Bi-Annual Construction Monitoring Report-July 2022-December 2022

SMWSTCTP-AFJ-1NL-EN-RPT-000018 Revision 02

Sydney Metro West – Central Tunnelling Package

DOCUMENT APPROVAL

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COMPLIANCE MATRIX

Condition Reference	Condition Requirement	Reference
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**: (a) Noise and vibration Monitoring program; consult with EPA, SOPA (in respect of Sydney Olympic Park), Place Management NSW (in respect of The Bays) and Relevant Council(s) (b) Blasting Monitoring program; consult with SOPA (in respect of Sydney Olympic Park), Place Management NSW (in respect of The Bays) and Relevant Council(s) (c) Surface water quality Monitoring program; consult with DPE Water, Relevant Council(s) and Sydney Water (if any Sydney Water assets are impacted) (d) Groundwater Monitoring program; consult with DPE Water and SOPA (in respect of Sydney Olympic Park) Note: The Blasting Construction Monitoring Program is only required to be prepared if blasting is proposed to be conducted during construction.	Section 3 of the Surface Water Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PRG-000001) Section 3 of the Groundwater Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PLN-000006)
C15	Each **Construction Monitoring Program** must provide: (a) details of baseline data available including the period of baseline monitoring; (b) details of baseline data to be obtained and when; (c) details of all monitoring of the project to be undertaken; (d) the parameters of the project to be monitored; (e) the frequency of monitoring to be undertaken; (f) the location of monitoring; (g) the reporting of monitoring results and analysis results against relevant criteria; (h) details of the methods that will be used to analyse the monitoring data; (i) procedures to identify and implement additional mitigation measures where the results of the monitoring indicated unacceptable project impacts; (j) a consideration of SMART principles; and (k) any consultation to be undertaken in relation to the monitoring programs; and (l) any specific requirements as required by Conditions C16 to C17 of this schedule.	Section 3 of the Noise and Vibration Monitoring Program (SMWSTCTP-AFJ-1NL-NV-PLN-000001) Section 3 of the Surface Water Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PRG-000001) Section 3 of the Groundwater Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PLN-000006)
C16	The **Noise and Vibration Construction Monitoring Program** and **Blasting Construction Monitoring Program** must include: (a) noise and vibration monitoring determined in consultation with the AA to confirm the best-achievable construction noise and vibration levels with consideration of all reasonable and feasible mitigation and management measures that will be implemented; (b) for the purposes of (a), noise monitoring must be undertaken during the day, evening and night-time periods and within the first month of work as well as throughout the construction period and cover the range of activities being undertaken at the sites; and (c) a process to undertake real time noise and vibration monitoring. The results of the monitoring must be readily available to the construction team, the Proponent, ER and AA. The Planning Secretary and EPA must be provided with access to the results on request.	Section 3 of the Noise and Vibration Monitoring Program (SMWSTCTP-AFJ-1NL-NV-PLN-000001)

C17	**Groundwater Construction Monitoring Program** must include: (a) groundwater monitoring networks at each construction excavation site; (b) detail of the location of all monitoring bores with nested sites to monitor both shallow and deep groundwater levels and quality; (c) define the location of saltwater interception monitoring where sentinel groundwater monitoring bores will be installed between the saline sources of the estuary or river and that of the stations or shafts; (d) results from existing monitoring bores; (e) monitoring and gauging of groundwater inflow to the excavations, appropriate trigger action response plan for all predicted groundwater impacts upon each noted neighbouring groundwater system component for each excavation construction site; (f) trigger levels for groundwater quality, salinity and groundwater drawdown in monitoring bores and / or other groundwater users; (g) daily measurement of the amount of water discharged from the water treatment plants; (h) water quality testing of the water discharged from treatment plants; (i) management and mitigation measures and criteria; (j) groundwater inflow to the excavations to enable a full accounting of the groundwater take from the Sydney Basin Central Groundwater Source; and (k) reporting of groundwater gauging at excavations, groundwater monitoring, groundwater trigger events and action responses; and (l) methods for providing the data collected to Sydney Water where discharges are directed to their assets.	Section 3 of the Groundwater Monitoring Program (SMWSTCTP-AFJ-1NL-PE-PLN-000006)
C23	The results of the **Construction Monitoring Programs** must be submitted to the Planning Secretary, **ER** and relevant regulatory agencies, for information in the form of a **Construction Monitoring Report** at the frequency identified in the relevant **Construction Monitoring Program**. Note: Where a relevant CEMP Sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP Sub-plan.	This Report

1. INTRODUCTION

This bi-annual monitoring report (B-ACMR) has been prepared to address the Condition of Approval (CoA) C23 of the planning approval. The B-ACMR presents monitoring data for the reporting period for all works undertaken on the Central Tunnelling Package (CTP) from **21st June 2022 to 20th December 2022.**

This report will highlight the results from the construction phase of the monitoring programs and compare the results against established baseline data where available. There is a large amount of noise and vibration data from the unattended monitors, examples of complaint data will be provided to demonstrate the monitoring occurred on a continuous basis. Ground water and surface water data will be provided in full. This report will primarily highlight and discuss exceedances of the required criteria.

