deposits WRRF, SOPA, Wentworth Point and Meadowbank.		Will affect areas of HDD pit entries and open tunnels	These areas are former landfills and areas of land reclamation.	Surface soil will contain fill and have the potential to be contaminated and contain asbestos. Potential and actual ASS could be intersected.	Construction workers could be exposed via ingestion, inhalation and dermal contact. Excavation and oxidisation of ASS and generation of acidity in soils. This will generate acidic run-off water and possible migration into nearby surface water bodies.	Construction workers Future maintenance workers Parramatta River	Moderate to high (Human health)
				Contaminated groundwater could migrate into the trench.	Construction workers could be exposed through contact with contaminated groundwater, and the environment could be exposed to contamination via uncontrolled releases during construction. Migration through preferential pathways.		
				Ground gases are likely to be present during excavation.	Ground gas could be present in access pits, pipeline alignment, and migration through preferential pathways.		
AEI-012 – RRP: Acid sulfate soils	WRRF, Corner of Vore Street and Derby Street, Silverwater	Open trench and HDD pits	ASS has been detected in some areas along the alignment, but a full investigation has yet to be completed.	Potential and actual ASS could be intersected.	Excavation and oxidisation of ASS and generation of acidity in soils. This will generate acidic run-off water and possible migration into nearby surface water bodies.	Duck River Narawang Wetlands Haslams Creek Parramatta River	Moderate (Ecological)
	SOPA, Wentworth Point	HDD tunnelling		Potential and actual ASS could be intersected near the surface. ASS and PASS where the tunnelling is at depth.	Excavation and oxidisation of ASS and generation of acidity in soils. This will generate acidic run-off water and possible migration into nearby surface water bodies.		
Dioxins and ASS from Parramatta River and Homebush Bay John Whitton Bridge and Parramatta River		River release structure within Parramatta River at Meadowbank including temporary cofferdam and partial seawall removal	Contamination and ASS are present in the surficial sediments.	Potential for these sediments to be disturbed by the construction of the release pipe and the release of the clean water.	Construction workers could be exposed via ingestion and dermal contact. Migration and disturbance of sediments further down the Parramatta River. Disturbance of sediments will release contamination into the water.	Construction workers Future maintenance workers Parramatta River	Moderate to high (Human health and ecological)

7.1 Construction phase

7.1.1 Potential impacts of contamination on the project

Overview

The contamination risk ranking (Table 7.1 to Table 7.3, Section 7) indicates there is a moderate to very high risk of contamination with complete pathways if no mitigation measures are in place during the construction and operation of the project. These relate to impacts on the construction workforce due to potential contact with contaminated soil, soil vapour, groundwater gases and/or water. They also relate to the environment due to uncontrolled water release into the local waterways and the draining or exposure of ASS. These impacts would be managed through the implementation of management plans and common PPE practices to minimise the risk from direct contact and ingestion of contaminants, e.g. waste materials at the surface, asbestos in soil, organic contaminants in soil, ASS and contaminated groundwater.

The potential impacts of soil and groundwater contamination on the project, are detailed below.

Soil

Construction activities, including excavation and earthworks, vegetation clearing, stockpiling and vehicle movement, would involve soil disturbance, potentially creating an exposure pathway through direct or indirect contact and/or risk of inhalation with the construction workforce. Without appropriate management measures, this interaction has the potential to cause harm to human health for the construction personnel, sensitive receptors, and ecological resources such as terrestrial flora and fauna.

During project construction, soil will be disturbed, and groundwater will be intercepted. Any soil removed during construction will require assessment for onsite management and/or disposal in accordance with the NSW Waste Classification Guidelines 2014 Parts 1-4 and any applicable Resource Recovery Orders and Exemptions (RRO/RREs) under the *Protection of Environment Operations Act 1997* (POEO Act). This is addressed as part of the Waste Management Impact Assessment (GHD, 2025).

Results from the soil sampling along the three main sections show a presence of asbestos, hydrocarbons, heavy metals (nickel) and PAHs above the adopted SAC (see Appendix B). Preliminary waste classification was undertaken across the alignments and the WRRF site, and this has been discussed in the Waste Management Impact Assessment (Draft) (GHD, 2025). Final waste classification will be required prior to any material being taken off-site.

COPCs such as ACM and PACM would require management. ACMs, including bonded and AF/FA (asbestos fines, friable asbestos) were detected at the brine and transfer pipelines, WRRF and the river release pipeline and it is possible that they are present throughout much of the alignment due to historical manufacturing and disposal activities. Fill material of unknown origin, quality and contents is present along the pipeline alignments. Any ground disturbance or excavation for entry and exit points for tunnelling pits and open trenches will interact with subsurface fill material or buried wastes of unknown quality.

Design considerations at the WRRF that require excavations into the contaminated soil below the VENM and imported tunnel spoil raised ground layer need to include considerations to minimise disturbance. Structures should be designed to restrict/manage the ingress and accumulation of groundwater/soil vapour and prevent new pathways as practically possible.

Further investigations need to be undertaken within the river release pipeline alignment at 54-58 Derby Street and 103-105 Silverwater Road, Silverwater to provide information on the contamination in this area and allow the preparation of the respective management plans.

The risks of soil contamination within the project footprint would be greatly reduced through the implementation of mitigation measures recommended in Section 8.

Soil vapour

There is a high chance of encountering soil vapour at the WRRF where soil vapour exceeded human health screening criteria for VOCs. There is also a potential to encounter soil vapour in excavations along the alignment if hydrocarbons and solvents are present in the groundwater at high concentrations.

Ground gases

Ground gas monitoring results indicated elevated levels of methane and carbon dioxide at the WRRF, former Silverwater Landfill (now MET recycling), and Sydney Olympic Park. This indicates the potential for gas accumulation in trench excavations and/or pits during construction, within service pits (construction and operation), which presents a risk for explosion and/or asphyxiation that will require management.

ASS

Within the project footprint there is a high probability of encountering acid sulfate soils due to the project's elevation and/ or surface geology. Therefore, it is likely that ASS would be encountered during construction. The ASS data collected as part of the DSIs across the project were limited. The brine and transfer pipelines alignment passes through Class 4 ASS risk area, and it is likely that ASS may be present more than two metres below the natural ground surface. At the WRRF, ASS may be present in natural soils in depths ranging from 1.5 to 12.95 mbgl. Shallower ASS in fill and natural soils may be encountered at construction entries located within and/or between the WRRF, Rosehill Gardens Racecourse overflow carpark and Camellia pumping station.

For the river release pipeline alignment, evidence of the presence of ASS was identified at various locations along the alignment, including Camellia (WRRF), Sydney Olympic Park and Meadowbank. This investigation was limited, and it was recommended that further investigations, especially in areas at Newington near PDC Park, Sydney Olympic Park and Meadowbank where the excavation is being carried out to understand the required measures for construction.

Soil salinity

Excavation would be undertaken in areas with moderate salinity potential for the WRRF, river release pipeline and the brine and transfer pipelines alignment from south of the Parramatta River to the WRRF. The brine and transfer pipelines alignment on the northern side of the Parramatta River is an area with low salinity potential. The construction may disturb soils in areas with unidentified salinity potential. High salinity soil can reduce or stop vegetation growth and produce aggressive soil conditions, which may be detrimental to concrete and steel. Other impacts may occur as a result of soil erosion and migration of saline sediments to the receiving environments (Duck River, Parramatta River, Narawang Wetlands and Haslams Creek). The potential for impacts due to the presence of saline soils is considered low. Any potential impacts would be temporary and managed by implementing erosion and sediment control measures.

Sediments

The sediments near the proposed river release structure within Parramatta River contain zinc and dioxins/furans at levels exceeding the adopted criteria. The investigation report into the sediments (Birch, G.F and Batley, G., 2025) recommended obtaining engineering advice as the sediments should not be disturbed. The report noted that other projects in different areas of the Parramatta River have been undertaken with similar levels of contaminants in the sediment and have proceeded with mitigation techniques.

A cofferdam will be constructed at the Parramatta River to facilitate the installation of the river release structure in addition to the temporary removal of the seawall at Meadowbank. Both of these activities will disturb surficial and deeper sediments at these locations which may impact the environment. The construction impact of the river release structure on surface water at the Parramatta River has been assessed to be low (Aurecon, 2025) and the construction works would be undertaken under a dedicated River Release Structure Construction Environmental Work Method Statement (RRSCEWMS) which will mitigate environmental risks.

Groundwater

The project will intersect with groundwater when undertaking construction activities at several locations across the project footprint. These include all under bore/horizontal directional drilling lines, open trenches, entry pits and HDD launch and retrieval pits at areas where shallow groundwater was encountered.

Groundwater sampling results reported the presence of PFAS, heavy metals and ammonia exceeding the adopted health and ecological SAC across the project footprint.

Below ground structures could act as preferential migration pathways for contaminated groundwater and soil vapour to ingress into pipelines. The design of the pipelines should restrict and/or manage the potential for ingress and accumulation of contaminated water and/or vapours.

If excavations are dewatered during construction, this may mobilise contaminants in groundwater and oxidise and acidify ASS if not appropriately managed. Groundwater quality would need to be determined to identify the appropriate management of dewatered groundwater. If contaminated, the groundwater would require management and/or off-site disposal in line with the groundwater dewatering procedure to be developed for the project.

Unexpected contamination

Unexpected contamination may be encountered due to soil contamination not previously identified, or where methods or design changes result in an increased risk of encountering contaminated soils or groundwater within the project footprint. Unexpected contamination would be managed in accordance with an Unexpected Finds Protocol (UFP) during construction. Contaminated soil and groundwater would require management or disposal at a waste to licenced facilities in accordance with the *NSW Waste Classification Guidelines 2014 Parts 1-4, Addendum 2016* and any applicable Resource Recovery Orders and Exemptions under the POEO Act.

7.1.2 Potential impacts of the project on contamination

Storage and use of various hazardous and dangerous goods during construction (e.g., fuels, paints, solvents, etc) may result in unintended leaks and spills which may contaminate the local environment and impact on terrestrial and aquatic flora and fauna, surrounding soils, groundwater and watercourses.

Management of excavated spoil would be undertaken in accordance with the construction soil and water management plan to be prepared as part of the CEMP for the project to reduce the risk of soil and sediment mobilisation impacting local watercourses. All excavated spoil is being stored at the WRRF within the southern area and will be managed by a Waste and Resource Recovery plan. The plan will track excavated spoil from source to final destination. The plan will also include procedures for analytical testing for placement of site won spoil at the WRRF, waste classification for offsite disposal and testing of imported materials from offsite sources (e.g., VENM, ENM, other materials under RROs) to verify each meets the applicable classification. This will allow segregation of spoil (including asbestos containing soil and ASS). These procedures would also reduce the risk of inadvertent transfer of contaminants to other parts of the project footprint.

Groundwater intersected during excavations and drilling will need to be managed. Trenchless sections of alignment (e.g., HDD/microtunnelled tunnels) are not expected to significantly interact with groundwater, as pressure is maintained during drilling, significant groundwater inflow from the surrounding formation is not anticipated. Microtunnelling construction methods are understood to involve advancing the pipe as the machine is advanced, again preventing significant inflow from the formation.

Drilling muds/fluids and dewatered groundwater across the project will require management as per a Construction Environmental Management Plan (CEMP). Approval to treat/discharge dewatered groundwater and drilling muds/fluids will need to be sought and managed via a Groundwater Dewatering Management Plan (GDMP).

During the construction phase, wastewater would be generated by construction personnel at construction compounds. This wastewater would be contained within portable amenity facilities, with wastewater removed and disposed of frequently as required by a licensed contractor. No impacts to the environment from wastewater are anticipated.

7.2 Operational phase

7.2.1 Potential impacts of contamination on the project

Soil, soil vapour and ground gases

During the operation phase of the project, workers within the WRRF are not expected to be exposed to soil, groundwater contamination. An LTEMP at the WRRF is required to be implemented to manage any remaining contamination. It should also include the management of contamination during future works and any ongoing monitoring requirements.

For areas of the project footprint outside of the WRRF, during operation, there would be minimal soil disturbance associated with general maintenance activities. As such, the operation of the project is unlikely to result in exposure of human and environmental receptors to existing potentially contaminated soil or groundwater. Maintenance workers requiring access to any of the service pits along the alignment, may require management measures to ensure there is no accumulation of hazardous gases.

Sediments

The sediments near the proposed river release structure within Parramatta River contain zinc and dioxins/furans at levels exceeding the adopted criteria. The investigation report into the sediments (Birch, G.F and Batley, G., 2025) recommended obtaining engineering advice as the sediments should not be disturbed. Sydney Water has considered the risks associated with the contamination present in the sediments and factored this into the design of the river release structure.

Groundwater contamination

There is a low potential for groundwater to be intersected during operation.

7.2.2 Potential impacts of the project on contamination

Operation has the potential to contaminate soil and groundwater from leaks and spills of fuel, oils and other hazardous materials during maintenance activities. However, the potential is considered to be low, given the likely scale and duration of maintenance activities along the alignment. At the WRRF the potential for impact is higher and this would be minimised by implementing procedures to handle dangerous goods and hazardous materials and manage spills as per Sydney Water procedures. This includes management of waste, soil erosion, spills and leaks and other associated operational aspects.

All wastes generated from maintenance activities would be stored, handled, and disposed of in accordance with the Waste Classification Guidelines (NSW EPA, 2014).

ASS

The operation will not have an impact on ASS. Maintenance activities along the alignments and at the WRRF are unlikely to be at a depth that would encounter and disturb ASS.

Soil salinity

Operation is not expected to impact the salinity levels of the project site. Maintenance activities along the alignments and at the WRRF are unlikely to be at a depth sufficient to increase water infiltration, resulting in erosion and off-site transport of saline sediments.

Sediments

The sediments near the proposed river release structure within Parramatta River contain zinc and dioxins/furans at levels exceeding the adopted criteria. The disturbance of the sediments from the release pipeline may change the water quality in the area. The operational impact of the river release structure on surface water at the Parramatta River has been assessed to be low (Aurecon, 2025) with specific mitigation measures detailed in the Surface Water and Geomorphology Assessment (Aurecon 2025).

7.3 Cumulative impacts

Chapter 23 of the EIS outlines the assessment methodology for cumulative impacts, including the methods for identifying projects that have been considered in the cumulative assessments.

Sixteen projects were identified for consideration as part of the cumulative assessment with respect to soil and land contamination and are shown in Figure 5.1. The following projects have been considered:

- 1 – Rosehill Resource Recovery Facility.
- 2 – Mixed Use Development with In-fill Affordable Housing - Melrose Park South – East.
- 3 – River Road West Build-to-Rent.
- 4 – SAMI - Camellia - Bitumen Plant Redevelopment.
- 6 – Mod 4 - DSRRC throughput increase and Central Sydney Industrial Estate SSD 10459 Mod 5.
- 17 – Residential development with affordable housing – Llewellyn Street, Rhodes.
- 19 – Mixed-use development with affordable housing – 23-29 Marquet Street, Rhodes.
- 20 – Camellia-Rosehill Place Strategy.
- 21 – SOPA Master Plan.
- 22 – Parramatta Light Rail Stage 2.
- 23 – Sydney Metro West - Rail infrastructure, stations, precincts and operations.
- 24 – Duck River Nature Trail.

Table 7.4 outlines the potential cumulative impacts relevant to each assessment.

The contamination assessment has noted that the project is of moderate to high risk of interacting with existing contamination within or adjacent to the project footprint. However, most nearby major projects are not expected to require the management of a significant amount of contaminants, and most of these projects are at a distance over which contaminant transport to the project footprint would not be expected. The project's contribution to cumulative impacts, if any, would be low as the nature of the project and the construction and operation works required have a low risk of exacerbating any existing contamination and exposure risks to project personnel and to the public.

Multiple projects in the area requiring the disposal of contaminated waste have the potential to strain local waste facilities.

Provided that the identified contamination risks assessed in this report are managed in accordance with the mitigation measures, the project is unlikely to generate cumulative impacts with other projects.

Table 7.4 Potential cumulative impacts of relevant future projects

Project ID and number (#) on Figure	Project name	Approximate location from project footprint	Status/timeframe/ operational period	Potential for cumulative impact
SSD-77870968 #1	Rosehill Resource Recovery Facility	0.85 km	Project under assessment. Commencement date TBC. Construction expected to take 8 months. Operational TBC, only in scoping stage.	<p>An EIS is currently being prepared for this project. The SEARs have been issued, and contamination and remediation are included.</p> <p>Appropriate control and monitoring measures are expected to be implemented for the project, minimising soil and contamination concerns to be confirmed by the EIS.</p> <p>Based on this and the distance from the project footprint and the construction methodology proposed for the project, the cumulative risk from this project is considered to be low.</p>
SSD-71558962 #2	Mixed Use Development with In-fill Affordable Housing - Melrose Park South – East	1 km	Project under assessment. Construction timeframe not provided in scoping report.	<p>The EIS concluded that all soil contaminants were below the criteria except heavy metals, a low probability of ASS, and groundwater contained heavy metals and PFOS above the criteria. It determined that contamination was not widespread at the site.</p> <p>Appropriate control and monitoring measures are expected to be implemented for the project, minimising soil and contamination concerns to be confirmed by the EIS.</p> <p>Based on this and the distance from the project footprint, the cumulative risk from this project is considered to be low.</p>

Project ID and number (#) on Figure	Project name	Approximate location from project footprint	Status/timeframe/ operational period	Potential for cumulative impact
SSD-50894964 #3	River Road West Build-to-Rent	0.4 km from WRRF	Project under assessment TBC only industry specific SEARs available for construction and operation.	An EIS is currently being prepared for this project. The SEARs have been issued, and contamination and remediation are included. Appropriate control and monitoring measures are expected to be implemented for the project, minimising soil and contamination concerns to be confirmed by the EIS. Based on this and the distance from the project footprint and the construction methodology proposed for the project, the cumulative risk from this project is considered to be low.
SSD-65654458 #4	SAMI - Camellia - Bitumen Plant Redevelopment	0.8 km	Project under assessment. Construction and operational timeframe not provided.	An EIS is currently being prepared for this project. The SEARs have been issued, and contamination and remediation are included. Soil testing was undertaken with remedial action plans to be developed as part of the construction works. Based on this and the distance from the project footprint, the cumulative risk from this project is considered to be low.
SSD-10459-Mod-4 and 5 #6 and #27	Central Sydney Industrial Estate Mod 4 - DSRRC throughput increase	Directly adjacent to the WRRF	Change to existing project. Construction timeframes TBC with only the scoping report available.	This modification is to increase the annual processing of reclaimed asphalt pavement. The scoping report did not mention soil and land contamination as an issue. However, this will be confirmed in the modification report. Based on this, the cumulative risk from this project is considered to be low.
	Central Sydney Industrial Estate SSD 10459 Mod 5		Project under assessment. Construction and operational timeframes have not been provided.	

