



Surface Water Monitoring Program

SMWSTCTP-AFJ-1NL-PE-PRG-000001 Revision 02

Sydney Metro West – Central Tunnelling Package



DOCUMENT APPROVAL

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Date:	01/10/21	01/10/21	01/10/21

REVISION HISTORY

Rev:	Date:	Pages:	By:	Description:
00	18/08/21	All	EW	For internal review
01	01/10/21	All	EW	For submission to Sydney Metro
02	25/10/21	All	EW	Response to comments

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1. INTRODUCTION

1.1 BACKGROUND

Sydney Metro is Australia's biggest public transport program. Services on the North West Metro Line between Rouse Hill and Chatswood started in May 2019. The Sydney Metro network also includes Sydney Metro City & Southwest, Sydney Metro West and Sydney Metro Western Sydney Airport.

Sydney Metro West is a new 24 kilometre metro line between Westmead and the Sydney CBD. This infrastructure investment will double the rail capacity of the Greater Parramatta to Sydney CBD corridor with a travel time target between the two centres of about 20 minutes.

The planning approvals and environmental impact assessment for Sydney Metro West has been split into a number of stages recognising the size of the project. This includes:

- Stage 1 – Concept and all major civil construction works including station excavation and tunnelling between Westmead and The Bays. Planning approval for this stage was granted in March 2021.
- Stage 2 – All major civil construction works including station excavation and tunnelling from The Bays to Sydney CBD
- Stage 3 – Tunnel fit-out, construction of stations, ancillary facilities and station precincts, and operation and maintenance of the Sydney Metro West line

An Environmental Impact Statement (EIS) (Jacobs/Arcadis, 2020) for the Concept and Stage 1 (herein referred to as the Project) assessed the soil and surface water quality impacts in response to the Secretary's Environmental Assessment Requirements issued by the Department of Planning, Industry and Environment (DPIE). The soil and surface water quality impact assessment is included in Chapter 19 and Technical Paper 10 of the EIS. The Project was approved on 11 March 2021 (SSI 10038). An administrative modification (Modification 1) was approved on 28 July 2021.

1.2 SCOPE

The Surface Water Monitoring Program will be appended to the Soil and Water Management Plan (SWMP) which forms part of the Project Construction Environmental Management Plan (CEMP). This Program outlines how Acciona Ferrovial Joint Venture (AFJV) will comply with and implement the applicable environmental requirements for the Central Tunnelling Package (CTP) to monitor the construction surface water impacts during construction of the CTP civils construction phase B1 (in accordance with the Sydney Metro Phasing Report).

This FFMP outlines how AFJV will comply with and implement the applicable elements from the following documents, collectively referred to herein as the 'Project requirements':

- NSW Minister for Planning and Public Spaces Conditions of Approval (CoA)
- Revised Environmental Mitigation Measures (REMMs) and the
- Sydney Metro Construction Environmental Management Framework (CEMF)

1.3 OBJECTIVES

This Program will be utilised to define, address, and implement surface water quality monitoring requirements and will apply for the duration of construction.

This Program outlines how AFJV will comply with and implement the applicable elements of the following documents, collectively referred to herein as the 'Project requirements' for the CTP:

- The CoA (issued on 11 March 2021 and as modified on 29 July 2021)
- The Project EIS, Submissions Report and Amendment Report
- Sydney Metro Construction Environmental Management Framework (CEMF).

2. LEGAL AND OTHER REQUIREMENTS

2.1 RELEVANT LEGISLATIONS AND GUIDELINES

The legislation relevant to the SWMP and this program is listed in Section 3 of the SWMP.

Guidelines and standards specifically relating to this monitoring program include:

- ANZG (2018). Australian and New Zealand Guidelines for Fresh and Marine Water Quality (known as 'ANZG Guidelines'),
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000),
- Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (2004),

2.2 PROJECT REQUIREMENTS

The Project Requirements relevant to the development of this Surface Water Monitoring Program are listed in Table 2-1.

There are no specific CEMF requirements that pertain to the development or implementation of a Surface Water Monitoring Program, and in particular, the monitoring of surrounding waterways. Monitoring of surface water discharge is outlined in the SWMP and discussed throughout this program. Some of the CEMF requirements have been included as they partially relate to general monitoring related to soil and water management.

TABLE 2-1 PROJECT REQUIREMENTS

Project Planning Approval		
C14	The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each to compare actual performance of construction of Stage 1 of the CSSI against the performance predicted in the documents listed in Condition A1 of this schedule or in the CEMP: (c) Surface water quality Consultation with: DPIE Water, Relevant Councils and Sydney Water (if any Sydney Water assets are impacted)	This plan
C15	Each Construction Monitoring Program must provide:	Section 4.3
	(a) details of baseline data available including the period of baseline monitoring;	
	(b) details of baseline data to be obtained and when;	Section 4.3
	(c) details of all monitoring of the project to be undertaken	Section 6

Project Planning Approval		
	(d) the parameters of the project to be monitored;	Section 6.2
	(e) the frequency of monitoring to be undertaken;	Section 6.2
	(f) the location of monitoring;	Section 6.1
	(g) the reporting of monitoring results and analysis results against relevant criteria;	Section 6.6
	(h) details of the methods that will be used to analyse the monitoring data;	Section 6.5
	(i) procedures to identify and implement additional mitigation measures where the results of the monitoring indicated unacceptable project impacts;	Section 6.7
	(j) a consideration of SMART principles; and	Section 7
	(k) any consultation to be undertaken in relation to the monitoring programs; and	Section 3.1
	(l) any specific requirements as required by Conditions C16 to C17 of this schedule.	n/a
D117	Stage 1 of the CSSI must be designed and constructed so as to maintain the NSW Water Quality Objectives (NSW WQO) where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW WQO over time where they are not being achieved as at the date of this approval, unless an EPL in force in respect of the CSSI contains different requirements in relation to the NSW WQO, in which case those requirements must be complied with.	Section 2.1 Section 4.2 Section 6
SSWQ6	<p>A surface water monitoring program would be implemented to observe any changes in surface water quality that may be attributable to Stage 1 and inform appropriate management responses.</p> <p>The program would be developed in consultation with the EPA and relevant Councils. The program would consider monitoring being undertaken as part of other infrastructure projects such as the WestConnex M4 East monitoring.</p> <p>Monitoring would occur during pre-construction and during construction at all waterways with the potential to be impacted. Monitoring sites could be located upstream and downstream of the potential discharges and would include sampling for key indicators of concern.</p>	This plan
CEMF		
12(a) vii	A description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be undertaken, the	SWMP Section 6.6