In accordance with each Construction Monitoring Program, the data will be made available to relevant authorities within 40 business days of the ending of the monitoring period.

2. NOISE AND VIBRATION

The Noise and Vibration Monitoring Program (NVMP) aims to identify the potential impacts of the CTP works on noise and vibration within the local environments surrounding the construction sites. The data presented in the B-ACMR is submitted per CoA 16 and 23 of the project Planning Approval, which requires reporting the results of CTP works to the Planning Secretary, ER and relevant regulatory agencies.

The report details the results of the construction phase of the NVMP. This will investigate the baseline noise and vibration impacts against operational monitoring data undertaken during the specified stage of the project.

2.1 MONITORING LOCATIONS

2.1.1 ATTENDED NOISE MONITORING

Attended noise monitoring was completed using a handheld sound level meter fixed to a tripod. Noise monitoring was completed as required, generally for verification purposes at the Out of Hours Work (OOHW) location. Attended monitoring locations where LAeq exceedances were detected are provided in Appendix A. The LAeq noise levels were captured by these monitors, which includes both subject activities and extraneous noise. The other attended noise monitoring events showed compliance with the predicted noise levels of the noise model.

Please note that the duration of each monitoring event is 15 minutes.

2.1.2 UNATTENDED MONITORING

Unattended noise and vibration monitoring is completed on a continuous basis using noise loggers and vibration units deployed at each of the CTP construction sites to obtain real time data over satisfying CoA C16c. The unattended monitoring locations are identified in Appendix B. Please note, given the vast quality of noise and vibration data, only exceedances are included in the below Appendix B, all other vibration data over this monitoring period is compliant. An example of unattended noise monitoring data collected is shown in Appendix A.

2.2 NOISE AND VIBRATION MONITORING RESULTS

2.2.3 ATTENDED NOISE MONITORING

During this period, 14 attended noise monitoring events were conducted at different locations near the construction sites throughout the monitoring period. A summary of these results is provided in Appendix A.

Of these events, six OOHW works were recorded to exceed LAeq when compared to OOHW Permit modelling. The greatest exceedance was identified at the Bays site on 28th June, which registered a measure LAeq of 56dB compared to the model-predicted 40.4 dB. The exceedances did not occur as a result of CTP works; they were identified as external noises from generated from non-construction-related activities, which is noted in the monitoring sheets detailed in Appendix A.

The next exceedance was recorded at Sydney Olympic Park (SOP) on 4th November, which registered a measure LAeq of 60.8 dB compared to the model-predicted 46 dB. Again, the exceedance was not associated with CTP construction works, but due external noise sources not related to the construction activities of the project.

Four other slight exceedances occurred at Five Dock and Burwood due to noisy equipment such as the concrete saw, breaker, and vacuum truck. The LAeq measured at Burwood was 56 and 63 dB in front of 21 Burton Street and 7 Moreton Street respectively with model predicted LAeq measured as 62dB. Works were slightly above the predicted, but generally in line with predictions and showing a negligible impact to the receiver. Mitigation measures were observed on the shift and the construction works were amended works by swapping from rock hammering to a saw cutting machine after the monitoring identified a minor

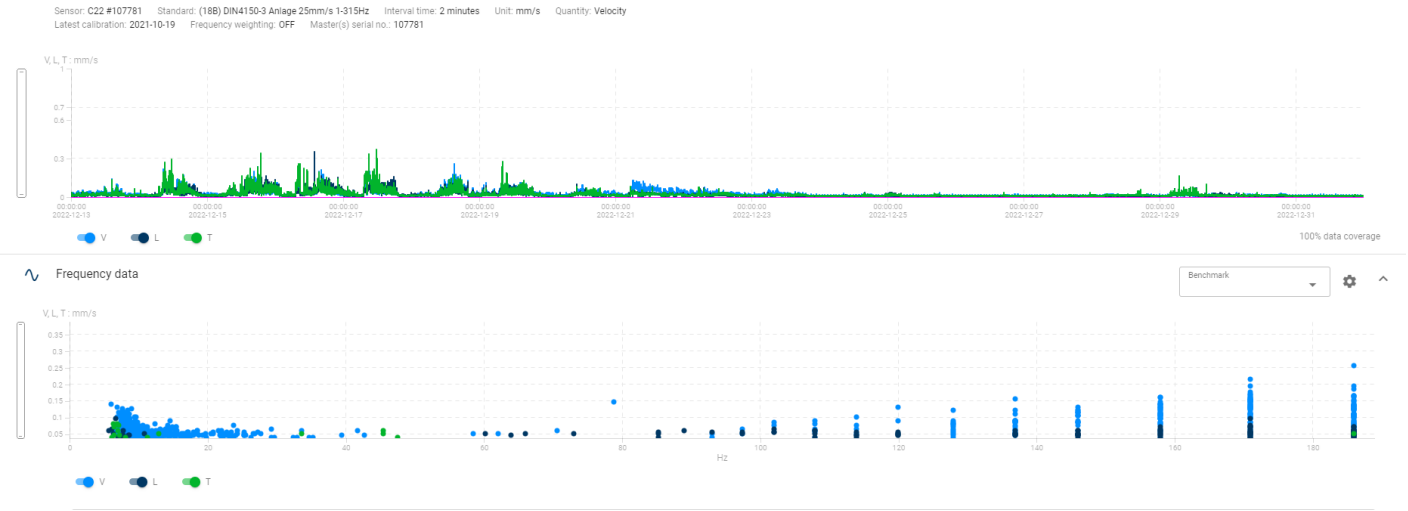
noise exceedance. This allowed for a reduction in the time rock hammering was required on this shift thus minimising the overall impact to the residents. Field sheets for attended noise monitoring during the 6 monthly monitoring period are provided in Appendix A.