Project ID and number (#) on Figure	Project name	Approximate location from project footprint	Status/timeframe/ operational period	Potential for cumulative impact
SSD-6750873 #17	Residential development with affordable housing – Llewellyn Street, Rhodes	0.7 km	Project under assessment. Construction and operational timeframes are not provided. TBC in EIS.	<p>An EIS is currently being prepared for this project. The SEARs have been issued, and contamination and remediation are included.</p> <p>Appropriate control and monitoring measures are expected to be implemented for the project, minimising soil and contamination concerns.</p> <p>Based on this and the distance from the project footprint, the cumulative risk from this project is considered to be low.</p>
SSD-67636458 #19	Mixed-use development with affordable housing – 23-29 Marquet Street, Rhodes	0.9 km	Project under assessment. Construction and operational timeframes are not provided. TBC in EIS.	<p>An EIS is currently being prepared for this project. The SEARs have been issued, and contamination and remediation are included.</p> <p>Appropriate control and monitoring measures are expected to be implemented for the project, minimising soil and contamination concerns.</p> <p>Based on this and the distance from the project footprint, the cumulative risk from this project is considered to be low.</p>
N/A #20	Camellia-Rosehill Place Strategy	Overlaps with project	<p>Finalised approved project</p> <p>Construction period of 20 years.</p> <p>The operational period varies throughout the next 20 years</p>	<p>The design includes remediation as well as water quality treatment to be incorporated into the design.</p> <p>The project aims to improve the Camellia-Rosehill area. Appropriate control and monitoring measures are expected to be implemented, minimising soil and contamination concerns.</p> <p>Based on this, the cumulative risk from this project is considered to be low.</p>

Project ID and number (#) on Figure	Project name	Approximate location from project footprint	Status/timeframe/ operational period	Potential for cumulative impact
N/A #21	SOPA Master Plan - approved	Overlaps with project	Approved draft project. Construction period of 25 years Operational period is various throughout the next 20 years	Construction and operational timeframes overlap with the construction of the river release pipeline alignment. Additional consideration of excavations and groundwater dewatering may need to occur if the two projects are being undertaken at the same time. Appropriate control and monitoring measures are expected to be implemented for the project, minimising soil and contamination concerns. Based on this, the cumulative risk from this project is considered to be low.
SSD-10035 #22	Parramatta Light Rail Stage 2	Overlaps with project	Approved project 22/02/2024 Construction 5 to 6 years commencing in 2025 No completion date has been set.	Construction and operational timeframes overlap with the construction of the brine and transfer pipelines and river release pipeline alignments. The main risks associated with construction and operation were the mobilisation of contamination through erosion and sedimentation, spills and runoffs, and the generation of oxidised/acidic gas, which would affect receiving environments. Appropriate control and monitoring measures are expected to be implemented for the project, minimising soil, soil erosion and contamination concerns. Based on this, the cumulative risk from this project is considered to be low.
SSI-22765520 #23	Sydney Metro West - Rail infrastructure, stations, precincts and operations	<1 km	Approved 25/01/2023 The construction period for stages 1 and 2 is eight years and commenced in 2024. Operational expected from 2032	Construction and operational timeframes overlap with the construction of the brine and transfer pipelines alignment. Based on the construction methodology near the river release pipeline alignment and the construction methodology proposed for the project, the cumulative risk from this project is considered to be low.

Project ID and number (#) on Figure	Project name	Approximate location from project footprint	Status/timeframe/ operational period	Potential for cumulative impact
N/A #24	Duck River Nature Trail	Overlaps with project	Approved To be completed in three stages: <ul style="list-style-type: none"> – Stage 1: Construction began in March 2025. – Operational in September 2025 – Stage 2: Construction to begin in late 2025. – Operational in mid 2026 – Stage 3: Construction to begin in 2026. Operational in 2028	The construction may overlap, and the Stage 2 intersects the river release pipeline at the western end of Carnarvon Street. Appropriate control and monitoring measures are expected to be implemented for the project, minimising soil and contamination concerns. The project will include a cycle path and footpath and will not intersect groundwater. Based on this, the cumulative risk from this project is considered to be low.

8. Mitigation measures and management measures

Mitigation measures proposed to avoid or minimise contamination risks and potential impacts on the environment are listed in Table 8.1. These mitigation measures will be included in the Construction Soil and Water Management Sub-Plan and a Contamination Management Sub-Plan (CMSP), which will form a component of the CEMP.

With respect to the management of contamination from ground disturbance/excavation works associated with the raised layer, construction and operation of the WRRF, future plans developed for the management of contamination would need to be prepared in accordance with the requirements of the respective AA1, AA2 and AA3 LTEMPs, considering that the suitability for use of the land for commercial/industrial purposes and the repeal of regulatory notices is based on implementation of the respective LTEMPs.

Table 8.1 Soil and contamination risk mitigation measures

Impact	Mitigation measure	Timing
Ineffective controls pending additional investigations	Undertake the following investigations: <ul style="list-style-type: none"> – Further characterisation of ASS and asbestos along the pipeline alignments. – A soil, groundwater and soil vapour investigation at 54-58 Derby Street, Silverwater and 103-105 Silverwater Road, Silverwater. 	Detailed design
Soil, soil vapour, ground gases and groundwater contamination	Implement a Soil and Water Management Plan including a Contamination sub-management plan with reference to an Asbestos Management Plan. Refer to SW01 and 'disturbance of asbestos' below. Disturbance to AEIs identified as having a potentially complete source-pathway-receptor (SPR) linkage in the Contamination Assessment (Section 7), will be managed in accordance with a Soil and Water Management Plan (SWMP) that will include: <ul style="list-style-type: none"> – detailed processes, responsibilities and measures to manage soil and water contamination impacts during construction. – procedures for dewatering, specifying capture, storage, and testing requirements. – measures to minimise exposure and migration of potentially contaminated soil, including handling and storage procedures. At the WRRF, contamination needs to be managed including aesthetics* and redundant below ground infrastructure which could be exposed during any ground disturbance works below the raised VENM and imported tunnel spoil layer. – relevant HSE requirements, including contractor/staff inductions and PPE to minimise the risk of dermal contact, ingestion and inhalation. – Respiratory equipment and filters specified. – requirements for soil testing of excavated soils in accordance with EPA's waste classification guidelines and NEPM (2013), to identify opportunities for onsite reuse or offsite disposal (e.g., contaminated material) at licenced facility. – contaminated groundwater will not be released to the surrounding environment and will be disposed of at a licenced facility. – ground disturbance will be minimised to the extent practicable, and construction will be staged with progressive rehabilitation to minimise the amount of disturbed land at any one time. <p>The plan would be prepared in accordance with Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom, 2004) (referred to as the 'Blue Book'), IECA's Best Practice Erosion and Sediment Control – for building and construction sites (2008) and Sydney Olympic Park Authority Policy - Stormwater Management and Water Sensitive Urban Design (Sydney Olympic Park Authority, 2016) (in relation to Sydney Olympic Park). The development of</p>	Detailed design Construction

Impact	Mitigation measure	Timing
	<p>mitigation measures in the plan would be guided by the 'Blue Book' to determine the magnitude of rainfall events to which the capacity of the construction mitigation measures should be designed.</p> <p>A Waste and Resource Recovery Plan (as per the Waste Impact Assessment) as part of the SWMP to adequately manage any proposed temporary and permanent stockpiles at the WRRF in the southern area. This will include details on:</p> <ul style="list-style-type: none"> – exact location of stockpiles. – minimising stockpile size. – height, slopes and batters. – preventing mixing and cross contamination. – consideration of future maintenance. – capping. – erosion and sediment control. – restoration. 	
Soil contamination – compound sites	<p>At the construction compound sites, the avoidance and minimisation of ground disturbance will consider the importation and placement of engineering fill, Excavated Natural Materials (ENM) or Virgin Excavated Natural Materials (VENM) as a construction base (or hardstand) underlain by geotextile fabric to avoid disturbance of potentially contaminated soils in these areas.</p> <p>If excavations are required, the contamination status of the surface soils will be assessed prior to importation of VENM or ENM, and management, if necessary, will be undertaken in accordance with procedures detailed in the CEMP.</p>	Construction
Soil and groundwater contamination	Implement a Drilling Fluid Management Plan. Refer to SW04 .	Detailed design Construction
Groundwater contamination	<p>Monitoring of groundwater quality at the WRRF, in accordance with the groundwater monitoring proposed in the Groundwater Impact Assessment (Jacobs, 2025k). Refer to GW07 and GW08.</p> <p>Undertake groundwater monitoring at the WRRF site within 12 months of operation commencing, in accordance with the Groundwater Impact Assessment (Jacobs, 2025k). No operational pipeline groundwater monitoring (quantity of quality) is proposed for the pipelines or Camellia pumping station. Refer to GW09.</p> <p>Implement a Soil and Water Management Plan. Refer to SW01.</p> <p>Implement a dewatering procedure. Refer to SW05.</p>	Detailed design Construction
Spills resulting from improper storage and handling of hazardous substances	Implement a spill response procedure. Refer to SW05 .	Pre-construction Construction Operation
Unexpected contamination	Manage the discovery of any unexpected contamination during construction will be managed in accordance with an Unexpected Finds Protocol (UFP).	Construction
Disturbance of acid sulfate soils	Implement an Acid Sulfate Soil Management Plan. Refer to SW02 .	Pre-construction Construction
Salinity	Generally, the potential for impacts due to the presence of saline soils is considered low. Any potential impacts would be temporary and managed by implementing standard best-practice erosion and sediment control measures.	Construction
Disturbance of asbestos	Prepare and implement an Asbestos Management Plan (AMP) which would detail asbestos locations on-site, management decisions including transport management, air monitoring requirements (if applicable) during construction, testing, disposal and encapsulation options, incident and emergency procedures.	Pre-construction Construction
Potential impacts of contaminated sediment disturbance	Minimise the disturbance and migration of contaminated sediments. Refer to GE01 .	Construction

Impact	Mitigation measure	Timing
	Construction works to be undertaken in accordance with the River Release Structure Construction Environmental Work Method Statement (RRSC EWMS).	
Soil and groundwater contamination at WRRF	An updated LTEMP will be required to manage the existing contamination at the WRRF. The LTEMP will need to consider and include relevant management requirements under the existing three LTEMPs associated with the WRRF (which will be superseded).	Operation

Notes:

* Aesthetics refers to deleterious materials such as stained soils, free phase product, refuse, redundant pipework (whole, pieces).

9. Conclusions

The impact assessment outlined in this report is considered sufficient to inform the project's Environmental Impact Statement (EIS). The soil and land contamination assessment has included desktop assessments through the PSIs and intrusive site investigations (i.e., detailed site investigations) and identified any potential Areas of Environmental Interest (AEIs) within the project footprint.

The AEIs were given a risk ranking based on whether there were complete pathways and receptors identified. The majority of the SPR linkages relate to the potential impacts and risks to the project's construction workforce through direct contact, inhalation and ingestion of contaminants in soil, soil vapour, ground gases and/or groundwater. These risks are considered to be low with the implementation of mitigation measures. During operation, this risk of exposure to contaminants is considered to be negligible, with any maintenance activities having a very low likelihood of direct contact and/or inhalation of dust/fibres from contaminated soil or groundwater due to minimal soil disturbance and earthworks required for these activities.

The majority of the assessed potential impacts to the construction workforce can be managed through the implementation of common personal protective equipment practices, which would minimise the risk from direct contact, inhalation, and ingestion of contaminants, e.g., waste materials at the surface, asbestos in soil, organic contaminants in soil (e.g., total recoverable hydrocarbons), and potentially contaminated groundwater. Further measures such as an Unexpected Contamination Finds Protocol (UCFP) would protect construction and maintenance personnel against any unknown areas of contamination.

Further assessment through a DSI is required to inform the mitigation measures. This includes further assessment of acid sulfate soils (ASS), asbestos and waste classification along the alignment. Further assessment is required for the reuse suitability of the spoil being transported for placement at the WRRF. Further investigations are also required at the Water Resource Recovery Facility (WRRF) to assess potential mitigation measures to support the management of contamination.

The Construction Environmental Management Plan (CEMP) will include an adaptive management approach to reduce the risk to human health and the environment. The approach will respond to soil and groundwater contamination analytical results and other additional information, which may inform the need for further assessment and investigations in accordance with relevant guidelines.

Mitigation measures to address contamination, which will form a component of the CEMP will be included into:

- Construction Soil and Water Management Sub-Plan (including a Waste and Resource Recovery Plan).
- Asbestos Management Sub-Plan (AMP).
- Acid sulfate soil management Sub-Plan (ASSMP).
- Contamination Management Sub-Plan (CMSP).
- Drilling Fluid Management Sub-Plan.
- Groundwater Dewatering Management Sub-Plan.
- River Release Structure Construction Environmental Work Method Statement (RRSC EWMS).

An operational long term environmental management plan (LTEMP) will be required after construction, to manage the existing contamination at the WRRF including aesthetics and redundant below ground infrastructure that remain in-situ. The LTEMP will include management of contamination during future intrusive works and mitigation measures to reduce risks to human health and the environment.

It is recommended that the feasibility of the proposed mitigation measures be assessed in response to any additional information on soil and contamination conditions that is collected during detailed design or pre-construction. During construction and operation, it is recommended that the mitigation measures be implemented through adaptive management strategies to mitigate soil and contamination impacts in response to the specific methodologies, schedules and potential unexpected conditions.

10. Limitations

This report has been prepared by GHD for Sydney Water Corporation and may only be used and relied on by Sydney Water Corporation for the purpose agreed between GHD and Sydney Water Corporation as set out in Section 1.6 this report.

GHD otherwise disclaims responsibility to any person other than Sydney Water Corporation arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

11. References

AAJV (2016). Wentworth Point – Concept Design Geotechnical and Environmental Investigation Report, AECOM and Aurecon Joint Venture, 16 September 2016.

Ahern CR, M. A. (2004). *Acid Sulfate Soils Laboratory Methods Guidelines. In Queensland Acid Sulfate Soils Manual 2004*. Indooroopilly, Queensland: Department of Natural Resources, Mines and Energy.

ANZECC & ARMCANZ, 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

ANZG, 2018, Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia.

Aurecon, 2025. Greater Parramatta and Olympic Peninsula Water Cycle Management, Surface Water and Geomorphology Assessment, 01 September 2025.

Australian Standards . (2005). *AS4482.1-2005. Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds*.

Birch, G. F., Harrington, C., Symons, R. K., & Hunt, J. W. 2007. The source and distribution of polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofurans in sediments of Port Jackson, Australia. *Marine Pollution Bulletin*, 54, 295–308.

Department of Land and Water Conservation, 1998. Acid Sulphate Soil Risk Mapping.

Girch, G.F., and Batley, G. (2025) Greater Parramatta and Olympic Peninsula Water Cycle Management. Sediment size and chemistry for cores retrieved from the John Whitton Bridge potential release site.

Council, N. E. (2013). *National Environment Protection (Assessment of Site Contamination) Measure (NEPM)*.

Friebel, E & Nadebaum, P 2011, CRC Care Technical Report No.10, Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 1: Technical development document, CRC CARE Technical report no. 1, CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia.

Geological Survey of NSW. (1983). *1:100,000 Sydney Geological series Sheet 9130 (Edition 1)*. Department of Mineral Resources.

GHD (2025). Greater Parramatta and Olympic Peninsula Water Cycle Management, Waste Management Impact Assessment, 20 June 2025 (Draft).

Jacobs (2024a). Greater Parramatta and Olympic Peninsula (GPOP) Project – WRRF Camellia - Detailed Site Investigation Report, Version D, 21 January 2025.

Jacobs (2025b). Camellia WRRF Reference Design Report (WRRF 05), Version 3, 7 March 2025.

Jacobs (2025c). Greater Parramatta and Olympic Peninsula (GPOP) Project – Brine and Influent Pipelines – Preliminary Site Investigation Report, 16 April 2025.

Jacobs (2025d). Greater Parramatta and Olympic Peninsula (GPOP) Project - Detailed Site Investigation – Brine and Influent Pipeline Alignment, 17 April 2025.

Jacobs (2025e). Greater Parramatta Olympic Peninsula River Release Pipeline 100% Concept Design Drawings Brine and Influent Pipeline Drawings, 23 May 2025.

Jacobs (2025f). Greater Parramatta and Olympic Peninsula (GPOP) Project – Groundwater Monitoring and Management Plan for WRRF Capping, 24 April 2025.