Project Planning Approval

locations where monitoring would take place, how the results of the monitoring would be recorded and reported, and, if any	Section 8
exceedance of the criteria is detected how any non-compliance can be rectified.	Section 11

2.3 ENVIRONMENTAL PROTECTION LICENCE

An Environmental Protection Licence (EPL) will be required for the CTP. Once any EPL conditions relevant to surface water monitoring have been finalised, a review of this Program will be undertaken and the document updated as required.

3. DOCUMENT CONSULTATION AND APPROVAL

3.1 DOCUMENT CONSULTATION

This monitoring plan builds on the consultation that had been undertaken by the EIS, and Response to Submissions managed by the project proponent, Sydney Metro.

In accordance with CoA C14(c), this Program will be provided to the following government agencies for review and comment.

- DPIE Water
- Sydney Water (if any Sydney Water assets are impacted)
- Inner West Council
- City of Canada Bay
- Strathfield City Council
- Burwood Council
- City of Paramatta Council

Details of issues raised by a government agency during consultation will be included as **Appendix B** of the SWMP, including copies of all correspondence from those agencies, as required under CoA A6.

Ongoing consultation with stakeholders may be undertaken as required during project delivery.

In line with CoA B11, a copy of the Construction Monitoring Reports will be published on the AFJV project website.

3.2 DOCUMENT APPROVAL

In accordance with CoA C18 this Monitoring Program will be submitted to the Planning Secretary for approval, following ER endorsement.

4. EXISTING ENVIRONMENT

4.1 OVERVIEW

The CTP is located across two estuaries which are sub-catchments of Parramatta River and Sydney Harbour. Sydney Olympic Park, North Strathfield, Burwood North and Five Dock are all located within the upper estuary of the Parramatta River catchment, one of the main tributaries of Sydney Harbour. The Bays drains to White Bay in the lower estuary of Sydney Harbour.

The CTP surface sites are located within urban catchments that generally drain directly into highly modified constructed drainage systems which are extensively channelised or hard-edged concrete structures. Relevant watercourses and the receiving waters are shown in the table and map below.

These catchments are generally highly urbanised and altered from a natural state, with pockets of open spaces and parkland. These land uses influence the water quality and quantity and speed of drainage flows within the catchment.

Despite the highly urbanised and altered nature of the receiving watercourses along the Project, several were classified in Chapter 19 of the EIS as sensitive receiving environments. This is generally either owing to the presence of SEPP coastal wetlands or the designation of the waterway as Key Fish Habitat (KFH).

Table 4-1 below identifies the distance from the site to the listed receiving creeks, as well as the classification of creek as Key Fish Habitat and the proximity to SEPP Coastal Wetlands.

TABLE 4-1 WATERCOURSES AND RECEIVING WATERS

Project Site	Watercourse	Distance from site to creek	Condition	Receiving waters	Key Fish Habitat (KFH)?	SEPP coastal wetlands
Sydney Olympic Park metro site	Northern Water Feature Haslams Creek Saleyards Creek	1km 960m	All stormwater in the vicinity of the SOP Project Site discharges into the Northern Water Feature, prior to being discharged into Haslams Creek. In its upper reaches Haslams Creek is a concrete channel running through the Lidcome semi-industrial area. It passes through a rehabilitated estuarine area before discharging into Homebush Bay. Saleyards creek is a concrete lined stormwater drain that discharges into the Powells Creek drain.	Homebush Bay	Haslams Creek Type 1 KFH Northern Water Feature has potential Green and Golden Bell Frog Habitat.	SEPP coastal wetlands within 500m
North Strathfield metro site	Powells Creek	350m	Powells Creek is mainly a concrete-lined channel with a highly urbanised riparian corridor, consisting of commercial land use with extensive impervious surfaces and only isolated vegetated pockets.	Homebush Bay	The Northern section of Powells Creek is KFH	SEPP coastal wetlands within 500m
Burwood North metro site	St Lukes Park Canal Barnwell Park Canal	230m 1km	St Lukes Park Canal is a concrete-lined channel that originates at Parramatta Road, then discharges into Canada Bay. The canal is tidal. Barnwell Park Canal is a concrete channel that discharges into Kings Bay, just south of Canada Bay. The riparian corridor is urban residential with some open space.	Canada Bay Hen and Chicken Bay	Not KFH	No SEPP coastal wetlands within 500m
Five Dock metro site	Dobroyd Canal / Iron Cove Creek	600m	Dobroyd Canal is highly urbanised tidal concrete channel. At lower reaches the riparian corridor is open space with scattered trees.	Iron Cove	The Northern section of Iron Cove Creek is KFH	SEPP coastal wetlands within 500m