2.2.4 UNATTENDED VIBRATION MONITORING

A total of 2 vibration-related exceedances was recorded during the reporting period are summarised in Appendix B. The exceedance at the Five Docks was at St Albans Church was attributed to the use of hammer drills for the installation of brackets required to attach an air-conditioning unit to the wall by subcontractors hired by the Church. The work was not associated with the CTP project.

The second exceedance at the Bays occurred at White Bay Power Station Silos, which was found to be not associated with any AFJV works.

Below is an example of unattended vibration data collected during the month of December 2022 at The Bays- Cement Silos. No exceedance was observed over this period.



2.3 NOISE AND VIBRATION COMPLAINTS

There were several complaints received from the community regarding noise throughout all the sites. Data was taken immediately to address the complaints and preventive actions were taken. Mitigation measures were provided to minimise the impacts on the affected community members. The recommendations were implemented in consultation with the community and stakeholders.

In response to one complaint being received, noise monitoring was conducted at the property to determine specific noise impacts. In November, a complaint was filed by a Sydney Olympic Park resident regarding noise generated by the early commencement of work approved under an OOHW permit. A meeting was conducted with the resident, and he agreed to attend noise monitoring within his property. Results indicated noise monitoring was above indicated NML compliance by the model and two previous monitoring events conducted at ground level for the OOHW permit. Works were subsequently ceased, and the resident was appreciative of the efforts made by the team. This shows a positive result and interaction with the community validation the specific impact and mitigating accordingly.

2.4 CONCLUSION

Minimal exceedances occurred as a direct result from CTP construction works to the surrounding community. Impacts did occur during night works be appropriate mitigation measures were implemented such as the use of noise mats and offering alterative accommodation to highly affected residents. The exceedance at the Sydney Olympic Park site and the Bays site was due to extraneous noise impacts such as traffic and wind.

A slight exceedance of 5dB was observed at Five Docks and Burwood. Dominant noises were from the vacuum truck, concrete saw, and breaker (when in use). Other sources of background noise included public traffic and wind. Mitigation measures were implemented to minimise noise impacts of rock breakers by swapping to road saws increasing efficiency reducing the overall hammering required. Additional noise mitigation included the use of noise mats during OOHW activities. Alternative accommodation was offered to residents shown to be above the noise modelling threshold for impact throughout this monitoring period.

The vibration data was collected over the 6 months period, with two exceedances occurring; one at Five Dock and one at the Bays, which are detailed in Appendix B. Mitigation measures were implemented for the vibration exceedance at the Five Dock and no other exceedances have occurred since. The vibration exceedance at the Bays was not due to AFJV works, hence no action was taken by AFJV.