Jacobs (2025g). Greater Parramatta Olympic Peninsula River Release Pipeline 100% Concept Design Drawings River Release Pipeline, 27 May 2025.

Jacobs (2025h). Greater Parramatta and Olympic Peninsula (GPOP) Project – River Release Pipeline – Preliminary Site Investigation Report, 27 May 2025.

Jacobs (2025i). Greater Parramatta and Olympic Peninsula (GPOP) Project – Detailed Site Investigation – River Release Pipeline Alignment, 16 June 2025.

Jacobs (2025j). Greater Parramatta Olympic Peninsula River Release Pipeline 100% Concept Design Drawings River Release Pipeline, 27 May 2025.

Jacobs (2025k) Greater Parramatta and Olympic Peninsula Water Cycle Management Project Groundwater Impact Assessment. Revision C 13 August 2025.

HEPA. (2020). PFAS National Environmental Management Plan – Version 2.0, January 2020 (PFAS NEMP, 2020).

HEPA. (2025). *PFAS National Environmental Management Plan Version 3.0*.

NEPC, 2013, National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999 as amended 2013.

NHMRC, 2019, Guidance on Per and Polyfluoroalkyl substances (PFAS) in Recreational Water for protection of marine ecosystems.

NSW EPA, 2016, Environmental Guidelines, Solid waste landfills. Second edition, 2016. NSW Environment Protection Authority.

NSW EPA, 2020, Assessment and management of hazardous ground gases - Contaminated Land Guidelines, NSW Environment Protection Authority.

NSW EPA. (1997). *Contaminated Land Management Act*.

(2023). *Parramatta Local Environmental Plan*.

(2014). *Ryde Local Environmental Plan*.

Simpson, S.L., Batley, G.E., Maher, W.A. 2016. Chemistry of sediment contaminants. In: Sediment Quality Assessment. A practical guide. Chap 3. Eds. Simpson, S. L., Batley, G. E., CSIRO, Bangor NSW.

Stone, Y. A. (1998). *Acid Sulfate Soils Manual 1998*. Acid Sulfate Soil Management Advisory Committee. Wollongbar, NSW.

Appendices

Appendix A

Auditor

Correspondence

20 November 2025

Sydney Water Corporation
2 Parramatta Square
Parramatta NSW 2150

Advice Prepared for Sydney Water Corporation

**Re: Interim Advice IA20 – Review of Contamination Reports for GOP WCM Project
Response to SEARS**

1 Introduction

Sydney Water Corporation is proposing to build and operate a new water resource recovery facility (WRRF) at Camellia – Rosehill NSW. The project requires the construction of associated infrastructure including pipelines, to connect to the existing network and allow for the release of high quality treated water into the Parramatta River at Meadowbank. The project is referred to as the Greater Parramatta and Olympic Peninsula (GOP) Water Cycle Management (WCM) Project (the Project site).

The Project is State Significant Infrastructure (SSI) No.74258485, and Sydney Water is preparing an Environmental Impact Statement (EIS) to support an application to the Minister for Planning and Public Spaces.

Sydney Water Corporation (SWC) has appointed Rebeka Hall of Geosyntec Consultants Pty Ltd (Geosyntec), a NSW EPA Auditor accredited under the Contaminated Land Management (CLM) Act 1997, to conduct an Audit for the proposed Sydney Water Greater Parramatta and Olympic Peninsula (GOP) project comprising the Water Resource Recovery Facility (WRRF) located on Devon Street, Camellia, NSW, two new pipe alignments as well as upgrade to an existing pipeline alignment that will feed in and out of Camellia pumping station.

1.1 Purpose of Current Interim Advice

The purpose of this Interim Audit Advice (IA) letter is to respond to the Planning Secretary's Environmental Assessment Requirements (SEARS) SSI 74258485, particularly Key Issue **4.4 Contamination** namely that:

Contamination risks are independently considered consistent with the auditing regime established under the Contaminated Land Management Act, 1979.

Item 4.4 Any Preliminary Site Investigation, Detailed Site Investigation, or other related reports on contamination (including but not limited to a Sampling Analysis Quality Plan), must be accompanied with an Interim Audit Advice or a Site Audit Statement from a NSW EPA accredited Site Auditor certifying the appropriateness of the assessments. Any risk rating of areas of environmental interest (or areas of environmental concern or any other similar terminology) as well as the proposed mitigation measures must be also reviewed as appropriate by the accredited Site Auditor.

This IA aims to:

- Confirm that the environmental investigations have been appropriately conducted with respect to identifying actual or potential contamination at the WRRF site and the three pipe alignments;
- Confirm the investigations have been conducted in accordance with NSW EPA made or endorsed guidelines for land contamination assessment; and
- Whether the mitigation measures presented in the environmental investigation reports are appropriate for site conditions.

The Audit is being conducted in accordance with the requirements outlined in the NSW EPA (2017) Contaminated Land Management Guidelines for the NSW Site Auditor Scheme (3rd edition).

2 Summary of the Project

The GOPP water cycle management project has been designed to be efficient, sustainable, and cost effective for the community, as well as resilient and adaptable for future water uses.

The main elements of the project include:

- A new WRRF at Camellia-Rosehill to treat wastewater to produce advanced treated water
- Upgrades to the existing pumping station at Camellia
- A new wastewater transfer pipeline from Camellia pumping station to the WRRF
- A new and repurposed brine pipeline to transfer brine from the Camellia pumping station to the Northern Suburbs Ocean Outfall Sewer (NSOOS)
- A new river release pipeline to transfer advanced treated water from the WRRF to a release structure in Parramatta River at Meadowbank.

The location of the main elements of the project is provided in **Attachment A Figure 1**.

3 Site Description

The Auditor has reviewed contamination investigation reports related to the following land:

Primary Site:

- **Water Resource Recovery Facility (WRRF)** which is legally identified as Lot 1 in DP1300589 and occupies an area of 21.45ha (primary site), as shown in **Attachment A Jacobs Figure 1**.

Pipeline Alignments:

- **River Release Pipeline (RRP)** defined as the southern portion of the Camellia WRRF across Duck River to Carnarvon Street, Silverwater; areas within and immediately adjacent to Carnarvon Street, Vore Street, Derby Street (crossing Silverwater Road), Day Street and Fariola Street, Silverwater; areas within and immediately adjacent to Comaneci Avenue, Newington Boulevard, Pierre De Coubertin Park, Avenue of Oceania, Newington; areas within and immediately adjacent to Hill Road, Sydney Olympic Park and crossing Parramatta River at Wentworth Point; and areas within Meadowbank Park and within and immediately adjacent to Meadow Crescent, Meadowbank. The RRP alignment is approximately 8km in length and shown in **Attachment A Jacobs Figures 1a-1c**.
- **Brine Influent Pipeline (BIP)** will be located between the northeast corner of the WRRF site and the existing sewage pumping station (SP0067) in Rosehill and is approximately 1.5km in length. The pipeline will be installed under the Rosehill Gardens Racecourse and Grand Avenue, as shown in **Attachment A Jacobs Figure 1**.

- **The existing Camellia Pumping Station to the Northern Suburbs Ocean Outfall Sewer (NSOOS) (SP0067-NSOOS)** pipeline alignment has been defined as the Camellia pumping station to the adjacent light railway corridor, and north alongside the railway corridor to Parramatta River; across Parramatta River and Victoria Road including portions of Western Sydney University Campus; along Rippon Avenue to Kissing Point Road to connect to the junction with the Northern Suburbs Ocean Outfall Sewer, as shown in **Attachment A GHD Figure 1.1**.

3.1 Pipeline Construction Methods

The proposed construction method for the RRP and BIP will include a combination of underboring, Horizontal Directional Drilling (HDD) or micro-tunnelling and open trenching). The proposed depths for each method are:

- Up to 4.5m depth for trenching works
- Up to approximately 55m depth into bedrock using HDD, underboring or micro-tunnelling.

Construction Elements (CEs) are placed along the alignments typically where changes in methodology are required, particularly to initiate and receive drilling equipment and for spoil removal. These CEs will require excavation and exposure to soil and groundwater along with the open trenching portions of the alignment.

4 Scope of Audit and Nature of Interim Advice

NSW EPA (2017) describes the site assessment and audit process as:

- *Consultant is commissioned to assess contamination.* The contaminated site consultant designs and undertakes the site assessment and, where required, all remediation and validation activities to achieve the objectives specified by the owner or developer; and
- *Site auditor reviews the consultant's work.* The site owner or developer commissions the Auditor to review the consultant's work. The Auditor then prepares a SAR and SAS at the conclusion of the review, which are given to the owner or developer.

Therefore, the contaminated land consultant and other relevant parties should be satisfied that the work to be conducted conforms to all appropriate regulations, standards and guidelines and is suitable based on the site history and the proposed land use.

5 Current Interim Advice

In preparing this interim audit advice, the Auditor has reviewed the following environmental investigations identifying potential contamination and/or characterisation of the Project site:

For WRRF:

- Jacobs (21 June 2024) Greater Parramatta and Olympic Peninsula – WRRF Camellia, Sampling Analysis and Quality Plan (Ref: IA319500-00-T-J-PLN-00-02. Rev. 4).
- Jacobs (21 January 2025) Detailed Site Investigation, Camellia WRRF, Greater Parramatta and Olympic Peninsula Project (Ref: IA319500-00-T-J-RPT-00-01 Version D).

For RRP:

- Jacobs (27 May 2025) Preliminary Site Investigation – River Release Pipeline (Ref: IA319500-00-T-J-RPT-00-08 Version: 05).
- Jacobs (12 May 2025) Sampling Analysis and Quality Plan – River Release Pipeline (Ref: IA319500-00-T-J-RPT-00-10-03 Revision: 03).
- Jacobs (16 June 2025) Detailed Site Investigation – River Release Pipeline Alignment (Ref: A319500-00-T-J-RPT-00-12 Version: B).

For BIP:

- Jacobs (6 April 2025) Preliminary Site Investigation – Brine and Influent Pipelines (Ref: IN.20037236 - 12750-0007 Version: 03).
- Jacobs (7 May 2025) Sampling Analysis and Quality Plan – Brine and Influent Pipelines, (Ref: IA319500-00-T-J-RPT-14-02 Revision: 02).
- Jacobs (5 August 2025) Detailed Site Investigation – Brine and Influent Pipeline Alignment, (Ref: A319500-00-T-J-RPT-00-17 Version: 02).

For Camellia pumping station to NSOOS:

- GHD Pty LTD (30 September 2025) Desk Top Study – Camellia Pumping Station to NSOOS Greater Parramatta, Olympic Peninsula Water Cycle Management (Ref: 12673348_Desk top study_GPOP_SP to NSOOS_Draft Rev A)

An appraisal of the reports are presented in **Attachment B**. The Auditor has prepared various interim advice during the investigation phases of the project. Section 6 outlines the principal findings related to contamination at the Project site.

6 Summary of Investigations and Site Conditions

Preliminary site investigations (PSI) and detailed site investigations (DSI) have been conducted for the Project site. The main objective of the various investigations was to obtain information on the contamination status of the Project site to be considered as part of the design, construction and/or operation of the WRRF and the installation or upgrade of the pipeline alignments.

6.1 Summary of WRRF Site Conditions

The scope of work (Jacobs, January 2025) included excavation of test pits and boreholes in a systematic grid across the site to assess soil contamination and groundwater conditions. Additional test pits targeted areas of redundant inground piping and infrastructure, past asbestos finds, and in the vicinity of a historical aqueous firefighting foam (AFFF) tank. A network of shallow and deep monitoring wells, and soil vapour probes were installed to assess groundwater quality, the potential for non-aqueous phase liquids and vapour generation. Soil samples were collected from stockpiles and surface water at Duck Creek.

Investigations identified fill material to a depth of 4.7m below ground level (bgl), comprising sandy clayey fill with variable amounts of construction debris and isolated areas of soil contamination. Groundwater flows south and southeast, within an unconfined to semi-confined system in fill and shallow alluvium. Soil testing identified exceedances of ecological and human health assessment criteria for several contaminants, including heavy metals, hydrocarbons, and asbestos, particularly in the shallow fill. These exceedances were considered unlikely to pose a risk for the proposed commercial / industrial land use noting as the WRRF site is being capped with approximately 1.7m of imported crushed sandstone.

Acid sulfate soils were identified between depths of 1.5 and 13m bgl. Stockpile sampling results indicated that the fill material is suitable for reuse onsite, provided management plans are followed.

Surface water sampling in Duck River detected copper, zinc, and PFAS above ecological criteria, with higher PFAS levels recorded downstream. Groundwater results indicated exceedances for heavy metals, hydrocarbons, and PFAS. Given the location of exceedances and flow direction there is the potential for off-site migration and impact on the river ecosystem. Soil vapour samples exceeded criteria for volatile organic compounds, suggesting potential vertical and lateral vapour migration onsite and across boundaries. Redundant underground infrastructure was identified, with the likelihood of encountering more during future earthworks and excavations.

To ensure that the contamination identified is effectively managed during and post construction works the following is recommended:

- Continued implementation of existing environmental management plans prepared for the WRRF enabling works - capping activities currently underway to ensure no unacceptable risk to human health or the environment associated with asbestos, acid sulfate soils and chemical contaminants identified in soil, soil vapour and groundwater. Existing management plans, which have been reviewed and endorsed by the Auditor, include:
 - Groundwater monitoring and management plan (GMMP);
 - Asbestos management plan (AMP);
 - Spoil and stockpile management plan (SSMP);
 - Soil and water management plan (SWMP);
 - Contamination management plan (CMP);
 - Unexpected finds protocol (UFP);
 - as well as periodic monitoring of groundwater, surface water and soil vapour conditions for a period of at least 12 months.
- Other management plans may be required as construction methods are confirmed or as new information becomes available including Acid Sulfate Soil Management Plan (ASSMP) and Groundwater Dewatering Management Plan (GDMP).
- As the construction of the WRRF facility may involve deep foundations or services installed within contaminated material, the design should consider minimal disturbance in areas of known contamination, selection of durable building materials for proposed inground structures, and engineering solutions to prevent the potential migration and accumulation of soil vapour into above ground features that could pose a risk to future operational and maintenance workers (if required).
- At the completion of WRRF works, a long term environmental management plan (LTEMP) will be required documenting residual contamination and ongoing maintenance and management in the event site activities breach the cap and/or expose workers to the underlying contamination. Any redundant infrastructure decommissioned and left insitu must also be documented within the LTEMP.

6.2 Summary of RRP alignment conditions

The PSI (Jacobs May 2025) identified known contamination within or adjacent to the RRP to include the former Shell oil refinery (on Devon Street), various landfills (on Carnarvon Street, and within the Sydney Olympic Park Precinct including Haslams Reach North, Woo-la-ra) and former commercial/industrial sites along Derby Street, Silverwater.

Potential contamination sources along the alignment include various non-specific commercial/industrial land uses (past and present) in Silverwater and Wentworth Point; the Former Armory, Newington; and historical land reclamation at Wentworth Point and Meadowbank Park.

The intrusive investigation (Jacobs, June 2025) comprised soil sampling at 27 borehole locations during the geotechnical investigation, supplementary surface soil sampling at 14 locations and collection of seven groundwater and ground gas samples. The investigation was limited to targeting the CE sites only, to provide an indication of likely soil/groundwater/vapour conditions likely to be encountered and the requirement for specific management plans.

Based on the findings it was concluded that contaminated soils, hazardous ground gases, soil vapour, asbestos impacted soils, acid sulfate soils, and groundwater must be managed during construction to prevent human health and ecological risks during construction works.

Asbestos contamination could be present throughout the alignment. Acid sulfate soils and potential acid sulfate soils require management during excavation and groundwater dewatering.

Groundwater may be encountered at all construction sites, so groundwater management plans are necessary.

Landfill gas could accumulate in access pits at certain CE site, requiring occupational health and safety controls such as air monitoring and appropriate personal protective equipment for workers during (and possibly post) construction activities.

To ensure the protection of human health and the environment, WHS and environmental management plans – similar to those adopted for WRRF - are to be developed and implemented during RRP construction activities. Further investigations are required for soil, groundwater and vapour targeting Derby Street (54-58 Derby Street and 103-105 Silverwater Road) and the CE site (i.e. CE-004) to supply the necessary information for the preparation of the respective management plans (including dewatering management plan DWP), as well as further drilling, ASS sampling and laboratory testing targeting areas where data gaps in ASS risk were identified.

6.3 Summary of BIP alignment conditions

Key sources of contamination identified in the PSI (Jacobs, April 2025) for the BIP alignment include known asbestos contamination at the Camellia pumping station, Grand Avenue Rosehill, historical placement of fill material or disturbed terrain along the length of the alignment, a service station on James Ruse Drive, and other non-specific commercial/industrial land uses (former and current) in Camellia, Clyde and Rosehill that are adjacent to the alignment.

The intrusive investigation (Jacobs, August 2025) comprising 17 boreholes and sampling of groundwater and ground gas at 9 locations, confirmed the presence of friable asbestos in fill in some areas along the alignment and the presence of acid sulfate soils.

To ensure the protection of human health and the environment, WHS and environmental management plans – similar to those adopted for WRRF - are to be developed and implemented during BIP construction activities. Prior to construction commencing further acid sulfate soil (ASS) sampling is required to inform an acid sulfate soils management plan (ASSMP) for spoil that is generated. Any surplus spoil generated during works will require waste classification to facilitate offsite disposal.