The Bays metro site	White Bay	Immediately adjacent to water	White Bay is a working port with docking facilities for small ships.	Sydney Harbour	White Bay is Type 1 KFH	SEPP coastal wetlands within 500m
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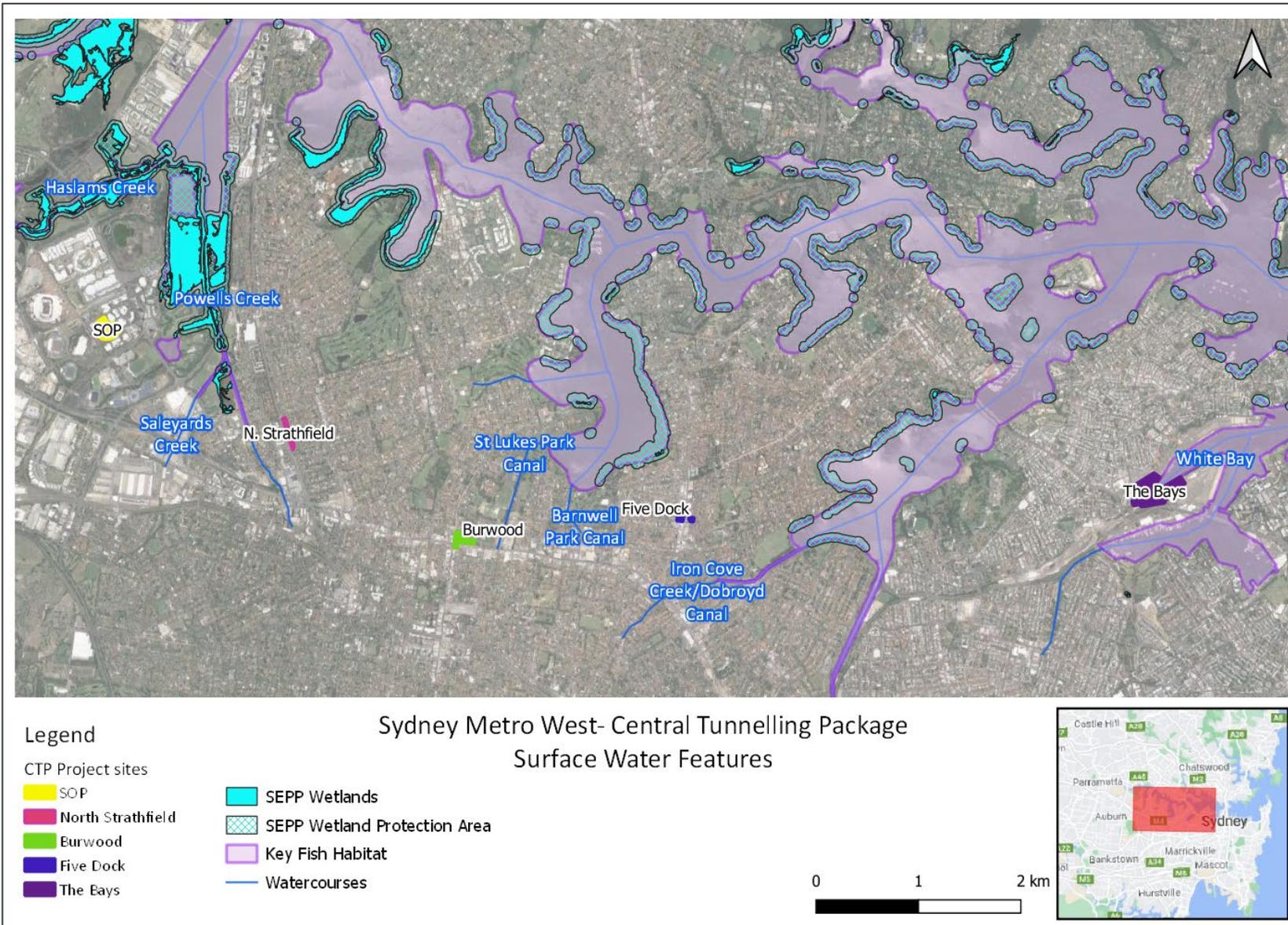


FIGURE 1 WATERCOURSES ALONG THE SYDNEY METRO WEST, CTP ALIGNMENT.

4.2 WATER QUALITY OBJECTIVES

The NSW Water Quality and River Flow Objectives (NSW Department of Environment, Climate Change and Water, 2006) provide environmental values for the Sydney Harbour and Parramatta River regional catchments.

The table below shows the environmental values assigned within the NSW Water Quality and River Flow Objectives to each of the watercourses relevant to CTP, as taken from the Project's Environment Impact Statement (EIS) (Jacobs/Arcadis April 2020).

These objectives provide a framework to assess water quality in terms of whether the water is suitable for a range of environmental values. These provide environmental values for NSW waters and the ANZECC 2000 Guidelines provide the technical guidance to assess the water quality needed to protect those values.

TABLE 4-2 WATER QUALITY OBJECTIVES (SOURCE: TABLE 19-5 OF THE EIS)

Site	Aquatic Ecosystem	Visual amenity	Primary contact recreation	Secondary contact recreation
Haslams Creek	✓	✓		✓
Powells Creek	✓	✓		
Saleyards Creek		✓		✓
St Lukes Park Canal	✓	✓		
Barnwell Park Canal	✓	✓		
Dobroyd Canal	✓	✓		
Iron Cove	✓	✓	✓	✓
White Bay	✓	✓	✓	✓

4.3 BASLINE MONTORING

There has been no detailed pre-project baseline surface water monitoring data identified in the Sydney Metro West EIS documentation.

A review of available existing water quality data collected from Sydney Water, Local Councils, University of Western Sydney and the WestConnex M4 East project undertaken as part of the EIS indicated that some background levels exceed the ANZECC (2000) water quality trigger values for slightly to moderately disturbed ecosystems (Section 19 of EIS). These are summarised in Table 4-3.

TABLE 4-3 SUMMARY OF EXISTING WATER QUALITY CONDITIONS

Watercourse	Water quality characteristics relevant to ANZECC/ARMCANZ (2000) Indicators
White Bay	<ul style="list-style-type: none"> • Elevated nutrient concentrations • Elevated heavy metal concentrations • High turbidity

Dobroyd Canal	<ul style="list-style-type: none"> • Low dissolved oxygen levels • Elevated nutrient concentrations • Elevated heavy metal concentrations • High turbidity
St Lukes Park Canal	<ul style="list-style-type: none"> • Low dissolved oxygen levels • Elevated nutrient concentrations • Elevated heavy metal concentrations • High turbidity
Powells Creek	<ul style="list-style-type: none"> • Low dissolved oxygen levels • Elevated nutrient concentrations • Elevated heavy metal concentrations • High turbidity
Saleyards Creek	<ul style="list-style-type: none"> • Low dissolved oxygen levels • Elevated nutrient concentrations • Elevated heavy metal concentrations • High turbidity
Haslams Creek	<ul style="list-style-type: none"> • Elevated nutrient concentrations • Elevated concentrations of faecal coliforms

Note: source of data is EIS Chapter 19, Table 19-6 (which is sourced from City of Parramatta, Sydney Water, Cumberland City Council and WestConnex M4 East, undated).