3. SURFACE WATER

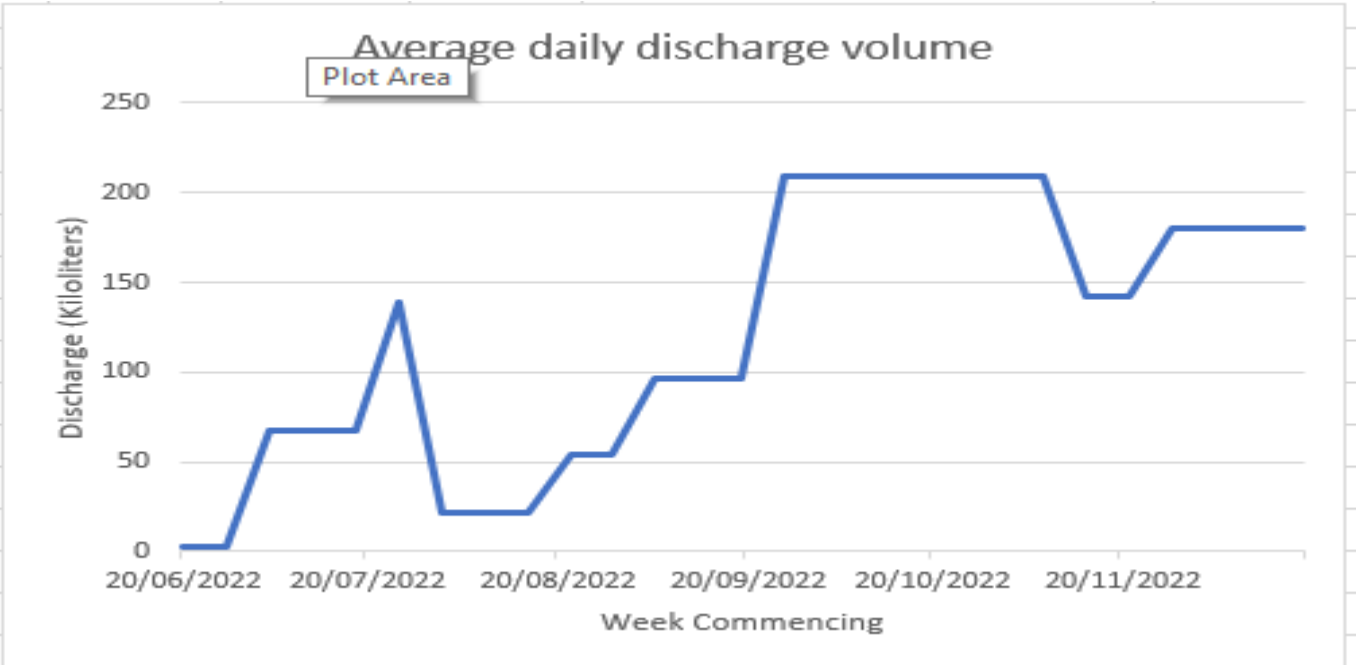
The purpose of the Surface Water Monitoring Program (SWMP) is to identify the potential impacts of the CTP works on water quality within local receiving waters. The data presented in the B-ACMR is submitted in accordance with Condition C23 of the Project Planning Approval which requires reporting the results of the CTP works to the Planning Secretary, ER and relevant regulatory agencies.

The report is to provide monitoring data and analysis of results as required to be generated in SWMP. The report details the results during the construction phase of the SWMP. This will investigate the baseline water quality against operational monitoring data undertaken during the specified stage of the project.

The report also includes the water discharge criteria for the Bays and Burwood site in Appendix C in line with the project EPL and Soil and Water Monitoring Program requirements.

Monitoring was also undertaken during the discharge of water through the WTP plant. This was a mixture of surface and ground water. Daily averages of discharge for each week are provided below.

Week commencing	Average daily KL discharged
20/06/2022	2.857142857
27/06/2022	2.857142857
4/07/2022	67
11/07/2022	67
18/07/2022	67
25/07/2022	139.2857143
1/08/2022	21.5
8/08/2022	21.5
15/08/2022	21.5
22/08/2022	54.30769231
29/08/2022	54.30769231
5/09/2022	96.27272727
12/09/2022	96.27272727
19/09/2022	96.27272727
26/09/2022	209.5111111
3/10/2022	209.5111111
10/10/2022	209.5111111
17/10/2022	209.5111111
24/10/2022	209.5111111
31/10/2022	209.5111111
7/11/2022	209.5111111
14/11/2022	142.5882353
21/11/2022	142.5882353
28/11/2022	179.75
5/12/2022	179.75
12/12/2022	179.75
19/12/2022	179.75
Total	22950.8147



3.1 MONITORING SITES

During construction, surface water quality monitoring was undertaken for dry weather conditions and wet weather conditions in accordance with SWMP monitoring program. Table 3-A Surface water quality monitoring locations provide a summary of the monitoring locations, and the monitoring location map is included in Appendix D.

Surface water quality is measured at eight locations during the reporting period. Monitoring locations were identified as being representative of the surrounding receiving waters and sufficient to identify potential project impacts should there be any quality exceedances.