6.4 Summary of Camellia pumping station to NSOOS alignment conditions

The desktop PSI (GHD, September 2025) identified potential sources of contamination, that may be encountered during the upgrade and relining of the Camellia pumping station-NSOOS pipeline, to comprise land to the immediate south of the Parramatta River; a Sydney Water asset (Asset ID LT001546, LT001571) impacted by asbestos and lead; surrounding industrial sites, including the James Hardie factory located directly to the west of the site; and the potential presence of ASS in the Camellia area and in the lower portion of Western Sydney University campus.

The PSI recommended, for excavations in the southern section of the site, works should be conducted in accordance with existing management plans or new plans developed. The plans are to provide a framework to manage the potential for exposure of contaminants, particularly asbestos, to construction workers.

Further investigation is required at the Camellia pumping station and the access road towards the Sydney Water asset to the north to assess potential soil and groundwater contamination ahead of construction works.

7 Mitigation Measures

The mitigation measures related to known or potential contamination for the Project Site to be implemented pre-construction planning and during construction activities, as well as post constructions of the WRRF associated with this IA are presented in Table 1.

Table 1 Mitigation Measures

Potential Impact/Activity	Mitigation Measure	Reason for Mitigation Measure
Pre and During Construction		
Change in Pipeline Alignment to that assessed as part of the EIS	Any changes to the proposed alignment (vertical and lateral - outside of the impact assessment area in the EIS) will require re-assessment of the existing investigations to confirm if further investigation is required. If additional investigation is required, this may comprise a preliminary site investigation, and if recommended, a detailed site investigation to assess contamination conditions for any amended alignment with greater certainty.	To confirm whether other/additional management controls are required, as well as to provide additional data to facilitate material disposal.
Data Gap SP0067-NSOOS characterisation of soil and groundwater as recommended in the PSI (GHD, September 2025)	Intrusive investigations in the vicinity of the pumping station and access road and in proximity to the former James Hardy facility, to assess soil and groundwater conditions to inform any construction management plans. In addition, data should be assessed against applicable land use exposure scenarios	To confirm whether other/additional management controls are required, as well as to provide additional data to facilitate material disposal for surplus material.
Data Gap BIP further acid sulfate soil (ASS) sampling to inform an acid sulfate soils management plan (Jacobs, August 2025)	Completion of additional works, and based on findings preparation of an Acid Sulfate Soils Management Plan (ASSMP)	To ensure material generated is appropriately managed, treated, handled, disposed if confirmed to be ASS/PASS
Data Gap RRP further investigation for soil, groundwater and vapour Derby Street (54-58 Derby Street and 103-105 Silverwater Road) and the CE site (i.e. CE-004); further ASS investigation where ASS risks were identified (Jacobs, June 2025)	Additional information for the preparation of management plans	To confirm whether other/additional management controls are required, as well as to provide additional data to facilitate material disposal for surplus material.
Identification of contamination during earthworks and construction	An Unexpected Finds Protocol (UFP, incorporated into the development's Construction Environmental Management Plan (CEMP), should be implemented in the event unexpected contamination is encountered during earthworks and construction. The UFP should identify potential 'types' of items that could be considered as unexpected contamination, and corrective actions (including any follow up testing) outlined.	In the event a contamination unexpected find (UF) is uncovered, the UFP will outline corrective measures to ensure the UF is appropriately removed, the area tested and confirmed to be suitable for the proposed future commercial/industrial land use.

Fill/soil/HDD generated material surplus to construction/Project needs	Complete waste classification in accordance with NSW EPA (2014) Waste classification guidelines	Ensures appropriate classification and lawful disposal of waste material. Compliance with the waste regulations.
Importation of fill to facilitate earthworks/construction	Imported fill should comprise certified excavated natural material (ENM), or virgin excavated natural material (VENM), quarried product or material generated under a NSW EPA Resource Recovery Order (and its application to land as outlined in the Exemption). Contractor to implement a material tracking register and ensure documentation provided confirms ENM or VENM or complies with relevant RRO/RRE.	Ensures no contaminated material is imported to the Project site.
Confirmation that the WRRF facility is suitable for intended use (post capping) to enable construction works to proceed	Site Auditor to review capping validation report, and to review final design with respect to any engineering controls (if required) to ensure that, post capping works, there is no unacceptable risk to construction workers.	Certainty that the site has been suitably managed and/or future design/construction incorporates any engineering controls (into the build) to enable construction works to occur.
Preparation of new or updates to existing management plans for contamination management to be implemented during construction activities as new information becomes available and pipe alignments are confirmed.	Site Auditor review updated or new management plans including ASSMP, GMMP, AMP, SWMP, SSMP, CMP, UFP, GDMP.	To ensure appropriate environmental and human health controls are implemented during construction works
Post Construction and during Operations		
Residual contamination (soil, groundwater, vapour) under the completed cap at WRRF	Requirement for Long Term EMP	Protective of Human Health during operations and maintenance. The EMP must be legally enforceable and publicly notified.
For all Construction Element areas, at the completion of pipeline installation and/or upgrade works, must be reinstated to a suitable condition.	Reinstatement with suitable clean fill and finished ground surface coverings that are fit for purpose.	Reinstatement of affected land to a condition suitable for the post construction land use (e.g. open space, commercial/industrial, residential)
Potential risk of exposure at maintenance points along alignments	Sydney Water's operational procedures to prevent exposure in areas where residual contaminant conditions occur for groundwater, soil or vapour conditions	Protective of Human Health during operations and maintenance of infrastructure.

8 Auditor Conclusions

For the statutory audit, this interim advice has been prepared to respond to the Planning Secretary's Environmental Assessment Requirements (SEARs) for State Significant Infrastructure SSI- 74258485, specifically to address **Key Issue Item no. 4. Contamination Item 4.** which requires a NSW EPA accredited Site Auditor to certify the appropriateness of the environmental investigations completed by Jacobs and GHD.

Based on the available data from the available preliminary (PSI) and detailed site investigations (DSI), the Auditor considers that the Project site has been appropriately investigated to assess

potential or actual contamination that may be encountered during construction activities and to inform environmental management plans to be implemented during works.

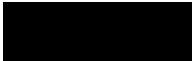
The available investigations have been conducted in general accordance with NSW EPA made or endorsed guidelines for land contamination assessment; and the mitigation measures presented in the environmental investigation reports are appropriate for site conditions or will be reviewed as new information becomes available or Project specifics are confirmed. The Auditor considers the mitigation measures related to known or potential contamination for the Project site, as outlined in Table 1 are to be implemented as part of pre-construction planning, during construction activities, as well as post construction of the WRRF.

9 Closure

This interim advice does not constitute a SAS or a SAR but rather is provided to assist the Client in the assessment and management of contamination issues for the project. The information provided herein should not be considered pre-emptive of the final Audit conclusions. It represents the Auditor's opinion based on the review of currently available information. At the completion of the Audit process site audit statements and reports may be issued.

Should you have any queries or wish to discuss any points, please do not hesitate to contact the undersigned.

Yours sincerely,



Rebeka Hall
NSW EPA Accredited Site Auditor
Geosyntec Consultants Pty Ltd

Attachments

- A – IA Figures**
- B – Summary of Previous Investigations**

Attachment A IA Figures

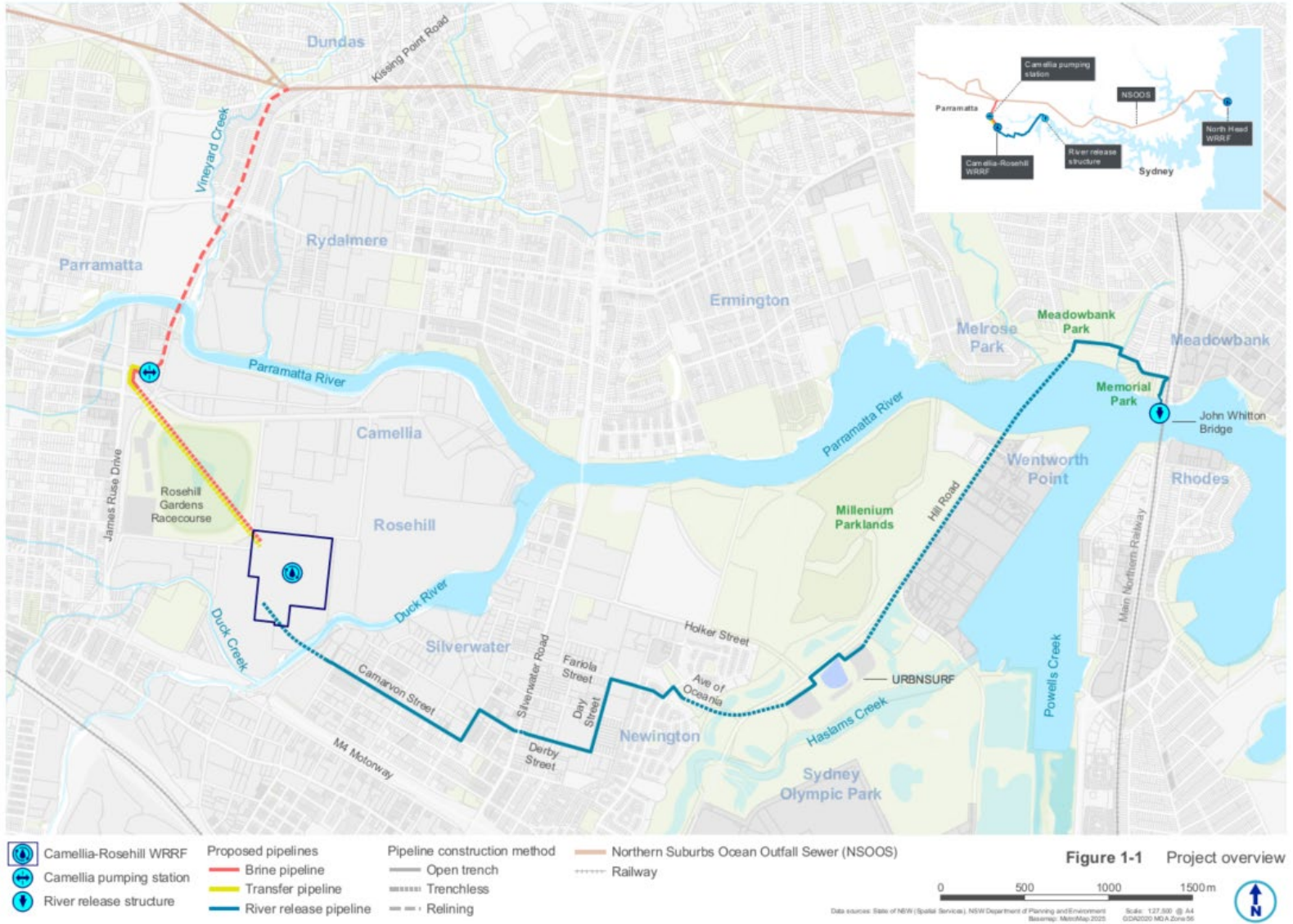
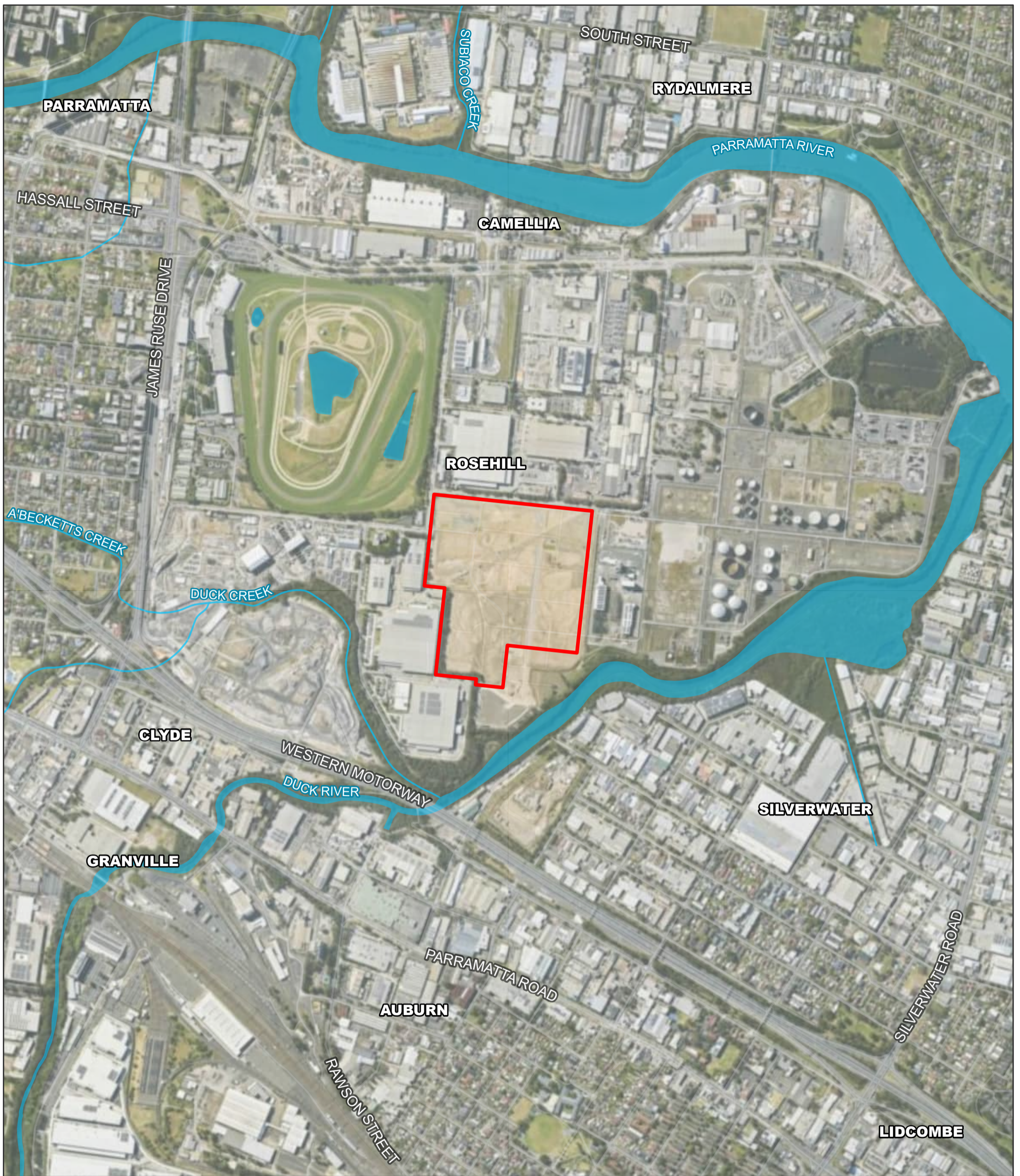
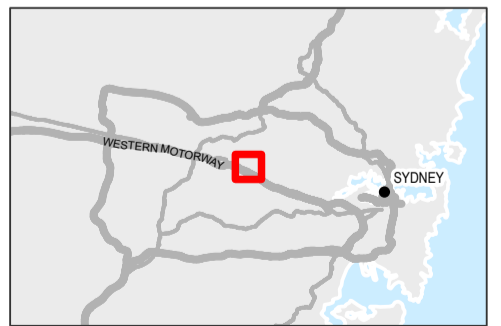