As previously mentioned, no detailed baseline surface water monitoring data was collected as part of the EIS; the data presented in Table 4-4 comes from the M4 East and the M4-M5 Link Project Documentation, as described below:

1. Appendix R of the M4 East project EIS:
 - Sal1 and Sal2 – Salesyard Creek
 - Pow1 and Pow2 – Powells Creek
 - Slp2 – St Lukes Park Canal
 - Bar2 – Barnwell Park Canal
 - Dob1 and Dob2 – Dobroyd Canal.
2. Other Major Projects:
 - SW01 - Rozelle Bay from the WestConnex Rozelle Interchange Project Soil and Surface Water Management Plan
 - SW09 - Dobroyd Canal from the WestConnex M4-M5 Link Mainline Tunnels Soil and Surface Water Management Sub-Plan

The monitoring data that was gathered from other projects was generally the background data that was used for those projects, as current monitoring data was not always readily available. The data provides an indication of general waterway health and is utilised in lieu of baseline surface water monitoring data was collected as part of the EIS.

Additional baseline data will also be gathered prior to the commencement of construction – and in particular, the commencement of ground disturbance that has the potential to cause run-off. A minimum of at least two baseline monitoring events (two monthly monitoring events) will be carried out to allow for direct comparison to baseline data captured immediately prior to construction commencing. Where possible, more than two monitoring events will take place.

TABLE 4-4 BACKGROUND WATER QUALITY MONITORING

Parameter	ANZECC Guideline ¹	Sal1 (U/S) ³ – Salesyard creek	Sal2 (D/S) ³ - Salesyard creek	Pow1 (U/S) ³ - Powells Creek	Pow2 (D/S) ³ - Powells Creek	SLP2 (D/S) ³ -St Lukes Park Canal	Bar2 (D/S) ³ - Barnwell Park Canal	Dob1 (U/S) ³ - Dobroyd Canal	Dob2 (D/S) ³ - Dobroyd Canal	SW09 Dobroyd Canal ⁴	SW01 Rozelle Bay ⁵
pH	7.0 – 8.5 ²	7.8-9.4	7.5-9.1	7.6-9.5	7.7-9.9	7.8-9.7	7.1-8.2	8.1-9.1	7.0-9.1	7.0 – 8.5	5.6-8.0
Conductivity (uS/cm)	Lowland rivers: 125–2200 µS/cm	126-3744	203-40,823	99-2977	101-36,323	165-4,535	258-30,752	230-1718	260-52,630	42 average	403-541,180
DO (mg/L)	N/a	8.8-15	5.4-14	6.9-13	6.8-16	8.2-14	4.7-10.8	9.0-13	4.4-15	n/a	-0.16-558
DO (%sat)	85-110	107-151	67-151	89-130	75-168	96-161	56-110	106-132	58-159	n/a	n/a
Turbidity (ntu)	0.5 – 10 ²	0-138	5-101	4-501	2-444	0-364	6-48	11-549	2.5-187	n/a	0-52
Oil and grease	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Notes: 1 – ANZECC (2000) – slightly to moderately disturbed aquatic ecosystems, 2 – Guideline value for SE Australian estuaries 3 - Appendix R of the M4 East project EIS 4- WestConnex M4-M5 Link Mainline Tunnels Soil and Surface Water Management Sub-Plan 5- WestConnex Rozelle Interchange Project Soil and Surface Water Management Plan

5. IDENTIFICATION OF POTENTIAL IMPACTS

The civils construction works will involve works on hardstand areas and minor surface soil works. When construction excavation works proceed below the groundwater table. Intercepted groundwater is addressed in the Groundwater Management Plan and Groundwater Monitoring Program.

The Table 5-1 lists the environmental aspects associated with the civils construction phase and lists the potential environmental impacts. The site management measures identified in the SWMP are also included for reference; for further detail on aspects, impacts and associated mitigation measures, please refer to the SWMP.

TABLE 5-1 ISSUES REQUIRING MANAGEMENT DURING CONSTRUCTION

Aspects	Potential Impacts (key contaminant)	Site Management
Continuing site establishment involving establishing hardstand areas, erecting sheds	Minor sediment or dust impacts from roadbase materials (sediment)	Soil erosion, sediment controls installed, coupled with inspection and maintenance regime
Minor concrete works for footings, and other establishment works	Concrete spillage and runoff from washout areas (sediment and pH)	Designated concrete washout areas
Material storage including chemicals storage	Spills from liquid chemicals (pH and other minor chemical residue)	Limit chemicals stored and banded storage areas and spill kits
Machinery operating on site	Leaking from refueling and hydraulic hose bursts (oil and grease)	Refuelling procedures and spill response and clean up
Drilling works	Sediment from drilled materials (sediment)	Soil erosion, sediment controls coupled with inspection and maintenance regime
Diaphragm wall works	Grout and/or concrete loss or spillage (sediment and pH)	Banded chemical storage areas, and sediment controls
Utility works	Sediment from trenching (sediment)	Soil erosion, sediment controls coupled with inspection regime
Stockpiling of soils from excavations	Sediment from spoil stockpiles (sediment)	Soil erosion, sediment controls coupled with inspection and maintenance regime
Exposure of potential acid sulphate soils (PASS)	Oxidization of PASS and generation of acidic leachate (sediment and pH)	PASS will be managed in accordance with Acid Sulfate Soil Management Procedure (Appendix F of the Soil and Water Management Plan) and any site specific contaminated land management plans or

Aspects	Potential Impacts (key contaminant)	Site Management
		Remediation Action Plan where it applies.
Concrete works for retaining walls, and shotcrete works	Concrete spillage and runoff from washout areas (sediment and pH)	Designated concrete washout areas
Groundwater seepage into excavation areas, mixing with washdown and dust suppression water	Site water being generated with a mix of potential pollutants entrained (multi-pollutant load)	Detail covered in Groundwater Management Plan.