Table 3-A SURFACE WATER MONITORING LOCATIONS

Name	Waterway	Nearest Project Site	Location	Distance From Site to Creek
WB-D/S	White Bay	The Bays	-33.866245°S, 151.180450° E	Immediately adjacent to the water
DC-U/S	Dobroyd Canal / Iron Cove Creek	Five Dock	-33.873828 ° S, 151.128243° E	600m
DC-D/S	Dobroyd Canal / Iron Cove Creek	Five Dock	-33.870604° S, 151.141474° E	600m
SLP-D/S	St Lukes Park Canal	Burwood North	-33.861571°S , 151.113347° E	230m
PC-U/S	Powells Creek	North Strathfield	-33.862145°S, 151.086294° E	350m
PC-D/S	Powells Creek	North Strathfield	-33.852589°S, 151.082359° E	350m
SC-D/S	Saleyards Creek	Sydney Olympic Park	-33.852282°S, 151.081934° E	1km
HC-D/S	Haslams Creek	Sydney Olympic Park	-33.834564°S, 151.075772° E	1km

3.2 SURFACE WATER QUALITY RESULTS

The surface water quality results were compared based on the ANZECC guideline. No detailed pre-project

baseline surface water monitoring data was identified in the Sydney Metro West EIS documentation. Monitoring data collected from other projects and from the previous monitoring report were used as background data. The data collected provides insight into the general health of the waterway. As per the review of existing water quality data collected, some background levels exceed the ANZECC guidelines (2000).

Table 3-B- PRE-EXISTING WATER QUALITY DATA BASED ON ANZECC GUIDELINES

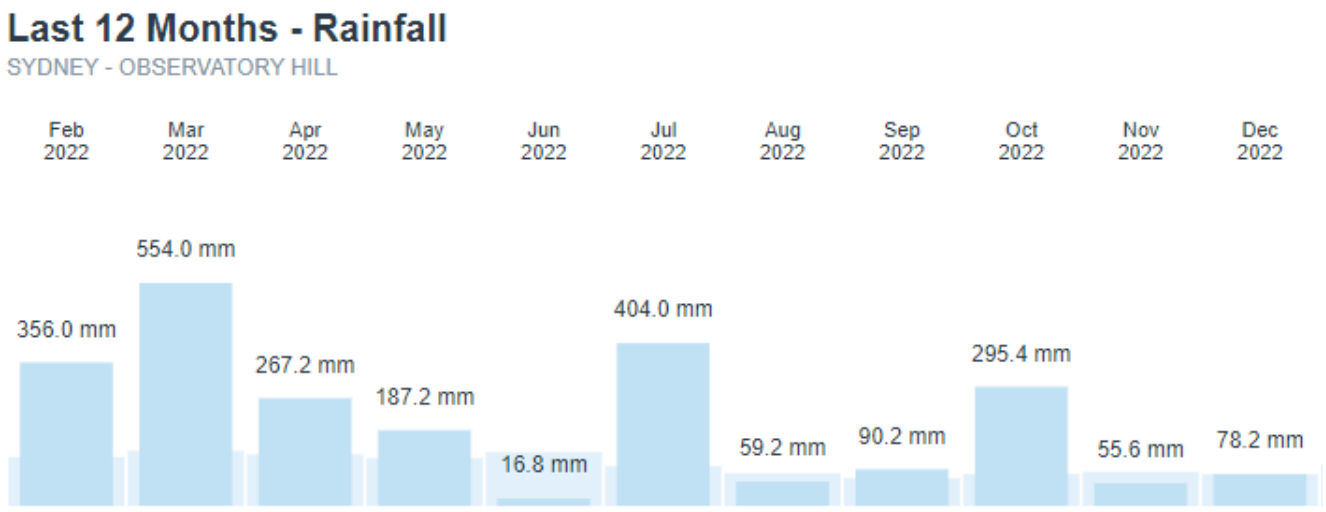
Parameter	ANZECC Guideline [1]	Sal1 (U/S)[3] – Salesyard creek	Sal2 (D/S)[3]- Salesyard creek	Pow1 (U/S)[3] - Powells Creek	Pow2 (D/S)[3] - Powells Creek	SLP2 (D/S)[3] -St Lukes Park Canal	Bar2 (D/S)[3] - Barnwell Park Canal	Dob1 (U/S)[3] - Dobroyd Canal	Dob2 (D/S)[3] - Dobroyd Canal	SW09 Dobroyd Canal[4]	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

Comparing the project results with the general condition of the waterways, the results are within the guideline values. The data suggests there are no additional impacts to the surrounding waterways from the project, these results can be found in Appendix D. A review of the existing water quality data collected for the project, undertaken in the EIS, states that the watercourses relevant to the CTP existed in poor condition prior to the project commencement and are representative of a heavily urbanised system. Given that multiple sources of potential impact exist along the corridor in a densely populated urban area, sources of exceedances in surface water quality are not determined to be attributable to project work.

3.3 RAINFALL DATA

Figure 3-C- Rainfall statistics



Due to reduced rainfall through August, November, and December (2022) some of the ephemeral waterways were dry and water sampling could not be conducted.

3.4 CONCLUSION

A review of the existing water quality data collected from Sydney Metro, Local Councils, University of Western Sydney, and WestConnex M4 East project undertaken as part of the EIS, indicated that some of the background levels exceed the ANZECC (2000) water quality trigger values. Refer to Appendix D for details. The watercourses were identified to be slightly to moderately disturbed ecosystems.