Figure 1 Project Overview



LEGEND
 Site boundary

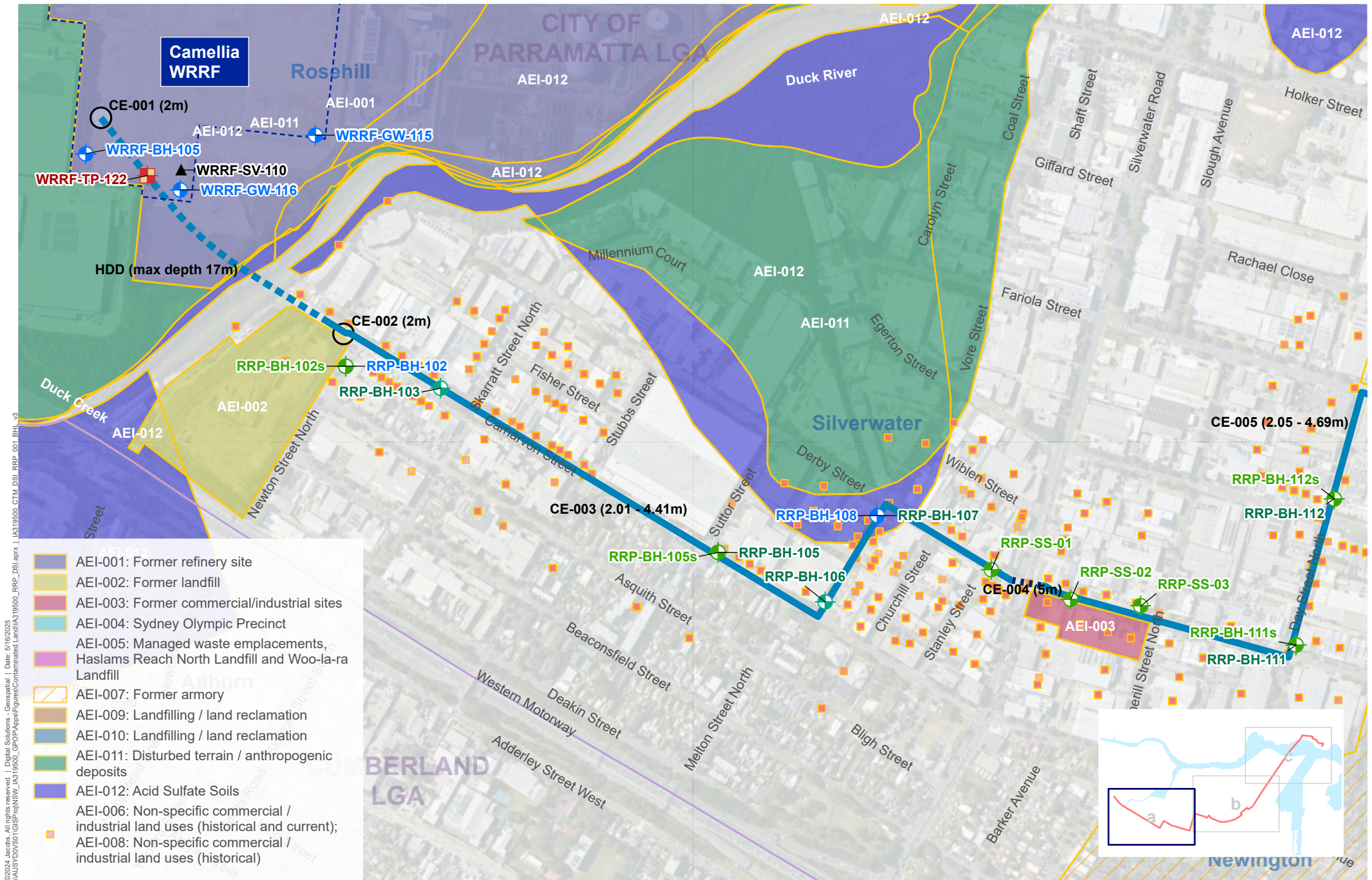
Watercourse
 Water body



N
 A4 1:15,000
 GDA2020 MGA Zone 56
 0 200 400
 Metres

Figure 1: Site location WRRF

Data Sources: Department of Customer Service (2024); Imagery Sources: Aerometrex 2024
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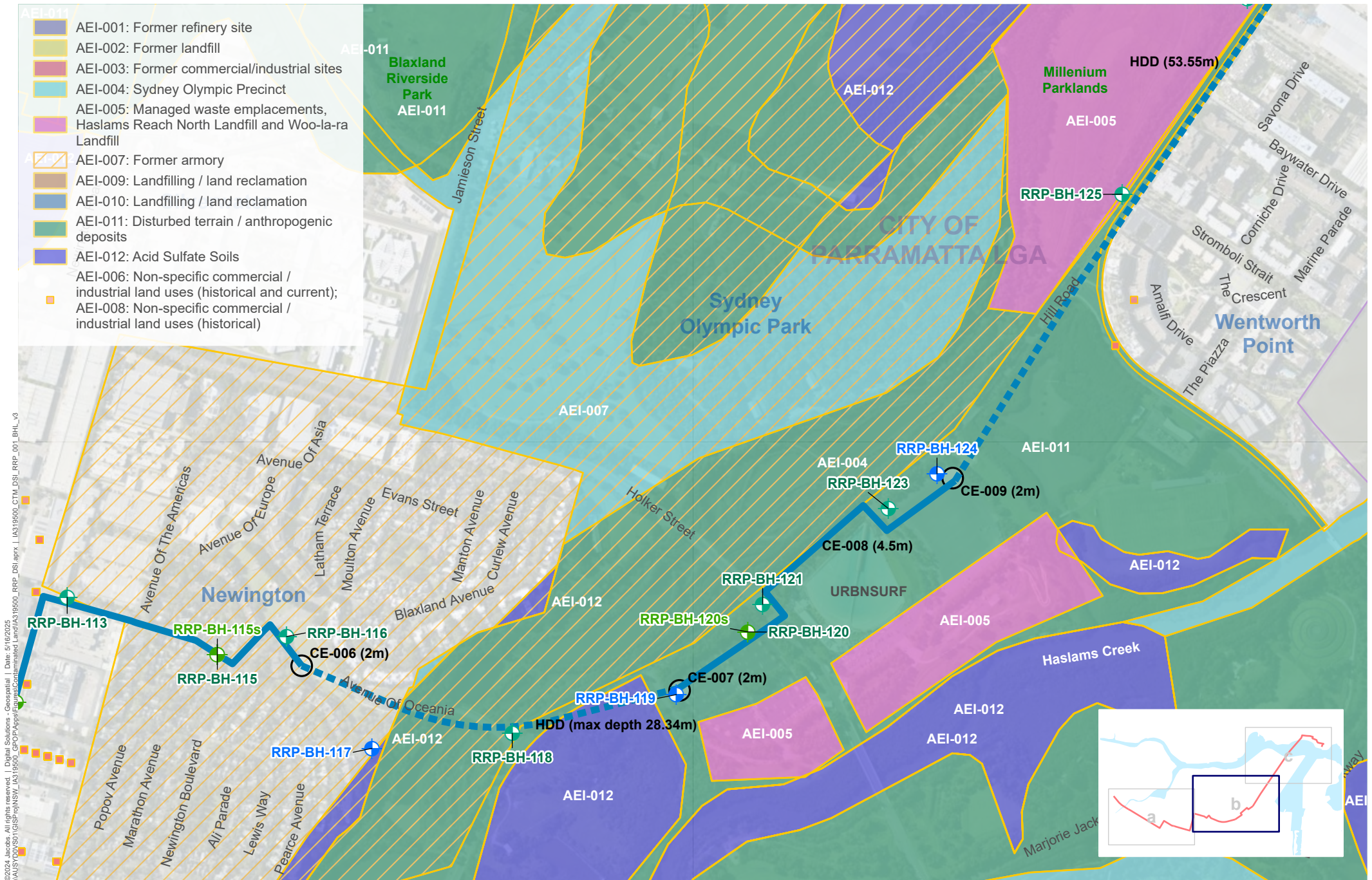


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Figure 1a River Release Pipeline - Site Layout and Sample Locations Map

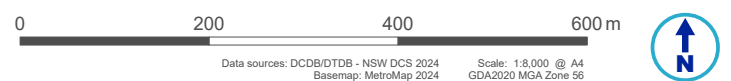


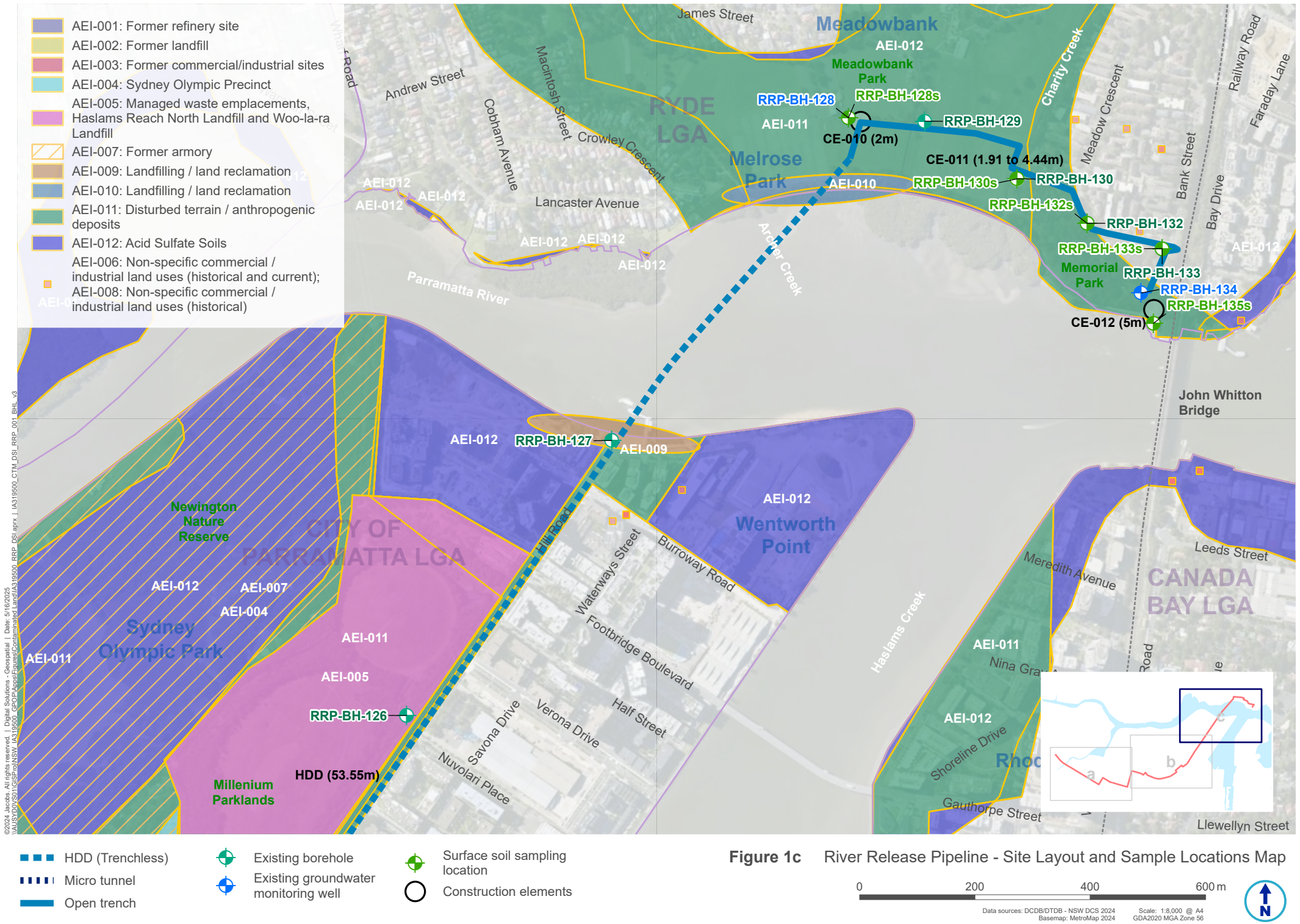
Data sources: DCDB/DTDB - NSW DCS 2024
 Basemap: MetroMap 2024
 Scale: 1:8,000 @ A4
 GDA2020 MGA Zone 56



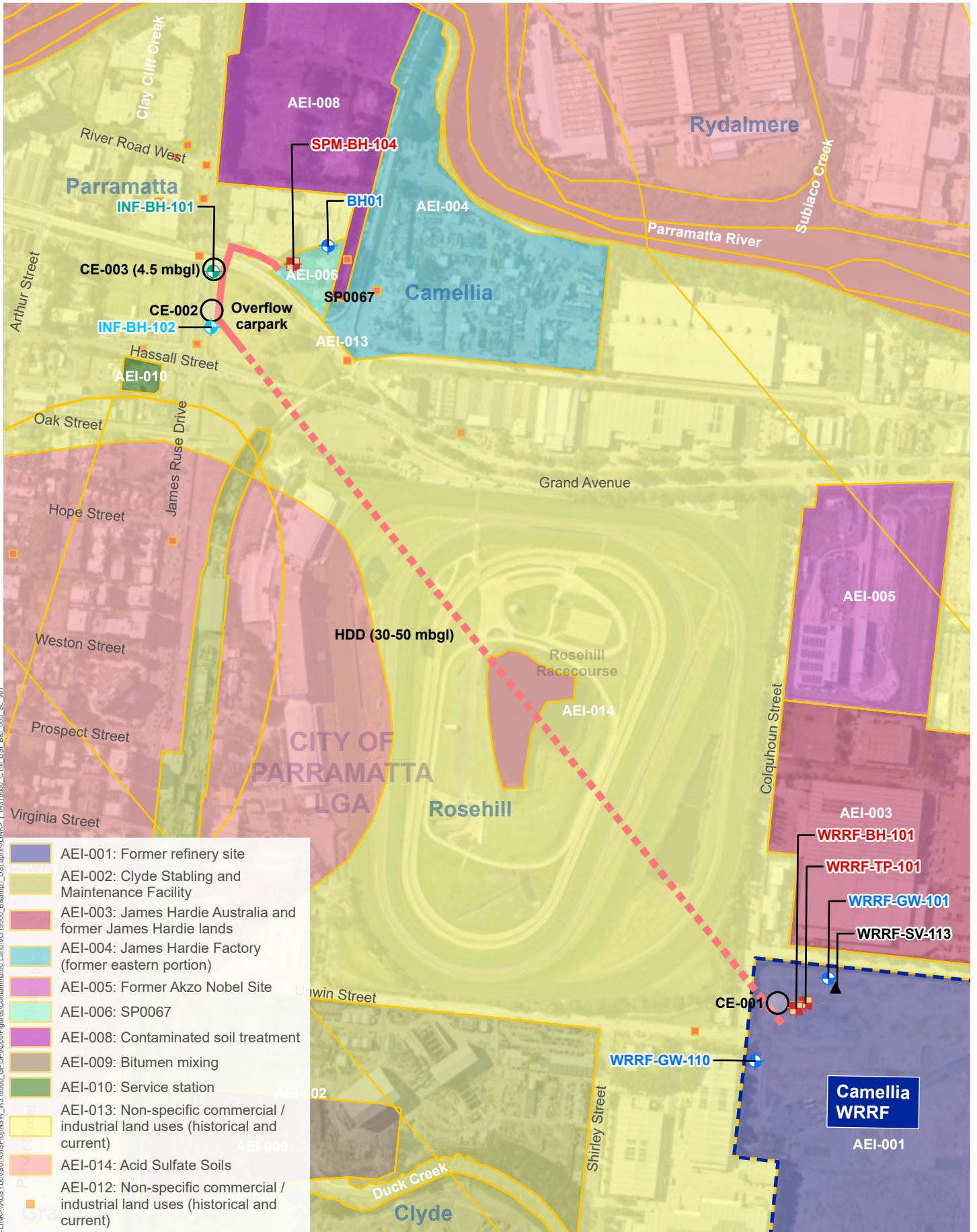
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Figure 1b River Release Pipeline - Site Layout and Sample Locations Map



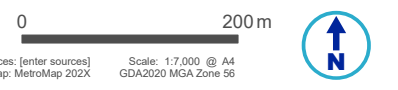


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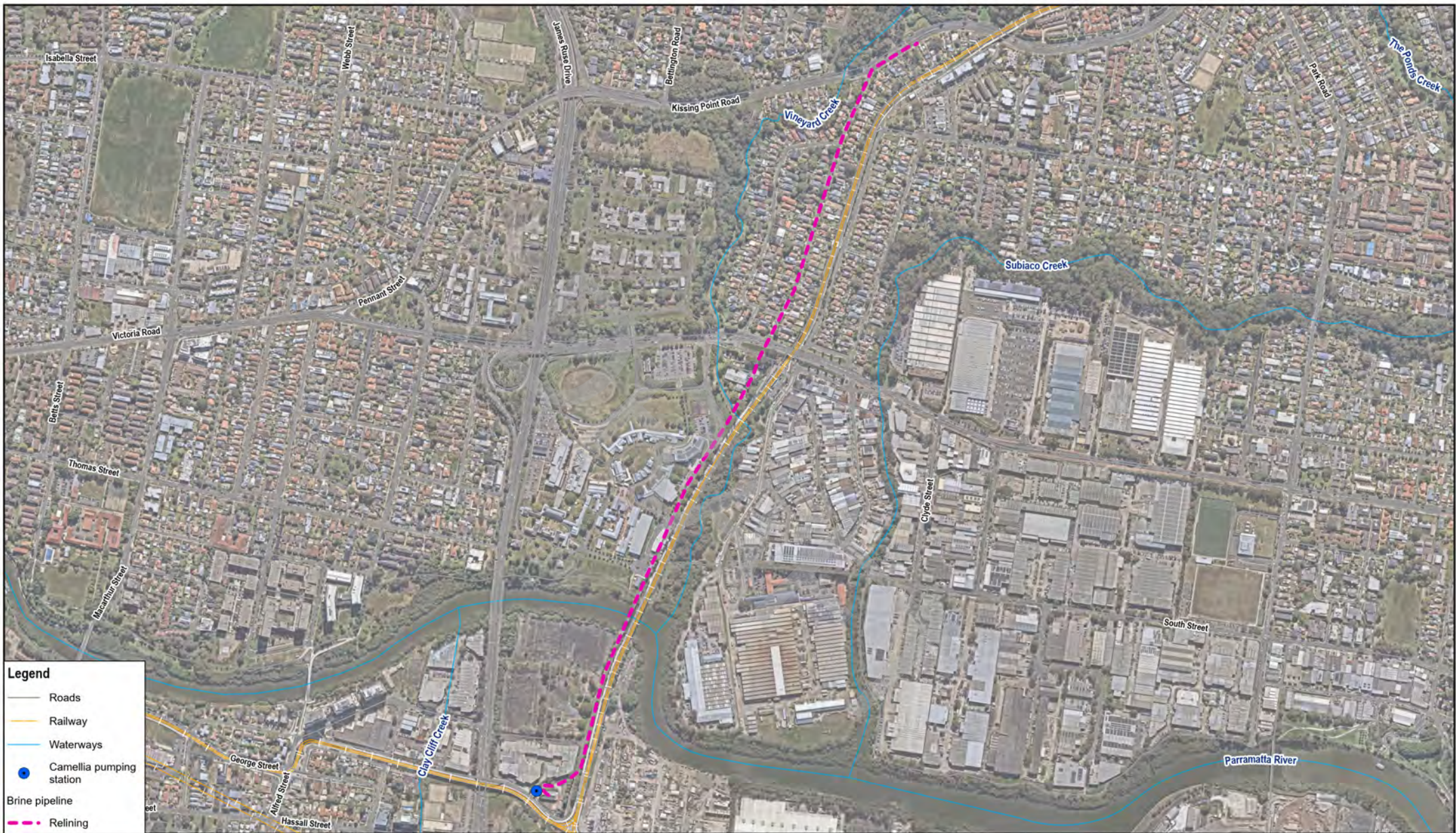


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Figure 2 Sampling Locations



Data sources: [enter sources]
Basemap: MetroMap 202X



Legend

- Roads
- Railway
- Waterways
- Camellia pumping station
- Brine pipeline
- Relining