The potential water quality impacts from these construction activities are principally presented as reduction in water quality of receiving waters in the aspects of sediment entrainment, pH and traces of oil and grease.

Where surface water interacts with contaminated areas, this water will be considered to also be contaminated (unless water quality testing proves otherwise) and will either be transferred to the construction WTP's or be removed from site and disposed in accordance with the Waste Classification Guidelines (EPA, 2014). Monitoring requirements for the construction WTP's is outlined in the Groundwater Monitoring Program.

Where an unexpected contamination find is uncovered, any water in contact with that unexpected contamination would also be treated as contaminated and be managed along with the contamination management response.

6. SURFACE WATER QUALITY MONITORING

6.1 PROPOSED MONITORING SITES

The proposed surface water quality monitoring sites are indicated in Table 6-1 below and show in the maps included in Attachment A. These sites have been chosen (where applicable) as they are similar to surface water monitoring locations from previous infrastructure projects, such as the WCX M4 East and WCX M4-M5 Link, to enable a continuation of existing information.

These sites may be subject to discussion with Sydney Water Corporation who manage the drainage assets, and may be revised following further ground truthing and consultation to ensure the monitoring locations are representative of potential Project impacts, and to minimise (wherever possible) potential confounding issues of non-project impacts. Monitoring locations will also be determined in consideration of safe access and any property owner access/permission requirements.

Where sampling locations are updated within the same reach of the same waterway, these will be considered to be minor and can be approved by the ER.

TABLE 6-1 SURFACE WATER QUALITY MONITORING SITES

Name	Waterway	Nearest access street address	Location
WB-D/S	White Bay	White Bay Port	-33.866245° S, 151.180450° E
DC-U/S	Dobroyd Canal / Iron Cove Creek	Henley Marine Drive near Parramatta Rd, Five Dock	-33.873828 ° S, 151.128243° E

DC-D/S	Dobroyd Canal / Iron Cove Creek	Henley Marine Drive, Timbrell Park, Five Dock	-33.870604° S, 151.141474° E
SLP-D/S	St Lukes Park Canal	Near Crane Street car park, Concord	-33.861571° S, 151.113347° E
PC-U/S	Powells Creek	At the Allen St bridge, Homebush	-33.862145° S, 151.086294° E
PC-D/S	Powells Creek	Footbridge at Mason Park, end of Conway Avenue, Homebush	-33.852589° S, 151.082359° E
SC-D/S	Saleyards Creek	Other footbridge at Mason Park, via end of Conway Avenue, Homebush	-33.852282° S, 151.081934° E
HC-D/S	Haslams Creek	Bennelong Parkway bridge	-33.834564° S, 151.075772° E

Maps showing these locations are provided in Attachment 1.

6.2 SAMPLING

During civils construction surface water quality monitoring will be undertaken monthly, both in dry weather and wet weather conditions. During this period there will be extensive ground disturbance prior to establishing hardstand across the site, and the erection of spoil sheds which will protect stockpiles from erosion. Standard soil erosion and sediment control measures will be implemented during this phase to mitigation potential impacts until the sites are fully established for operation during the tunnelling phase.

The monitoring data will be collated into a monitoring record spreadsheet and compared against the Water Quality Objectives. Monitoring parameters are outlined in Section 6.6.

During all works, water quality sampling may be undertaken at any time in response to complaint or incident, or as otherwise determined by the Environment Manager or regulatory agency. All water quality monitoring will also include a visual inspection of the receiving waters to identify any anomalies.

TABLE 6-2 MONITORING SCHEDULE

Item	Frequency	Standards	Responsibility
Civils Construction	Quarterly	Water Quality Objectives	Environment Coordinator
Monthly Water Quality Monitoring	Monthly	Water Quality Objectives	Environment Coordinator
Wet Weather water quality monitoring	Within 48 hours (where practical) of more than 25mm of rain is received in the local catchments.	Water Quality Objectives	Environment Coordinator
Surface Water Discharge from site	Where required prior to discharge.	EPL Blue Book	Environment Coordinator

6.3 RAINFALL RECORDS

To support the surface water monitoring program, rainfall records will be kept by use of the publicly available Bureau of Meteorology monitoring stations at:

- Sydney Observatory, and
- Sydney Olympic Park.

These automatic stations provide weather data via the BOM website at half hour intervals.

6.4 WET WEATHER WATER QUALITY MONITORING

In addition to the construction monitoring program wet weather water quality monitoring will be undertaken during the construction phase.

Wet weather monitoring will happen on average once a quarter, within 48 hours (where practical) of when more than 25mm of rain is received in the local catchments. Wet weather sampling will be undertaken when flow is reasonably constant and safe, not at peak flow.

6.5 MONITORING METHODOLOGY

6.5.1 SAMPLE COLLECTION

Grab samples will be collected manually from the sampling locations identified in Table 6-1. The volume of sample collected will be sufficient for the required physio-chemical (field) parameter analysis using a multi-probe water quality meter(s).

6.5.2 FIELD MEASURES

Field physio-chemical parameters including EC, pH, DO, Oil and grease, and turbidity will be measured at each sampling location using a fully calibrated multi-probe water quality meter(s) or provided for laboratory analysis. Other observations including odour and colour may also be recorded where anomalies are observed.

The multi-probe field water quality meter(s) will be calibrated against known standards, as supplied by the manufacturer, at the start and completion of each day of water quality sampling.

The sampling method for the appropriate water quality parameter is presented in the EPA publication, *Approved Methods for Sampling and Analysis of Water Pollutants in NSW (2004)*.

6.5.3 DECONTAMINATION

Sampling equipment will be cleaned (decontaminated) between each sample. Where a sample site shows evidence of contamination (i.e. there is an algal bloom, or the site smells strongly of hydrocarbons, sewage or something else) equipment will need to be cleaned thoroughly. In addition, equipment will need to be cleaned periodically to prevent a build-up of dirt.