The following table provides the adopted protection trigger values for each waterway associated with the project.

Table 3-D- Preliminary trigger values (ANZECC 2000)

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

This preliminary trigger value listed in the table able was used as a guideline for the initial sampling during the first monitoring period. The data collected during the monitoring period identifies that the trigger values listed in table 3-D are unachievable for some of parameters due to existing water quality values of the surrounding water bodies. These parameter values will be reviewed for adjustment during the next six-month monitoring period with the additional data collected in this period.

4. GROUNDWATER.

The purpose of the Groundwater Monitoring Program (GWMP) is to identify the potential impacts of the CTP works on the groundwater quality of the local environments. The data presented in the B-ACMR is submitted in accordance with condition C17 of the Project Planning Approval, which requires reporting the results of the CTP works to the Planning Secretary, ER and other relevant regulatory agencies.

This report details the results during the construction phase of the GWMP for the Bays, Five Docks, Burwood North, Sydney Olympic Park, and North Strathfield. Piling started at North Strathfield on 9th November 2022 and monitoring of the groundwater was conducted from December onward. Monitoring at North Strathfield will be conducted monthly for three months, following that period the site will be monitored on a quarterly basis.

Groundwater has been treated at the Bays and Burwood sites during this monitoring period. The influx of groundwater in the sites is highly depended on rainfall as greater ingress is observed during higher rainfall. Since the surface water and ground water is treated through single water treatment plants at each site, the numerous variables, including sprinkler systems utilised for dust suppression, makes calculating the amount of groundwater ingress for each site extremely difficult.

4.1 GROUNDWATER MONITORING LOCATIONS

In accordance with the GWMP, there are 33 boreholes identified that would be utilised throughout the project to monitor and sample from. However, some boreholes required removal during construction due to construction activities occurring in that location. Borehole locations utilised during the reporting period are summarised in Appendix E. It should be noted three replacement bores were installed to replace removed wells at Sydney Olympic Park to maintain compliance with the GWMP.

There were 5 more boreholes (including shallow and deep wells) installed at Sydney Olympic Park. The monitoring of these boreholes will be conducted from February 2023 in the monitoring report period.

Refer to table 4-A for a summary of monitoring completed within the reporting period.

Table 4-A- GROUNDWATER MONITORING PERIOD

Site	Ground Disturbance Trigger Date	Construction Monitoring (first 3 months of construction)	Quarterly Monitoring
The Bays	05/04/2022	Round 1: May 5 Round 2 May 25 Round 3: June 21	Round 1: September 19 Round 2: December 12 Round 3: Scheduled for March 22
Five Dock	23/05/2022	Round 1: June 21 Round 2: July 18 Round 3: August 29	Round 1: November 21 Round 2: Scheduled for February 20 Round 3: Scheduled for May 19
Burwood North	1/06/2022	Scheduled for Round 1: June 21 Round 2: July 18 Round 3: August 29	Round 1: November 21 Round 2: Scheduled for February 20 Round 3: Scheduled for May 19
North Strathfield	09/11/2022	Round 1: December 16 Round 2: Scheduled for January 12 Round 3: Scheduled for February 13	Not started yet.

Sydney Olympic Park	21/06/2022	Round 1: July 18 Round 2: August 29 Round 3: September 19	Round 1: December 12 Round 2: Scheduled for March 22

4.2 FIELD INVESTIGATION

4.2.1 GROUNDWATER SAMPLING AND GAUGING

Groundwater sampling and gauging was conducted at accessible groundwater monitoring wells. The below table outlines the boreholes that were sampled during the first monitoring period and the current monitoring period.

Table 4-B Groundwater Bores Monitored

Site	Borehole number	Baseline Monitoring 1 January	Baseline Monitoring 2 February	Baseline Monitoring 3 March	Post-construction 1 May	Post construction 2 June	Quarterly Monitoring 1 September	Quarterly Monitoring 2 December_
The Bays	S02d	Sampled	Not sampled	Not sampled	Not sampled	sampled	sampled	Sampled
	S06	Sampled	Not sampled	Not sampled	Not sampled	sampled	sampled	sampled
	S58d	Not sampled	Not sampled	Not sampled	Not sampled	sampled	sampled	Not sampled
	S55	Not sampled	Not sampled	Not sampled	Sampled	Not sampled	sampled	sampled
	S40d	Not sampled	sampled	Not sampled	Not sampled	sampled	sampled	Not sampled
	S54	sampled	sampled	Not sampled	sampled	sampled	sampled	sampled