<p style="font-size: 48px; opacity: 0.5; font-weight: normal;">DRAFT</p>	<p>1:11,500 @ ISO A4</p> <p>Metres</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA2020 Grid: GDA2020 MGA Zone 56</p>			<p>Sydney Water Corporation Desk top study Camellia pumping station to NSOOS</p>	<p>Project No. 12673348 Revision No. A Date. 29/09/2025</p>
<p>Site location</p>				<p>FIGURE 1.1</p>	

Attachment B Summary of Investigation Reports

Report	Outcomes
WATER RESOURCE RECOVERY FACILITY (WRRF) REPORTS	
<p>Jacobs (21 June 2024) Greater Parramatta and Olympic Peninsula – WRRF Camellia, Sampling Analysis and Quality Plan (SAQP) (Ref: IA319500-00-T-J-PLN-00-02. Rev. 4)</p>	<p>The main objectives of the proposed investigation are to:</p> <ul style="list-style-type: none"> Obtain additional information to provide further understanding of the contamination status of the site which will require to be considered as part of the design, construction and/or operation of the WRRF. Assess the potential change of the current contamination conditions at the site associated with the consolidation of subsurface materials associated with the proposed capping. <p>The proposed scope of works will involve the:</p> <ul style="list-style-type: none"> Excavation of 22 test pits in a systematic grid across the site (WRRF-TP-101 to WRRF-TP-122 and WRRF-BH-104, WRRFBH-105, WRRF-BH107) to achieve site coverage. Excavation of 5 test pits to target the historical AFFF tank no 24. Installation of 16 shallow and 2 deep groundwater wells to assess groundwater conditions and to establish a groundwater well network which could be used during future stages of works. Installation of 10 soil vapour probes targeting the areas of immobile NAPL. Collection of samples from existing stockpiles onsite. Collection of surface water from Duck Creek at up and down stream locations from the site. Collection and analysis of soil, groundwater and soil vapour samples from the abovementioned locations. <p>It is understood that the contamination assessment will be conducted in conjunction with the geotechnical investigation, also be completed by Jacobs.</p>
<p>Jacobs (21 January 2025) Detailed Site Investigation (DSI), Camellia WRRF, Greater Parramatta and Olympic Peninsula Project (Ref: IA319500-00-T-J-RPT-00-01 Version C)</p>	<p>The main objectives of the investigation were to:</p> <ul style="list-style-type: none"> Obtain additional environmental data to further understand the contamination status of the site to be considered as part of the design, construction and/or operation of the WRRF. Assess the potential change in current contamination conditions at the site associated with the consolidation of subsurface materials associated with the proposed capping. <p>The proposed scope of works comprised:</p> <ul style="list-style-type: none"> Excavation of 22 test pits and boreholes in a systematic grid (WRRF-TP-101 to WRRF-TP-127 and WRRF-BH-104, WRRFBH-105, WRRF-BH107 and WRRF-GW-101, WRRF-GW-107 to WRRF-GW-112, WRRF- GW-114 to WRRF-GW-118) for site coverage. Excavation of 6 test pits in the eastern portion of the site to target potential redundant inground pipelines containing sludge (WRRF-TP-114, WRRF-TP-115, WRRF-TP-118, WRRF-TP-119, WRRF-TP-124, WRRF-TP-126). Excavation of 4 test pits to target the vicinity of historical AFFF tank no 24 (WRRF-TP-128 to WRRF-TP-131). Excavation of 6 test pits in the northwestern portion of the site to target the previous asbestos finds (WRRF-TP-132 to WRRF-TP-137). Installation of 16 shallow (WRRF-GW-101, WRRF-BH-102 to WRRF-BH-106, WRRF-GW-108 to WRRF-GW-112, WRRF-GW-114 to WRRF-GW-118) and 2 deep groundwater wells (WRRF-GW-107 and WRRF-GW-113) to assess groundwater conditions and to establish a well network for monitoring during future stages of works.

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Report	Outcomes
	<ul style="list-style-type: none"> • Installation of 10 soil vapour probes targeting the areas of (immobile) NAPL (WRRF-SV-101 to WRRF-SV-110). • Collection of samples from the existing stockpiles. • Collection of surface water samples from Duck Creek (WRRF-SW-101 and WRRF-SW-102) at both up and down stream locations from the site. • Collection of soil, groundwater and soil vapour samples for analysis from the investigative locations presented above. It is noted that one round of methane monitoring was completed. <p>A Summary of Results Included:</p> <ul style="list-style-type: none"> • The site is underlain by fill materials to a maximum depth of 4.7 mbgl, or between 1 m to 3 m in depth on average. Within the fill material excavated visual contamination (odours, staining and aesthetics) was observed and contained a quantity of construction wastes, namely concrete, plastic, steel, glass, and bitumen with gross contamination (strong odorous, discoloured materials, product inflows) observed within isolated locations. • General groundwater flow direction was in a southerly direction with some south easterly groundwater flow within the eastern and southeastern portions of the site. Groundwater depths ranged from -0.833 mAHD to 3.736 mAHD in shallow monitoring wells, and -0.194 mAHD to 0.874 mAHD in deep monitoring wells. Groundwater beneath the site is present as an unconfined to semi-confined groundwater system within fill materials / shallow alluvium. • Concentrations of zinc, copper, lead, TRH, BTEX compounds and benzo(a)pyrene in soil exceeded the ecological site assessment criteria (SAC) in fill materials located between 0-1.0 mbgl. Given the historical industrial use of the site, exceedances of the ecological SAC in soils are unlikely to represent a risk under the current and proposed commercial/industrial land use. Concentrations of total chromium, lead, TRH and benzene in selected samples and asbestos exceeded the human health SAC in samples collected from between 0-1.0 mbgl variably across the site. All other contaminant compound concentrations in fill between 0-1.0 mbgl were reported below the respective SAC. • One stockpile (stockpile WRRF-SP-101) consisting of fill materials in the north-eastern portion of the site was sampled to determine its contamination status. Exceedances of the adopted ecological SAC were reported for benzo(a)pyrene and TRH (F2). All other contamination concentrations were reported below the adopted human health SAC, and no Potential Asbestos Containing Material (PACM) was observed or detected in any soil samples. Reuse of the material on-site as general fill is considered acceptable (subject to the plans detailed within the recommendations). • PACM was observed as randomly scattered fragments of fibre cement sheeting (non-friable) across site surfaces with the majority observed/identified within the southwestern portion of the site. Eleven of the PACM samples collected for laboratory identification contained asbestos. Although the main observations of ACM across site surfaces was in the southwestern portion of the site, isolated fragments were also identified within other areas. • Furthermore, asbestos field screening identified PACM as scattered bonded and fibrous materials inclusions in fill at three test pit locations at depths between 0.0-0.1 mbgl. Asbestos was identified in two of the PACM samples. The concentrations (w/w%) of the asbestos identified was below the adopted SAC in all bulk soil gravimetric samples collected at 0.0-0.1 mbgl. • Bonded ACM and fibrous (FA/AF) was also identified at two isolated locations within the underlying fill material across the site less than 1.0 mbgl. • No asbestos was identified in materials excavated from investigation locations and sampled in materials greater than 1.0 mbgl. • Exceedances of the EILs was noted for various CoCs in fill, natural soil and stockpiled fill onsite. As the site is unlikely to represent a terrestrial ecosystem of significant value, these exceedances of the ecological SAC in soils are unlikely to represent a risk under the current and proposed land use.

Report	Outcomes
	<ul style="list-style-type: none"> • TRH compounds including one exceedance of benzo(a)pyrene in natural soils SAC were reported in samples collected from >1.0 mbgl at selected locations. All other contaminant compound concentrations in fill and natural soils at depths of >1.0 mbgl were reported below the respective SAC. • For the stockpiled fill, the results of the stockpile sampling and in consideration of the contamination testing undertaken on fill across other areas of the site, the reuse of the material on-site as general fill is considered acceptable (subject to the plans detailed within the recommendations). • Based on the chromium reducible sulfur results, soil materials beneath the site ranging in depths from 1.5 mbgl to 12.95 mbgl are considered to be acid sulfate soils (ASS). • The results collected indicated the majority of soils have a preliminary waste classification of “General Solid Waste, Special Waste Asbestos”. Generally, the highest concentrations of hydrocarbons, benzene and select metals (chromium, lead and mercury) classified some materials as restricted and/or hazardous wastes. Further analysis including TCLP may reduce these classifications • Concentrations exceeding the ecological SAC were reported for copper, zinc and PFAS (i.e. PFOS) in the downstream surface water monitoring location of Duck River and for PFAS in the upstream surface water monitoring. Concentrations of PFAS in Duck River were marginally greater downstream compared to that reported upstream. No other contaminant compounds were detected in surface water samples collected from Duck River at concentrations above the SAC. • Groundwater sampling across the site indicated that concentrations of selected heavy metals, TRH, BTEX, PAH and PFAS compounds exceed the human health and/or ecological SAC. There is the potential for contamination (i.e. concentrations of PFAS, TRH, PAH and BTEX exceeding the SAC) in groundwater sourced from the site to migrate across site boundaries and could potentially impact upon the users and/or ecosystems of Duck River. • Concentrations of TRH and BTEX were reported in all soil vapour samples, but did not exceed the adopted SAC. TCE, vinyl chloride and 2,2,4-trimethylpentane concentrations exceed the adopted SAC at three soil vapour locations (WRRF-SV-104, WRRF-SV-108 and WRRF-SV-110). Similarly to groundwater, there is the potential for soil vapour to migrate across the southern site boundary. • Redundant underground infrastructure was observed in the central and eastern portions of the site. Two pit junctions from the residual drainage network were identified through on-site test pitting and confirmed against existing site plans/information. The pits were observed to be generally consistent with previous Site Audit Reports (GHD, 2021 & GHD, 2022), consisting of a concrete/rebar frame containing aggregate/stabilised sand. There is the potential for encountering additional redundant underground infrastructure as part of further earthworks and excavations on-site. <p>Recommendations</p> <ul style="list-style-type: none"> • For site preparation of the WRRF development, capping across the site involves some disturbance of shallow soils and potentially deeper soils (up to 1 m). Management of asbestos, contamination, acid sulfate soils should be captured under respective management plans, in addition to ongoing periodic groundwater and surface water quality monitoring for a minimum of 12 months. • Design of the WRRF may require the installation of deep foundations and/or services in contaminated materials present on site. Design considerations include minimisation of disturbance of known contaminated materials, selection of durable sub-surface materials used in the construction, design of subsurface structures to restrict/manage ingress and accumulation of groundwater/soil vapour, and concurrently preventing new contamination pathways (e.g. preferential soil vapour pathways) as practicably as possible. • During construction, implementation of the approved management plans and groundwater/surface water monitoring should also be undertaken. In addition, any materials excavated from the site which are surplus to construction require classification in accordance with the NSW EPA (2014) waste guidelines for off-site disposal to a licensed facility • • As part of operation of the WRRF, a long-term environmental management plan (LTEMP) will need to be implemented to manage any remaining contamination (including aesthetics and redundant below

Report	Outcomes
	<p>ground infrastructure) across the site during operations. The LTEMP should address the management of contamination during future intrusive works and any ongoing monitoring requirements.</p> <p>Based on this investigation, the majority of contamination identified is likely to be adequately managed by Sydney Water through the development and implementation of appropriate management plans. However, there is the potential for contaminated groundwater and/or vapour to migrate off-site across the southeastern boundary. It is recommended that additional groundwater, surface water and vapour monitoring be undertaken to further assess the potential migration of contamination across site boundaries, as well as potential further studies to quantify the actual risk. Following assessment of the results against the NSW EPA (2015) Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997, additional studies or remediation may be required if actual risks are identified.</p>
RIVER RELEASE PIPELINE (RRP) ALIGNMENT REPORTS	
<p>Jacobs (27 May 2025) Preliminary Site Investigation (PSI) – River Release Pipeline (Ref: IA319500-00-T-J-RPT-00-08 Version: 05)</p>	<p>This report provides the findings of a preliminary investigation associated with a desktop review for the RRP Alignment. The objectives of the report included:</p> <ul style="list-style-type: none"> • The identification of potential land contamination, based on a review of current and historical activities, within and/or adjoining the RRP alignment. • An indication of qualitative contamination risks in consideration of proposed alignment construction methodologies. • A preliminary conceptual site model (CSM) outlining potential risks which can be quantified by the development of an investigation program. <p>The scope of work included the:</p> <ul style="list-style-type: none"> • Review of information on environmental setting, including underlying soil types/geology, hydrogeological conditions, local topography (landform), drainage and surface waters. • Review of available hydrogeological information to identify the use and available groundwater quality information within the vicinity of the RRP alignment. • Review of available information to assess the historical uses and surrounding areas including historical aerial photography, regulatory notices and licences, State and Commonwealth Government databases and previous investigations. • A site inspection, including a site walk over to identify areas of potential contamination and evidence of current or former potentially contaminating activities. • Detail on the proposed construction methodologies. • Preparation of a PSI report incorporating the results of the desktop study and site inspection, detailing the potential contamination risks to site users or the environment in consideration of the proposed construction methodologies. <p>Key findings</p> <p>Known contamination is present within and/or adjacent the RRP alignment at the following locations:</p> <ul style="list-style-type: none"> • Area of Environmental Interest (AEI) AEI-001: Former refinery site, Camellia (within and adjacent to the RRP alignment) • AEI-002: Former landfill, Carnarvon Street (western end), Silverwater (adjacent to the RRP alignment) • AEI-003: Former commercial/industrial sites, Derby Street (east of Silverwater Road), Silverwater (adjacent to the RRP alignment) • AEI-004: Sydney Olympic Precinct lands associated with historical land uses including but not limited to brickworks, abattoirs, landfilling / land reclamation (within and adjacent to the RRP alignment) • AEI-005: Managed waste emplacements, Haslams Reach North Landfill and Woo-la-ra Landfill, Sydney Olympic Precinct (adjacent to the RRP alignment).

Report	Outcomes
	<p>Potential contamination that may be present within and/or adjacent the RRP alignment was identified at the following locations:</p> <ul style="list-style-type: none"> • AEI-006: Non-specific commercial / industrial land uses (historical and current), Silverwater (adjacent to the RRP alignment) • AEI-007: Former Armory, Newington (within and adjacent to the RRP alignment) • AEI-008: Non-specific commercial / industrial land uses (historical), Wentworth Point (adjacent to the RRP alignment) • AEI-009: Landfilling / land reclamation, Wentworth Point (within and adjacent to the RRP alignment) • AEI-010: Landfilling / land reclamation, Meadowbank Park (within and adjacent to the RRP alignment). <p>Other potential contamination / environmental risk areas on and/or adjacent to the RRP alignment include:</p> <ul style="list-style-type: none"> • AEI-011: Areas of disturbed terrain / anthropogenic deposits (within and adjacent to the RRP alignment) • AEI-012: Areas of Acid Sulfate Soils (ASS) (actual and/or potential) (within and adjacent to the RRP alignment). <p>In consideration of the known/potential contamination identified (i.e. AEIs) and the proposed construction methodologies, Jacobs' identified increased risk of contamination exposure associated with construction elements (CE) at 13 work sites along of the RRP alignment, however the nature of the increased risk was not fully outlined.</p>
<p>Jacobs (12 May 2025) Sampling Analysis and Quality Plan (SAQP) – River Release Pipeline (Ref: IA319500-00-T-J-RPT-00-10-03 Revision: 03)</p>	<p>This sampling analysis and quality plan (SAQP) memo outlines the proposed intrusive investigations along the proposed RRP alignment. The objectives of the intrusive works are to:</p> <ul style="list-style-type: none"> • Assess site contamination within the alignment to inform the design and construction of the RRP • Provide a preliminary waste classification to inform planning of waste management strategies • Obtain contamination data to inform the preparation of relevant contamination management plans and remediation action plans (where required) to reduce and/or remove the exposure risk from identified contamination to site users and receptors during construction. <p>The SAQP provides the following scope:</p> <ul style="list-style-type: none"> • The data quality objectives for the investigations • Areas that are to be investigated determined from the PSI (Jacobs, 2024) findings. • Media to be investigated (e.g. soil, groundwater, and ground gas) • Methodologies for sample collection. • The analytical schedule for collected samples • The procedures for data QA/QC and assessment of results. <p>The proposed investigation scope is summarised as follows:</p> <ul style="list-style-type: none"> • Sampling of soil (17 locations), groundwater (9 locations) and ground gas (9 locations) along targeted sections of the alignment. It is understood that most of the locations for soil and groundwater well sampling have been sampled/installed during the Geotechnical investigation that has been completed. • Selected samples from each media submitted for analysis for CoPC <ul style="list-style-type: none"> – Soil samples: Variably either TRH, BTEX, PAH, phenols, and heavy metals, PFAS, OCP, OPP, PCB, VCH, and Asbestos (AF/FA) and/or additional samples for ASS analysis: – Groundwater samples: TRH, BTEX, PAH, phenols, and heavy metals, PFAS, VOC, SVOC, and nutrients – Ground Gas: Methane, carbon dioxide, carbon monoxide, hydrogen sulphide, oxygen, balance, atmospheric pressure, differential pressure, flowrate