The following method will be followed:

- Rinse the equipment in tap water,
- Clean with DeCon 90 (a phosphate free detergent), or equivalent,
- Rinse again with tap water,
- Rinse three times with de-ionised water; and
- Allow to dry.

De-ionised and tap water will be available for washing equipment in the field, if required.

6.6 SURFACE WATER QUALITY PARAMETERS

6.6.1 SURFACE WATER DISCHARGE PARAMETERS

Water quality testing will be undertaken prior to discharge offsite in accordance with the AFJV – Water Discharge or Reuse Procedure for the following parameters and monitored on a daily basis (during multi-day discharges). Refer to Table 6 3 for testing criteria for offsite discharge in accordance with the Blue Book. This criterion will only be used for water that is captured on the surface that has not encountered any potentially contaminated material or groundwater.

TABLE 6 3: CRITERIA FOR OFFSITE DISCHARGE OF SURFACE WATER

Parameter	Criterion	Method	Time prior to discharge
Oil and grease	None visible	Visual inspection	< 1 hour
pH	6.5 – 8.5	Probe/Meter	< 1 hour
Total Suspended Solids (TSS)	<50 mg/L	Meter/grab sample	< 1 hour/ <24 hours

Where the Project EPL has differing or additional requirements for the discharge criteria, these will be updated in the Monitoring Program once available.

In accordance with REMM SSWQ3, discharges from construction water treatment devices would be monitored to ensure compliance with the discharge criteria, as stated above. Discharges from the Construction Water Treatment Plants (WTP) is managed in accordance with the Groundwater Management Plan and Monitoring Program.

6.6.2 SURFACE WATER QUALITY PARAMETERS

Water quality parameters identified in the NSW Water Quality and River Flow Objectives are classified by the local ecosystem type and the environmental values of the area. Several water quality objectives can be attributed to the receiving watercourses associated with the CTP. To standardise the trigger values across the project the trigger values associated with Aquatic ecosystems have been adopted for the whole Project as they are the most conservative.

On a receiving water body basis, the following table provides the adopted protection trigger values for each waterway associated with the project.

It is noted in Section 5.3 that the existing background data exceeds the ANZECC guidelines for slightly-moderately disturbed systems.

TABLE 6-4 PELIMINARY TRIGGER VALUES TO MAINTAIN WATER QUALITY OBJECTIVES

Receiving watercourse type (WQO)	Turbidity	pH	Dissolved Oxygen	Oil and grease	Electrical conductivity/Salinity
Aquatic Ecosystem (Estuaries)	0.5–10 NTU	7.0-8.5	80-110%	None visible on surface	Lowland rivers: 125–2200 µS/cm

These preliminary trigger values will be used as a guideline until further water quality data is collected and collated from the CTP project.

From investigations on the M4M5 link project, there is wide natural variability in water quality at the receiving waters due to the multiple potential urban runoff sources in the catchment, and between sites. As such, the project's water quality data set will be reviewed annually, and trigger values will be reviewed 6 months after commencement and then annually thereafter, once further surface water data is collated. Any adjustments will be discussed in consultation with the Environmental Representative.

6.7 SURFACE WATER QUALITY TRIGGER ACTIONS

As a result of the highly variable background results outlined in Table 4-4 a step-based trigger action approach will be applied when reviewing and responding to the surface water quality monitoring results.

- Step 1** Where an exceedance of any of the preliminary trigger values identified in Table 6-4, steps 2-4 would be followed.
- Step 2** The upstream and downstream values will be compared. Where the downstream value is greater than 20% than the upstream value for any parameter, steps 3-4 would be followed. Where the downstream results are consistent with, or less than the upstream results, no further action would be taken.
- Step 3** Where the exceedance of the preliminary trigger value is exceeded by 20% at the downstream site, a review will be initiated to determine the significance of the exceedance and the possible causes. The review will consider the corresponding background data, the upstream surface water quality results, recent rainfall records, and recent activities or incidents occurring in the catchment area (both CTP and non-CTP related).
- As part of the review, the background water quality values from Table 4-4 will be reviewed and compared to the exceedances to determine whether the values recorded are consistent with the waterway that is being monitored. Results are considered to be inconsistent where there is a worsening of >20% from average background data.
- Step 4** An investigation will then be carried out to determine whether the exceedance can be attributable to the Project.

If the exceedance is determined to be attributable to Project works and has the potential to cause environmental harm, the event will be treated as an environmental incident and managed in accordance with the requirements of the CEMP.

Corrective actions will be identified and implemented as part of that process.

7. SMART PRINCIPLES

The surface water quality monitoring attempts to use the 'SMART' principles.

- S for specific: The surface water quality monitoring for the CTP will be implemented in the following clear phases:
 - Civils Construction stage water quality monitoring.
 - Tunnelling stage water quality monitoring.

The locations, method and trigger levels are also specific.

- M for measurable: the monitoring parameters are provided in section 6.5
- A for actionable: the monitoring actions are described in section 6.
- R for realistic: the actions in section 6 are realistically achievable.
- T for timely: The timing for actions are provided in section 6.2.

The monitoring program will continue for the duration of CTP construction. Following AFJV's construction works, other follow on contractors to Sydney Metro may undertake further surface water quality monitoring.

A separate more detailed water monitoring regime will be prepared specifically for the water treatment plants. This monitoring regime will be included in the Groundwater Management Plan and Groundwater Monitoring Program, which also form part of the CEMP. The water treatment plants will be used once the excavations extend below the groundwater table.

8. MONITORING RECORDS

Results for each monitoring location will be recorded on appropriate field sheets (hard copy or digital) using unique sampling identification nomenclature consisting of the sample date, location, and sampler details.

For each monitoring event, the following information shall be recorded:

- Date and time of measurements,
- Name of person undertaking the measurements,
- Type and model number of instruments
- Sample time
- Map of area showing measurement location
- Measurement location details and number of measurements at each location
- Weather Conditions including rainfall in the past 24 hours

9. CALIBRATION, QUALITY ASSURANCE AND COMPETENCY

Specific targeted training will be developed by the Environmental Manager to ensure that officers involved in water quality monitoring are appropriately trained. Refer to the CEMP for full details on environmental training.