Site	Borehole number	Baseline Monitoring 1 January	Baseline Monitoring 2 February	Baseline Monitoring 3 March	Month1 (Post construction) July	Month2 (Post construction) August	Month3 (Post Construction) September	Quarterly Monitoring 1 December
Sydney Olympic Park	BH019	Sampled	Not sampled	Sampled	sampled	sampled	Not sampled	Not sampled
	BH120	Sampled	Not sampled	Not sampled	Not sampled	Not sampled	sampled	sampled
	BH068	Not sampled	Not sampled	Not sampled	sampled	sampled	sampled	sampled
	BH126	Not sampled	Not sampled	Not sampled	sampled	sampled	sampled	sampled
Tunnel NW of SOP	BH121	Not sampled	Not sampled	Not sampled	Not sampled	sampled	sampled	sampled
Tunnel SOP-NS	BH715B	Not sampled	Not sampled	Not sampled	Not sampled	sampled	sampled	sampled
	AF_BH36	Not sampled	Not sampled	Not sampled	sampled	sampled	Not sampled	Not sampled

Site	Borehole number	Baseline Monitoring 1 January	Baseline Monitoring 2 February	Baseline Monitoring 3 March	Post construction June	Month2 (Post Construction) July	Month3 (Post Construction) August	Quarterly Monitoring 1 November
Burwood	BH046R	Not sampled	Not sampled	Not sampled	Not sampled	Not sampled	sampled	Not sampled

	BH044	Not sampled	Not sampled	Not sampled	Sampled	Not sampled	sampled	Not sampled
Five Dock	BH051	sampled	sampled	sampled	sampled	sampled	sampled	sampled

Refer to Appendix E for detailed description of the monitoring conducted.

4.2.2 GROUNDWATER MONITORING WELL STATUS

The groundwater monitoring wells that couldn't be accessed, replaced, or sampled during this monitoring period are listed in the below table:

Month	Site	Borehole number	Comments
July	Tunnel-NW of SOP	BH070	The borehole has been removed. No longer available in GWMP.
July	Sydney Olympic Park	BH069	This borehole was replaced with BH_715b.
July	Sydney Olympic Park	BH033	This borehole was replaced with BH036.
All the months	Tunnel SOP-NS	BH034 and BH040	Will be monitored after tunnelling commences.
July and December	Sydney Olympic Park	BH032, BH032s	The borehole is located on private property. Couldn't get access in December and the resident would not provide access to the property. AFJV will attempt to gain access in the next monitoring period.
September and December	Sydney Olympic Park	BH019	The borehole couldn't be located. The existing borehole is in a field where the grass and not been mowed. Despite searching for the borehole, it was unable to be located. Further investigation will be carried out to see if the borehole was damaged in some way.
September and December	The Bays	AF_CGW1	The borehole is located near the T-WTP at the bays. The borehole couldn't be monitored due to excessive sediment deposits from rainfall. This restricted the ability to extend the pump to the bottom of the borehole. The sediment was cleaned up but access to the base of the borehole and water was not able to be sampled.
December	The Bays	S40_d	The borehole couldn't be monitored, as the casing was bent making it impossible to feed the pump through the casing. This will be fixed for the next monitoring period.
December	The Bays	S58_d	The borehole couldn't be monitored, due to excessive sediment deposits. Again, the pump could not be extended to the base of the bore hole. The borehole will be cleaned out at the next monitoring period prior to pump out to ensure water to be sampled.
July	Burwood	BH046	This borehole was replaced with BH046R.
November	Burwood	BH046R	This borehole couldn't be sampled as it is inside the site and construction was going

			on and the access was restrained. There is a chance that the borehole will be blocked due to construction activities for further monitoring events. Further investigation will be carried out to assess the borehole.
November	Burwood	BH044	This borehole could not be sampled. The pump reached the bottom, and no water was coming through the pump. There is a chance that the pump failed to pump water from the borehole. In the next monitoring it will be checked if this problem persists, and actions will be taken to make sure that it will be sampled.
December	North Strathfield	SMW_BH038	Couldn't pump water from the borehole, as the bore hole was found dry. A possible explanation would be given by the Geotech team after survey of the borehole.
December	North Strathfield	SMW_BH009	Couldn't pump water from the borehole, as the borehole was found dry. A possible explanation would be given by the Geotech team.
December	North Strathfield	SMW_BH035	Couldn't pump water from the borehole, as the borehole was found dry. A possible explanation would be given by the Geotech team.

These monitoring rounds were limited in nature due to constraints relating to access. Many of the boreholes were not accessible, majorly due to sediment deposits inside the borehole. Each borehole is capped to minimise sediment entering from the surface. Given the continues recharges of the bores, it is presumed sediment is entering during this process and creating sediment build up in the borehole. Removal of the sediment was conducted using an air compressor, but samples were unable to be attained from the base of the hole. The holes will continue to be cleaned and sampled for the next monitoring period. Additional measures will be undertaken to remove the excessive sediment build up prior to the next monitoring event to ensure that sampling occurs.