Report	Outcomes
	<ul style="list-style-type: none"> – QA/QC samples/analysis as required. • Comparison of field and analytical results against relevant human health, environmental and waste classification criteria. • Preparation of a report outlining field observations and results from the field and analytical program with a discussion and recommendations for additional investigations/preliminary waste classification.
<p>Jacobs (16 June 2025) Detailed Site Investigation (DSI) – River Release Pipeline Alignment (Ref: A319500-00-T-J-RPT-00-12Version: B)</p>	<p>The objectives of the RRP DSI include the following:</p> <ul style="list-style-type: none"> • Assess site contamination within the alignment to inform the design and construction of the RRP. • Provide a preliminary waste classification to inform planning of waste management strategies (should excess spoil generated during construction require offsite disposal). • Preliminary assessment of soils for potential re-use on-site. • Obtain the required contamination data to inform the preparation of relevant contamination management plans and remediation action plans (if required) to reduce and/or remove the exposure risk from identified contamination to site users and receptors during construction. <p>The scope of works involved:</p> <ul style="list-style-type: none"> • Soil sampling at 27 borehole locations advanced during the geotechnical investigation works (undertaken between October and November 2024) and supplementary surface soil sampling at 14 locations (28-29 April 2025) targeting various CE's and AEI's throughout the RRP alignment. • Analysis of selected samples for a range of contaminants including petroleum hydrocarbons, heavy metals, per- and poly-fluoroalkyl substances (PFAS), pesticides, poly-chlorinated biphenyls, volatile organic compounds (inc. chlorinated hydrocarbons), dioxins and asbestos. • Installation of groundwater monitoring wells at seven of the 27 borehole locations, which were advanced in the scope of the geotechnical investigation works. • Groundwater and ground gas monitoring of these seven monitoring wells. • Review and incorporation of the relevant (to the RRP alignment) soil, soil vapour, and groundwater data available from the Camellia WRRF DSI Report (Jacobs 2025c) into this report. • Preparation of the DSI report with reference to the relevant state and federal legislation and guidance and provision of advice regarding environmental management, further investigation, and remediation (where required). <p>Jacobs identified:</p> <ul style="list-style-type: none"> • Management of contaminated soils, hazardous ground gasses and soil vapour, acid sulfate soils, and groundwater will be required during construction to ensure no unacceptable health or ecological risks are generated during the pipeline construction. • While asbestos was identified in two locations during the DSI, given historical land uses along the alignment, excavated fill material is to be classified as Asbestos waste. Preliminary waste classification assessment identified a number of locations where materials are classified as restricted solid waste or hazardous waste. Further assessment of the surplus material will be required to confirm final waste classification prior to offsite disposal. • Jacobs noted that considering the scattered random nature of asbestos contamination in fill materials, the presence of asbestos in fill material within other areas of the alignment cannot be discounted • Management of acid sulfate soil (ASS) and potential ASS (PASS) will be required in parts of alignment both from a soil and dewatering (groundwater) aspect. • Groundwater may be encountered at vertical extent at all construction elements. Groundwater management planning would be required. • Ground gas results indicate there is a potential for landfill gas accumulation into access pits (inc. air valves, inspection shafts, gate valves or similar) that are planned in the design. Any excavation

Report	Outcomes
	<p>trenches or pits planned within and in the vicinity at the legacy landfill and disturbed terrain/anthropogenic deposit areas (inc. CE-002, CE-003, CE-007, CE-008, CE-009,) as well as the Camellia WRRF site (CE-001) would require the planning and application of appropriate construction occupational health and safety management measures (inc. breathing zone air monitoring and use of appropriate PPE by workers as required).</p> <p>Jacobs recommended the following:</p> <ul style="list-style-type: none"> • The following further investigations are required to supply the necessary information for the preparation of the respective management plans: <ul style="list-style-type: none"> – Soil, groundwater and vapour investigation targeting Derby Street (54-58 Derby Street and 103-105 Silverwater Road) and the construction elements (i.e. CE-004) in its vicinity – Further drilling, ASS field screening, ASS sampling and laboratory testing targeting areas where data gaps in ASS risk were identified. • Final waste classification sampling, testing and reporting will be required targeting materials scheduled to be taken off-site, in accordance with the NSW EPA Waste Classification Guidelines (2014) • Preparation of the following CEMP sub-plans: <ul style="list-style-type: none"> – ASS Management Plan (ASSMP) – WH&S requirements in the relevant subplan (incorporating relevant breathing zone air monitoring, respirator & filter requirements for workers targeting gases and vapours of concern identified in this DSI) – Asbestos Management Plan (AMP). The AMP shall address the asbestos in soil contamination risk in fill material along the entire alignment. Further sampling may be undertaken to delineate areas (if possible) that require Class-A asbestos removal controls – Groundwater Dewatering Management Plan (GDMP) – Contamination Management Plan (CMP) – Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP). • Post-construction access pit ground gas monitoring throughout the alignment. Should results indicate hazardous gas accumulation in pits, any potential OHS risks to maintenance workers (and mitigation measures) should be captured in Sydney Water's operational procedures.
BRINE AND INFLUENT PIPELINE (BIP) ALIGNMENT REPORTS	
<p>Jacobs (6 April 2025) Preliminary Site Investigation (PSI) – Brine and Influent Pipelines (Ref: IN.20037236 - 12750-0007 Version: 03)</p>	<p>This report provides the findings of a preliminary investigation associated with a desktop review for the BIP Alignment. The objectives of the PSI include the following:</p> <ul style="list-style-type: none"> • To identify and document the potential for land contamination, based on a review of current and historical activities undertaken within and/or adjoining the BIP alignment. • Provide an indication of 'qualitative' contamination risks in consideration of the proposed construction methodologies. • Develop a preliminary conceptual site model (CSM) outlining potential risks which can be quantified with further investigation. <p>The scope of work included the:</p> <ul style="list-style-type: none"> • Review of information to assess the environmental setting for the BIP alignment, including underlying soil and geology, hydrogeological conditions, local topography, drainage and surface waters. • Review of available hydrogeological information to identify the use and available information on groundwater quality within the vicinity of the BIP alignment. • Review of historical uses along the alignment and surrounding areas including historical aerial photography, regulatory notices and licences, state and commonwealth government databases and any available, previous investigations.

Report	Outcomes
	<ul style="list-style-type: none"> • Completion of a site inspection, including a site walk over to identify areas of potential contamination and evidence of current or former potentially contaminating activities. • Define proposed construction methodologies. • Preparation of a PSI report incorporating the results of the desktop study and site inspection and detailing the potential contamination risks to site users or the environment in consideration of the proposed construction methodologies. <p>Key findings</p> <p>Jacobs identified the following Areas of Environmental Interest (AEI) with known contamination within and/or adjacent to the BIP alignment that may pose a potential contamination risk (qualitative) during the construction:</p> <ul style="list-style-type: none"> • AEI-001: Former oil refinery site, Camellia (proposed WRRF). Known soil, groundwater and vapour contamination (impacted by hydrocarbons, BaP, heavy metals and asbestos and ASS). • AEI-006: SP0067, Grand Avenue Rosehill (within the BIP alignment). Known soil contamination (friable asbestos, hydrocarbon odour). <p>AEIs with potential contamination exposure risk during construction include:</p> <ul style="list-style-type: none"> • AEI-010: Service stations, James Ruse Drive Rosehill (adjacent to the BIP alignment). Potential soil (heavy metals, TRH, BTEX), groundwater (heavy metals, TRH, BTEX) and vapour (hydrocarbons) contamination. • AEI-012: Non-specific commercial / industrial land uses (historical and current), Camellia, Clyde and Rosehill (adjacent to the BIP alignment). Potential soil (heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB, phenols, PFAS, VCH, asbestos), groundwater (heavy metals, TRH, BTEX, PAH, PFAS, VCH, nutrients) and vapour (hydrocarbons and VOC) contamination. <p>Others (AEI-002, 004, 005, 007, 008, 009, 011) were discounted and considered unlikely to represent a contamination exposure risk given the contaminant media, location relative to the BIP alignment and intended construction methodologies.</p> <p>Other potential contamination / environmental risk areas on and/or adjacent to the BIP alignment which may represent a contamination exposure risk during construction include:</p> <ul style="list-style-type: none"> • AEI-013: Areas of disturbed terrain / anthropogenic deposits (disturbed terrain within the entire length of the BIP alignment, anthropogenic deposits within the southern end of BIP alignment adjacent to the Camellia WRRF). Potential soil (heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB, phenols, PFAS, VCH, and VOC) contamination • AEI-014: Areas of Acid Sulfate Soils (ASS) (known to be present beneath the Camellia WRRF). <p>Jacobs' identified increased risk of contamination exposure associated with construction elements (CE) at 3 work sites along of the BIP alignment, however the nature of the increased risk was not fully outlined. These work sites were noted to be:</p> <ul style="list-style-type: none"> • CE-001: Excavation of HDD within the WRRF Camellia site • CE-002: Excavation of HDD within the Rosehill Racecourse car park area • CE-003: Open trenching from Rosehill Racecourse car park area to SP0067. <p>To quantify potential contamination risks associated with construction of the BIP alignment, the following is recommended:</p> <ul style="list-style-type: none"> • Prepare a Sampling, Analysis and Quality Plan (SAQP). The SAQP would guide investigations to assess the preliminary conceptual site model and to quantify potential contamination risks and to inform a preliminary waste classification. • Undertake site investigations in accordance with the SAQP. The results of the investigation would be used to assess the presence of contamination within the BIP alignment and provide a preliminary waste classification. Based on the results of the investigation and where contamination is identified,

Report	Outcomes
	<p>management and mitigation measures can be implemented to reduce and/or remove the exposure risk from identified contamination to site users and receptors during construction</p>
<p>Jacobs (7 May 2025) Sampling Analysis and Quality Plan (SAQP) – Brine and Influent Pipelines, (Ref: IA319500-00-T-J-RPT-14-02 Revision: 02)</p>	<p>The objectives of the BIP SAQP include the following:</p> <ul style="list-style-type: none"> • To assess site contamination within the alignment to inform the design and construction of the BIP. • Provide a preliminary waste classification to inform waste management strategies (should excess spoil generated during construction require off-site disposal). • Obtain contamination data to inform the preparation of contamination management plans and remediation action plans (if required) to reduce and/or remove the exposure risk to site users and receptors during construction. <p>The SAQP outlines:</p> <ul style="list-style-type: none"> • The data quality objectives for the investigations • Identification of areas to be investigated • The scope of investigation to be completed (e.g. soil and groundwater) • The analytical schedule for samples to be collected • The procedures for: <ul style="list-style-type: none"> – Sample collection – Storage and disposal of excess soil, and groundwater – Quality assurance and quality control of data – Managing and evaluating data <p>Proposed SAQP Scope:</p> <p>Jacobs identified the following AEI with known contamination within and/or adjacent to the BIP alignment that may pose a potential contamination risk (qualitative) during the construction:</p> <ul style="list-style-type: none"> • AEI-001: Former oil refinery site, Camellia (proposed WRRF). Known soil, groundwater and vapour contamination (impacted by hydrocarbons, BaP, heavy metals and asbestos and ASS). • AEI-006: SP0067, Grand Avenue Rosehill (within the BIP alignment). Known soil contamination (friable asbestos, hydrocarbon odour). <p>AEIs with potential contamination risks during construction include:</p> <ul style="list-style-type: none"> • AEI-010: Service stations, on James Ruse Drive, Rosehill (adjacent to the BIP alignment). • AEI-012: Non-specific commercial / industrial land uses (historical and current), Camellia, Clyde and Rosehill (adjacent to the BIP alignment). • AEI-013: Areas of disturbed terrain / anthropogenic deposits (disturbed terrain within the entire length of the BIP alignment, anthropogenic deposits within the southern end of BIP alignment adjacent to the Camellia WRRF) • AEI-014: Areas of Acid Sulfate Soils (ASS) (southern end of BIP alignment in the vicinity of Duck River). <p>Jacobs identified an increased risk of contamination exposure associated with construction elements (CE) at 3 work sites along of the BIP alignment, however the nature of the increased risk was not fully outlined. These work sites include:</p> <ul style="list-style-type: none"> • CE-001: Excavation of HDD within the WRRF Camellia site • CE-002: Excavation of HDD within the Rosehill Racecourse car park area • CE-003: Open trenching from Rosehill Racecourse car park area to SP0067. <p>Jacobs noted the depth of the HDD beneath Rosehill Racecourse to be at a maximum depth of approximately 50mbgl, and contamination was unlikely due to spatial separation from (any) soil and groundwater impact, as well as the age of the racecourse (in operation since < 1930 indicating industrial activities were unlikely).</p>

Report	Outcomes
	<p>In consideration of the previous investigations undertaken and an understanding of the proposed construction of the BIP alignment, following data gaps have been identified:</p> <ul style="list-style-type: none"> Contamination status and waste classification of the spoil to be generated during excavation for selected construction elements including HDD excavation (CE-002) and trenching activities (CE-003) is unknown and requires further assessment. Groundwater levels and quality to inform dewatering (if required) for selected construction elements (CE-002 and CE-003) involving HDD excavation and trenching activities is unknown and requires further assessment. <p>The proposed works will include the drilling of two boreholes (to a maximum depth of 3.44 m bgl), with soil samples analysed for Heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB, phenols, PFAS, VCH (CE-002 only), asbestos, ASS (CE-002 and CE-003). the installation of one groundwater well in the above soil sampling location for CE-002 and resampling of one well at the CE-003 for, both wells sampled and analysed for heavy metals, TRH, BTEX, PAH, PFAS, VCH, nutrients.</p>
<p>Jacobs (5 August 2025) Detailed Site Investigation (DSI) – Brine and Influent Pipeline Alignment, (Ref: A319500-00-T-J-RPT-00-17 Version: 02)</p>	<p>The objectives of the BIP DSI include the following:</p> <ul style="list-style-type: none"> Assess contamination within the alignment to inform the design and construction of the BIP. Provide a preliminary waste classification to inform waste management strategies (should excess spoil generated during construction require off-site disposal). Obtain contamination data to inform the preparation of contamination management plans and remediation action plans (if required) to reduce and/or remove the exposure risk to site users and receptors during construction. <p>The scope of works involved:</p> <ul style="list-style-type: none"> Review and incorporation of the environmental data relevant to the BIP alignment collected as part of the previous investigations, including the Camellia WRRF DSI (Jacobs 2025a) and SP0067 Pump Station Contamination Investigation and Waste Classification (Jacobs 2024) Soil sampling at two borehole locations targeting an open trench and an under bore / horizontal directional drilling (HDD) launch and retrieval pit targeting specific CE's within and between the Rosehill Racecourse Overflow Carpark and SP0067 Conversion of one borehole within the Rosehill Racecourse Overflow Carpark into a groundwater monitoring well and undertaking one round of groundwater monitoring Analysis of selected soil samples for a range of contaminant compounds including TRH, heavy metals, PFAS, pesticides, PCBs, COCs, and asbestos Analysis of the collected groundwater sample for a range of contaminants including TRH, heavy metals, PFAS, VOCs and nutrients <p>Jacobs identified:</p> <ul style="list-style-type: none"> Friable asbestos in fill material was detected at some locations along the alignment, at concentrations exceeding adopted criteria of HSL-D. Detection of other contaminants were mainly noted as an ecological risk, which would require environmental management. A dewatering management plan would be required if dewatering occurred during construction work. Data indicated evidence of acid sulfate soil (ASS) in deeper natural soils, particularly near CE-001 at 11-11.5mbgl. However based on the limited data set, the areas is within a Class 4 ASS risk area, and potential ASS risk is to be managed for any materials disturbed >1.5m bgl. Soil vapour data near CE-001, were below the respective HIL and HSL. <p>Jacobs recommended the following:</p> <ul style="list-style-type: none"> Further ASS sampling at CE-002 and CE-003 Preparation of relevant management plans

Report	Outcomes
	<ul style="list-style-type: none"> Final waste classification assessment prior to offsite disposal Any changes to the proposed alignment (lateral and vertical) will require further assessment to confirm whether other/additional management controls are required, as well as to provide additional data to facilitate material disposal.
CAMELLIA PUMPING STATION TO NSOOS ALIGNMENT REPORT	
<p>GHD Pty LTD (30 September 2025) Desk Top Study – Camellia Pumping Station to NSOOS Greater Parramatta, Olympic Peninsula Water Cycle Management (Ref: 12673348_Desk top study_GPOP_SP to NSOOS_Draft Rev A)</p>	<p>The objectives of the report were to:</p> <ul style="list-style-type: none"> Assess the likelihood of contamination resulting from past or present activities within or near the Project area; and Provide Sydney Water with an understanding of contamination. <p>The scope of the desktop study included:</p> <ul style="list-style-type: none"> A desktop review and site history appraisal to identify potential Areas of Concern (AOC) and contaminants of potential concern (CoPC) by conducting historical searches and review of publicly available information: Published information including geology, topography, acid sulfate soils, and soil landscape maps Selected historical aerial photographs for the site and surrounding areas NSW EPA public records for the site Identification of nearby registered bores A review of previous environmental report relating to the site, provided by Sydney Water. A site inspection, to visually assess evidence of potentially contaminating activities both on and adjoining sites, and identify nearby sensitive receptors <p>Based on the desktop review the following key findings were identified:</p> <ul style="list-style-type: none"> To the north of the Parramatta River, the site is located in the WSU campus and extends to the residential areas near Kissing Point Road. Historically, the land use in this area comprised of bushland, agricultural and residential purposes. Further east of the site within WSU campus, the land has been used for agricultural/open space purposes and transitioning into a combination of residential, commercial and light/heavy industrial, the latter occupying land from Victoria Road to the Parramatta River. The land to the immediate south of the Parramatta River, is a Sydney Water asset (Asset ID LT001546, LT001571) and has been identified to be impacted by asbestos at levels above the human health criteria for commercial/industrial use; and lead at concentrations which will deem the material to be hazardous waste for offsite disposal. Camellia pumping station has been present since at least 1943 with the existing pipelines also visible traversing the Parramatta River. The surrounding land use at Camellia has been predominantly industrial, including the James Hardie factory located directly to the west of the site, with increased construction of industrial facilities over time. Acid sulfate soils are likely to be present in the Camellia area and in the lower portion of site at WSU campus. <p>A review of the NSW EPA Database identified five premises within 500m of the project footprint that have been notified to the NSW EPA. The premises and distance relative to the site were as follow:</p> <ul style="list-style-type: none"> James Hardie Factory, located 140m south east. Ongoing maintenance required to manage residual contamination (CLM Act). Rheem Australia, located 190m east. Contamination currently regulated under the CLM Act. United Petroleum Service Station, located 270m east. Regulation under CLM Act not required. BP Service Stations, located 340m east. Regulation under CLM Act not required. Council Reserve, located 360m east. Regulation under CLM Act not required.