All instruments will be calibrated in accordance with manufacturers specifications or relevant Australian Standards. Records of monitoring equipment calibration will be maintained by AFJV throughout delivery of the Project. Any field calibrations will only use standard solutions that are within their recommended use-by date to ensure instruments are field calibrated accurately.

Any sample to be sent to a laboratory will be subject to quality assurance protocols. Quality assurance and control protocols during sampling and recording of physio-chemical (field) parameters will be undertaken monthly (each sampling event) in accordance with ANZECC/ARMCANZ (2000b) to ensure the integrity of the dataset.

As part of sampling the following will be undertaken:

- Rinsate blanks (one per sampling event only),
- Blind duplicates (at a rate not less than 20% of total samples), and
- Split duplicates (at a rate not less than 20% of total samples).

Samples are to be transported to a NATA-accredited laboratory under documented chain-of-custody protocols.

Field results will be checked for accuracy before leaving the site and errors or discrepancies will be cross-checked and further investigation initiated if required.

Monitoring and calibration records will be maintained in accordance with the appropriate standard.

10. REVIEW AND IMPROVEMENT

Monitoring data will be reviewed throughout the construction period to provide potential requirements to increase, or decrease, the number of sampling locations. As noted in section 6.5 the project's trigger values will be reviewed six months after commencement of civils construction, once further surface water quality data is collated.

Continuous improvement of this Program will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets, and the Project performance outcomes of the EIS for the purpose of identifying opportunities for improvement

11. REPORTING

During construction, surface water quality data will be collected, tabulated and assessed against baseline conditions and performance criteria.

Reporting requirements associated with the Program for the construction phase of the Project are presented in Table 11-1.

TABLE 11-1 REPORTING REQUIREMENTS AND SCHEDULE

Schedule (during construction)	Requirements	Submission timeline
Surface Water Monitoring Reports (every six months)	Data summary reports presenting tabulated surface water monitoring data collected during the reporting period. Surface water quality results will be presented, and performance criteria	The six-monthly monitoring reports will be provided to the Planning Secretary, the ER and the relevant regulatory agencies within 40 business

	<p>exceedances will be highlighted. Applicable management responses will be documented.</p>	<p>days of the monitoring period ending. The monitoring report will be submitted via the Planning Portal within this timeframe.</p>
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In line with CoA B11, a copy of the Construction Monitoring Report will be published on the project website within one week of its submission to DPIE via the Major Projects Portal.

Separate from the Construction Monitoring Report, additional records relating to soil and water monitoring training, toolbox talks, monitoring results and audit results will be prepared, maintained, and stored in line with the CEMP and the SWMP. The complaints management and reporting procedure is described in the CEMP.

Where the Project EPL has additional requirements for reporting results, these will be added to the Monitoring Program once available.

ATTACHMENTS

ATTACHMENT A –SURFACE WATER MONITORING LOCATIONS



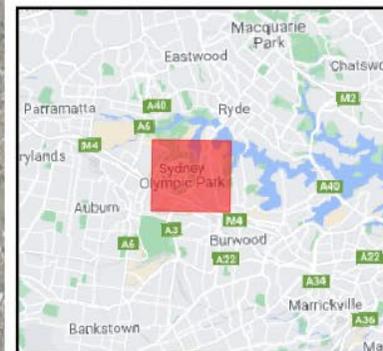
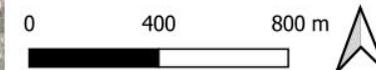
Sydney Metro West CTP - Surface Water Monitoring Locations

Legend

CTP Project sites

- SOP
- North Strathfield
- Eurwood North
- Five Dock
- The Bays

See the Surface Water Monitoring Program for further details of monitoring sites



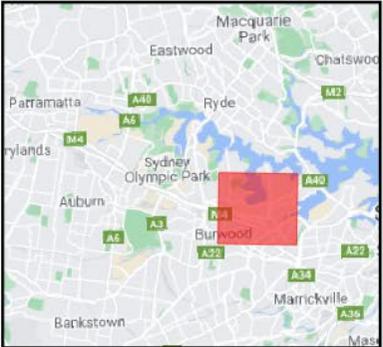
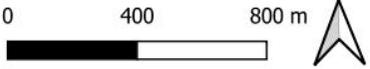
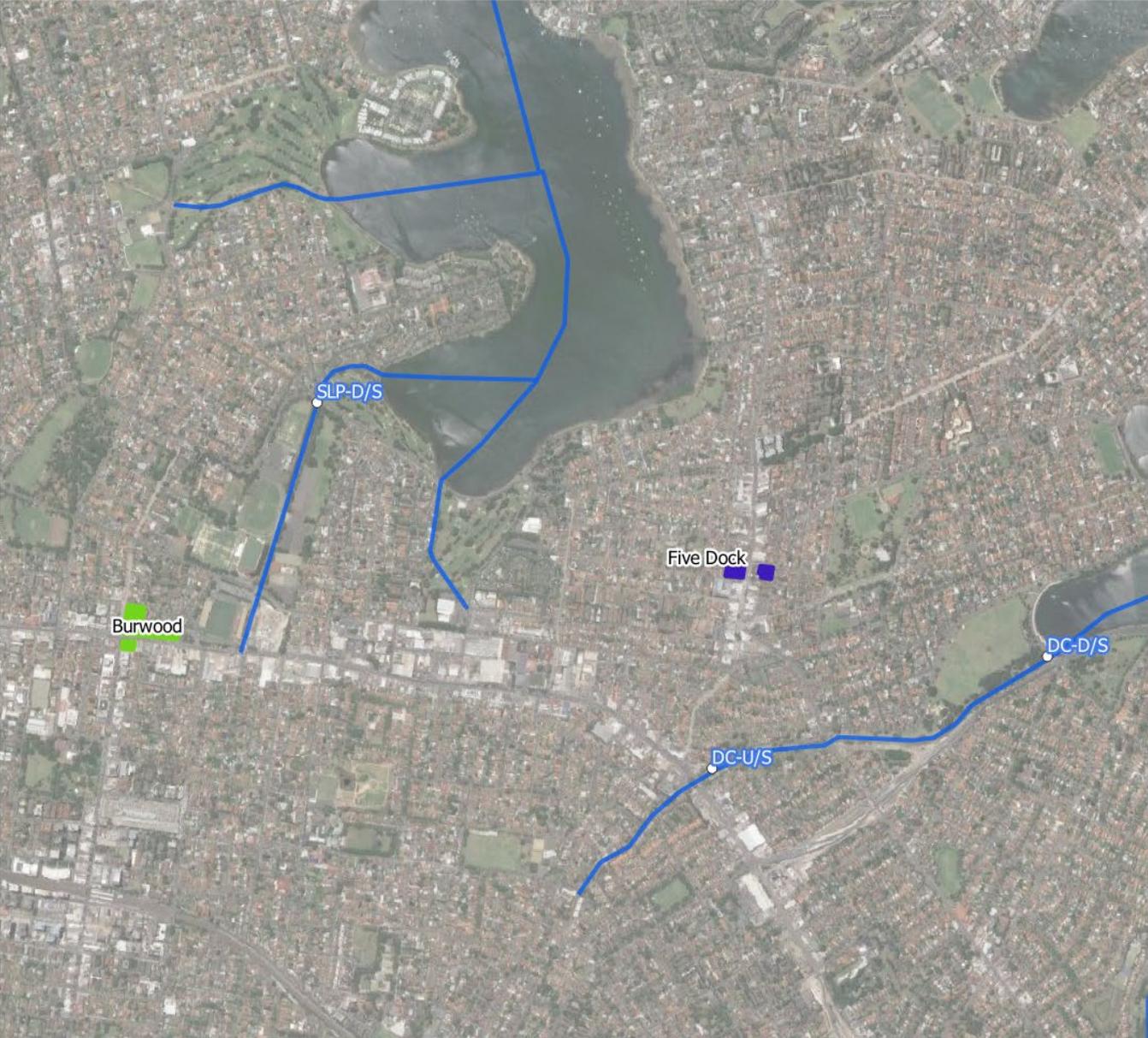
Sydney Metro West CTP - Surface Water Monitoring Locations

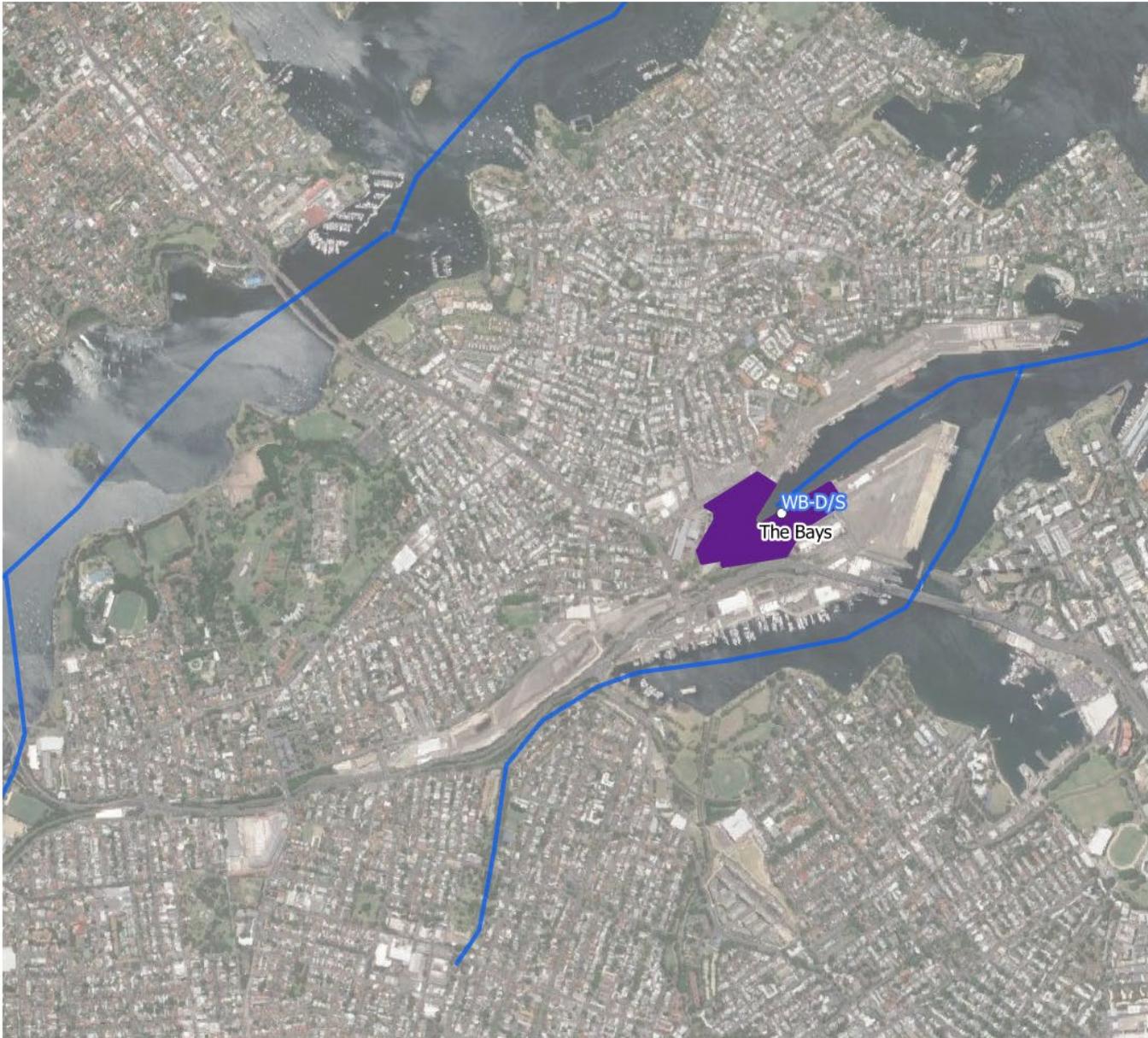
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