Report	Outcomes
	<p>Other key findings for the desktop review were as follows:</p> <ul style="list-style-type: none"> • There was one land parcel within 500 m of the project footprint that has been subject to current of prior notice. The premise identified was the James Hardie Factory which is located 140m south east of the site. • Four premises within 500m of the site were identified to have a current EPL licence under the POEO Act (1997). Out of the four licences, two related to the contamination soil treatment onsite and adjacent to the site from Camellia Pumping Station to Parramatta River, and the other two related to metal waste generation/processing (Rheem Australia: 190m east of the site) and the railway infrastructure construction. • Other premises were identified to have held former EPL licences were identified but these were noted to be hydraulically downgradient and at a sufficient distance from the site, and as such unlikely to present a contamination risk to the site. • There are four fuel service stations located within 500 m of the site, however, these were considered to be a sufficient distance and hydraulically cross-gradient from the site so as not to present a contamination risk. • The EPA searches did not identify any former gasworks sites or PFAS investigation program within closer proximity to the site. <p>Overall, the desktop data indicated that the highest risk of contamination being encountered is across the southern portion of the site (i.e. area to the south of Parramatta River) and within immediate vicinity of the Camellia pumping station.</p> <p>In consideration with the key findings the following recommendations were made:</p> <ul style="list-style-type: none"> • If construction works involve excavations at the southern section of the site, these should be undertaken in accordance with existing management plans where they exist. • Where management plans do not exist these should be prepared as part of a Construction Environmental Management Plan (CEMP) and associated sub-plans (i.e., Soil and Water Management Plan, Contamination Management Plan) to provide a framework to manage the potential for exposure of contaminants, particularly asbestos, to construction workers. • Investigate the area in the vicinity of Camellia pumping station and the access road towards the Sydney Water asset to the north to assess for the presence of contamination in soils and groundwater ahead of construction of the proposed infrastructure.

Appendix B

Site assessment criteria

The analytical testing undertaken as part of the DSIs on the three segments of the project was compared against a set of health and ecological investigation levels referred to as the site assessment criteria (SAC). The SAC adopted was selected based on the land use and surrounding receptors. These are commercial/industrial land users, construction workers, operational staff, and off-site users and receptors of surrounding water bodies.

The NEPM (2013) outlines a tiered approach for the assessment of human health and ecological risks associated with contaminated sites. Three tiers are defined as:

- Tier 1 (or screening level) assessment is the first stage of assessment at the site. It includes a comparison of known site data with published risk-based guidance levels. The assessment provides an initial screening of the data to determine whether further assessment is required. Exceedance of Tier 1 criteria is generally used to define the contaminants that require more detailed assessment at Tier 2.
- Tier 2 assessment is typically required when one or more contaminants are present at the site at levels that exceed Tier 1 guidance criteria, if there are no appropriate Tier 1 criteria, or if there are unresolved and significant uncertainties (limiting the reliability of the assessment conducted) identified in the Tier 1 assessment. Exceedance of the Tier 2 criteria triggers a Tier 3 risk assessment.
- Tier 3 assessment may be required where exceedance of Tier 2 site-specific risk-based criteria is judged to represent a potentially unacceptable risk to human health. The Tier 3 assessment typically focuses on the risk-driving contaminants in more detail, although studies aimed at reducing the uncertainties inherent in the modelling of exposure pathways are also common at Tier 3.

For the DSIs, the sample analytical results have been screened against Tier 1 criteria to provide an initial screen of risk to human health or ecological receptors. Where results exceed the investigation Tier 1 criteria, further assessment may be required to determine the potential for unacceptable risks to the relevant receptor (i.e. Tier 2 or 3 assessment). A summary of the adopted criteria are summarised below.

Adopted SAC for the project

Criteria	Purpose/media
Human health	
Human health screening criteria, NEPM Human health investigation levels (HIL) D, human health screening levels (HSL) D: commercial/industrial land use scenario.	Screening for human health risk from soil, soil vapour and asbestos contamination.
CRC CARE Soil HSLs for: <ul style="list-style-type: none"> – Direct Contact – HSL D commercial/industrial – Direct Contact – Intrusive Maintenance Workers (CRC CARE) – Vapour intrusion – Intrusive Maintenance Workers (Shallow Trench) (CRC CARE). 	Screening for human health risk from soil hydrocarbon contamination.
NEPM Management Limits for TPH fraction F1-F4 for commercial and industrial.	Screening for other adverse effects of TPH contamination, such as aesthetic considerations from soil hydrocarbon contamination.
PFAS NEMP (HEPA 2020) – HIL D – commercial/industrial	Screening for human health risk from soil.
USEPA regionals screening levels were used when no Australia values were provided in the NEPM (2013). Long term screening effects levels were adopted with an attenuation factor applied.	Screening for human health risk from soil vapour.
NSW EPA (2014) Waste classification guidelines of soil for potential off-site disposal.	Classification of soil for off-site disposal.
NSW EPA (2020) Assessment and management of hazardous ground gases – methane.	Exposure limits for ground gases.
The NEPM (2013) endorses the use of the Guidelines for Managing Risks in Recreational Waters (NHMRC, 2008). These guidelines recommend applying a multiplication factor of ten to the health-based guideline values from the Australian Drinking Water Guidelines (NHMRC, 2004) in order to assess the acceptability of recreational water quality. The current version of the Australian Drinking Water	Screening for human health risk groundwater and surface water.

Criteria	Purpose/media
<p>Guidelines is NHMRC (2011), Version 3.8 updated September 2022 (NHMRC, 2022). Subsequently, the DSIs adopted the most recent health-based guideline values provided in the NHMRC (2022).</p> <p>Where no guidelines levels were available for analytes, the ANZECC (2000) Recreational water quality and Aesthetic Guidelines were adopted.</p>	
<p>Human health screening criteria , NEPM HSL D: commercial/industrial for shallow groundwater at a depth of 2 m to <8 m have been adopted. Clay is the dominate soil type at the site and has been adopted in the selection of the appropriate HSL criteria.</p>	<p>Screening for human health risk for groundwater and surface water.</p>
<p>PFAS NEMP (HEPA 2020) – recreational screening levels.</p>	<p>Screening for human health risk for groundwater and surface water.</p>
<p>CRC CARE Soil HSLs for intrusive maintenance workers.</p>	<p>Screening for human health risk for hydrocarbons in groundwater</p>
Ecological	
<p>NEPM (2013) ecological investigation levels (EILs) and ecological screening levels (ESLs) potential risk to terrestrial ecosystems. The commercial/industrial land use were adopted. Site specific EILs were developed using the ASC NEPM toolbox.</p>	<p>Screening for ecological risk from soil contamination.</p>
<p>NEMP (HEPA 2020) for ecological protection for both direct and indirect exposure. The guidelines applies to all land uses including commercial/industrial.</p>	<p>Screening for ecological risk from soil contamination.</p>
<p>ANZG (2018) – 95% marine water. Where the guideline does not provide criteria for an analyte or the guideline considers the 95% protection level is inappropriate, EILs were sourced from:</p> <ul style="list-style-type: none"> – The 99% protection levels given in the guidelines for contaminants considered to be bioaccumulative (e.g., cadmium, mercury, nickel). – NEPC (2013) groundwater investigation levels – The ANZG (2018) guidelines do not provide criteria for TPH (C10 – C36). For this analyte, the Dutch Intervention Guideline (RIVM, 2000) for mineral oil (600 ug/L) were adopted. 	<p>Screening for ecological risk from groundwater and surface water contamination.</p>
<p>NEMP (HEPA 2020), the 99% species protection values for PFAS were adopted as the investigation criteria for surface water ecological protection direct toxicity because it is bioaccumulative.</p>	<p>Screening for ecological risk from groundwater and surface water contamination.</p>
<p>Sediment quality guidelines by Manning and Batley (2022) were applied to dioxin-like compounds. The ANZECC (2000) and Simpsons et al (2016) were applied to other organic and metallic contaminants.</p>	<p>Screening for ecological risk from sediment contamination in the Parramatta River.</p>

Appendix C

Photographic record

GPOP Soils and Contamination

Site inspection



Photo 1 View north east from WRRF site



Photo 2 View south west across WRRF site towards Duck Creek



Photo 3 View south from the WRRF site towards 'Southern Buried Waste Area'.



Photo 4 View north from WRRF site.

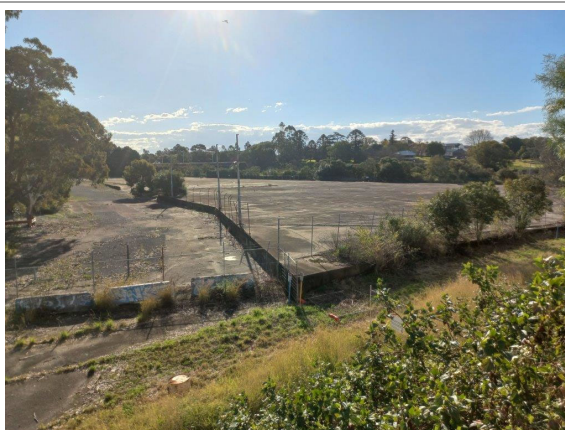


Photo 5 View west from Parramatta Light Rail bridge at north Camellia, foreground shows project footprint.



Photo 6 View south west from Parramatta Light Rail bridge at north Camellia, foreground shows project footprint – asphalt roadway.

Site inspection



Photo 7 View east along Carnarvon Street, Silverwater, MET Recycling on the right hand side.



Photo 8 Monitoring wells at western end of Carnarvon Street, outside MET Recycling (project footprint).



Photo 9 View south along Day Street North, Silverwater (project footprint).



Photo 10 View north towards Fariola Street on Day Street North, Silverwater (project footprint).



Photo 11 Foundry located at junction of Day Street North and Fariola Street, Silverwater.



Photo 12 Smash repair and mechanics on Day Street North, Silverwater, view west.

Site inspection



Photo 13 View east from junction of Day Street North and Fariola Street, Silverwater. View is towards Newington.



Photo 14 View north across car park to the south of Urbansurf recreational facility, Sydney Olympic Park. The car park forms part of the project footprint.



Photo 15 View south west along Hill Road at Urbansurf, Sydney Olympic Park (project footprint).



Photo 16 View north across car park to the north of Urbansurf recreational facility, Sydney Olympic Park. The car park forms part of the project footprint.



Photo 17 View north east across grassed area, north of car park at Urbansurf. Project footprint extends across this park.



Photo 18 View south west from car park off Hill Road, Wentworth Point, close to junction with Bennelong Parkway.

Site inspection



Photo 19 View north east from car park off Hill Road, Wentworth Point, close to junction with Bennelong Parkway.



Photo 20 View north east on Hill Road, residential land use on eastern side.



Photo 21 View west off Hill Road, Wentworth Point, Woo-la-ra landfill in the background.



Photo 22 Typical configuration along strip of land between Woo-la-ra landfill and Hill Road, Wentworth Point.



Photo 23 View east opposite Footbridge Street, Wentworth Point, 2 x monitoring wells on verge of Hill Road.



Photo 24 View east across former substation off Hill Road, stockpiles and monitoring wells present across this site.

Site inspection



Photo 25 View north east towards end of Hill Road at Parramatta River (project footprint).

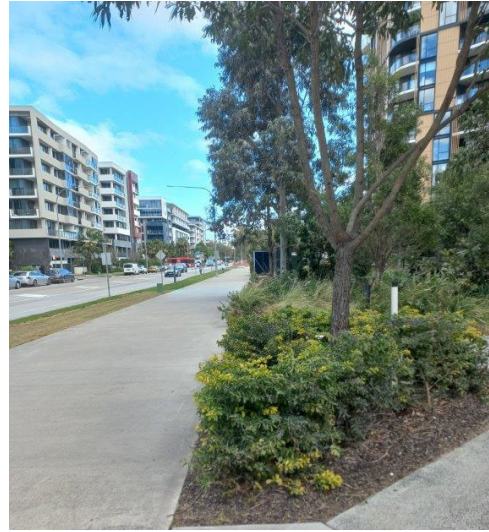


Photo 26 View south west at 16 Hill Road, Wentworth Point, with gas monitoring well visible adjacent to tree in foreground

Appendix D

Data sources

Data sources used to inform this report

Reference	Title	Scope	Document No	Date of Issue
Jacobs (2024a)	Greater Parramatta and Olympic Peninsula (GPOP) Project – WRRF Camellia – Detailed Site Investigation Report	<p>Sydney Water engaged Jacobs to undertake a DSI at Camellia WRRF. The general objectives of the DSI were to undertake intrusive sampling to provide further understanding of the contamination status in soil and groundwater at the site, and characterise any risks to current and future on- and off-site receptors. The DSI included sampling of:</p> <ul style="list-style-type: none"> – Soil – 37 test pits, 16 boreholes. – Soil vapour – 9 vapour probes. – Groundwater – 18 locations. – Surface water – two locations. – Ground gas – 18 locations. 	IA319500-00-T-J-RPT-00-01 Version D	21 January 2025
Jacobs (2025c)	Greater Parramatta and Olympic Peninsula (GPOP) Project – Brine and Influent Pipelines – Preliminary Site Investigation Report	<p>Sydney Water was engaged by Jacobs to undertake a PSI for the Brine and Transfer⁹ pipelines located between the Camellia WRRF and Sewage Pumping Station SP0067 at Rosehill. The PSI included:</p> <ul style="list-style-type: none"> – Review of environmental setting information and available hydrogeological information. – Review of historical information sources, aerial photography, state and commonwealth regulatory databases, and previous reports. – Completion of a site inspection and walkover. 	IA319500-00-T-J-RPT-00-13	16 April 2025
Jacobs (2025d)	Greater Parramatta and Olympic Peninsula (GPOP) Project - Detailed Site Investigation – Brine and Influent Pipeline Alignment	<p>Sydney Water was engaged by Jacobs to undertake a DSI for the Brine and Transfer pipelines located between the Camellia WRRF and sewage pumping station SP0067 at Rosehill. The general objectives of the DSI were to assess site contamination within the alignment, assess potential exposure to contamination during construction, and to provide recommendations for control measures (if required) during construction. The DSI included sampling of:</p> <ul style="list-style-type: none"> – Soil – two boreholes – Soil vapour – (utilising results from one vapour probe sampled for the WRRF DSI (Jacobs 2024a). – Groundwater – one location, and incorporation of results from the WRRF DSI at two locations (Jacobs 2024a). 	IA319500-00-T-J-RPT-00-17	17 April 2025

⁹ The pipeline has since changed from Influent to Transfer pipelines.

Reference	Title	Scope	Document No	Date of Issue
Jacobs (2025f)	Greater Parramatta and Olympic Peninsula (GPOP) Project – Groundwater Monitoring and Management Plan for WRRF Capping	Jacobs was engaged by Sydney Water to provide a groundwater monitoring and management plan for capping layer construction works undertaken at the Camellia WRRF. The plan included measures to protect the existing well network, repair damaged wells, and monitor groundwater levels.	IA319500-00-T-J-RPT-00-04	24 April 2025
Jacobs (2025h)	Greater Parramatta and Olympic Peninsula (GPOP) Project – River Release Pipeline – Preliminary Site Investigation Report	Jacobs was engaged by Sydney Water to undertake a PSI for the River Release Pipeline alignment located between the Camellia WRRF and the Parramatta River at Meadowbank. The PSI included: <ul style="list-style-type: none"> – Review of environmental setting information and available hydrogeological information. – Review of historical information sources, aerial photography, state and commonwealth regulatory databases, and previous reports. – Completion of a site inspection and walkover. 	IA319500-00-T-J-RPT-00-08	27 May 2025
Jacobs (2025i)	Greater Parramatta and Olympic Peninsula (GPOP) Project – Detailed Site Investigation – River Release Pipeline Alignment	Jacobs was engaged by Sydney Water to undertake a DSI for the River Release Pipeline alignment located between the Camellia WRRF and the Parramatta River at Meadowbank. The general objectives of the DSI were to assess site contamination within the alignment, assess potential exposure to contamination during construction, and to provide recommendations for control measures (if required) during construction. The DSI included sampling of: <ul style="list-style-type: none"> – Soil – 27 boreholes and 14 surface samples. – Groundwater – installation and sampling of seven groundwater wells. – Ground gas – sampling at seven of the groundwater wells and two miscellaneous wells found during the investigation. 	IA319500-00-T-J-RPT-00-12	16 June 2025
AAJV 2016	Wentworth Point – Concept Design Geotechnical and Environmental Investigation Report	Sydney Water engaged AAJV to undertake a combined geotechnical and contamination investigation. The investigation was undertaken to assist with a concept design for a water trunk main to service the WWP precinct. The investigation included drilling and sampling of boreholes for geotechnical and contamination purposes to a depth of 2 mbgl.	AAJV-233727-396-Geo	16 September 2016



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