One borehole at Burwood and multiple boreholes at North Strathfield could not be sampled because each of the bores was dry at full depth. Further consultation is ongoing with the Geotech team about the boreholes at North Strathfield to determine the cause was inconclusive. There is potential that drawdown of water level for the boreholes at North Strathfield is due to works completed as part WestConnex M4 East Tunnel. Temporary draw down could be attributed to the piling works occurring at North Strathfield. The piling is programmed to be finished during the next monitoring period, at which time, the bores holes will be sampled again, and further conclusions can be drawn from the next round of sampling. Investigation of Burwood and North Strathfield boreholes and sampling continue during the next monitoring period.

4.2.3 FIELD OBSERVATIONS

During sampling and gauging, no odours were noted. Also, no visual sign of contamination (such as a sheen) was observed. Refer to Appendix E for a detailed summary of pH and EC (Electrical Conductivity) for each borehole during the monitoring period.

4.3 LABORATORY RESULTS ANALYSIS

The results obtained from the laboratory after groundwater sampling are compared with the trigger levels adopted for assessing groundwater discharge to waterways. It should be noted this water was not discharged but the existing water was sampled in each borehole. The summary of trigger levels is attached in Appendix E. Based on the trigger level adopted for assessing groundwater levels, exceedance of in situ water was identified.

Table 4C- Trigger level exceedance

Month	Site	Borehole	Trigger level exceedance
July	Burwood	BH044	Copper, Chromium, Iron, Zinc, Lead, Manganese,
	Tunnel SOP-NS	AF_BH36	
	SOP	BH126	
July	Tunnel SOP-NS	AF BH36	Cobalt
July	SOP	BH126	Total nitrogen in water
August	SOP	BH126	Chromium, Copper, cobalt, mercury, zinc.
	Tunnel SOP-NS	AF_BH36	
August	SOP	BH068	Copper
	SOP	BH019	
	Burwood	BH046R	
August	SOP	BH121	Manganese, zinc, iron
	Tunnel SOP-NS	BH_715B	
	The Bays	BH040d	
September	SOP	BH120	Manganese, iron, zinc
	Tunnel SOP-NS	BH715B	
	The Bays	BH068	
September	SOP	BH126	Total nitrogen in water
September	The Bays	S54	Copper, Lead, Manganese, Zinc, Iron, Nickel
November	Five Dock	BH051	Manganese, Cobalt, Zinc, Iron
December	Tunnel SOP-NS	BH715B	Chromium, Iron, Manganese, Lead, Zinc,
	SOP	BH126	
	SOP	BH121	
December	The Bays	S54	Chromium, Copper, Cobalt, Manganese, Nickel, Lead, Zinc, Iron
	The Bays	S02d	
	The Bays	S06	
	The Bays	S55	

4.3.1 COMPARISON WITH THE BASELINE CONDITIONS

After analysing the results, obtained from the laboratory with the trigger levels it can be concluded that:

- BH126 at Sydney Olympic Park, after each monitoring period, shows an exceedance of metals and total nitrogen in the groundwater.
- S54 at the Bays showed an exceedance of total metals in the monitoring period of September and December.
- BH715B referenced, Tunnel SOP-NS, showed an exceedance of total metals in the last three monitoring period- August, September, and December.
- Other boreholes don't show a repeated exceedance of metals. Further can be analysed from the results obtained in the next monitoring events.
-

As per the baseline conditions of the monitoring bore locations:

- Boreholes at Sydney Olympic Park recorded exceedance in heavy metals, hydrocarbons, and nutrients.

- Boreholes at the Bays recorded moderate to high levels of heavy metals, hydrocarbons, and VOCs.

Summary of the monitoring bore locations along the alignment and baseline conditions are provided in Appendix E.

Monitoring commenced the month of June. During this period, the monitoring rounds were limited to constraints relating to access. Many of the boreholes were not accessible and some boreholes were replaced. Due to this, limited new data is available to compare with sampling from the previous period. Therefore, results were compared with the pre-existing baseline conditions. Comparing the results obtained from sampling with the baseline conditions and previous construction monitoring events, It can be concluded that the existing contamination was not increased due to CTP's construction activities. The construction activities of CTP works did not show any further elevated levels of heavy metals in the monitoring period. New trigger values will be set based of the initial and second monitoring period and incorporated in the next monitoring period.

4.4 GROUNDWATER LEVELS

During the reporting period, groundwater levels in borehole tunnel alignment and adjacent to construction sites showed minimal variance. Rainfall has a nearly direct correlation with the levels of water observed in the boreholes during the sampling period. Increased periods of rain fall show increased amounts of water in each bore with the levels tapering off as rainfall decreases. It does not appear from the data that construction activities have impacted groundwater significantly as the values remain consistent throughout this monitoring period. Refer to Appendix E for a summary of all groundwater level data compiled during the reporting period.

4.5 CONCLUSION

From the six months reporting period, some of the boreholes weren't accessible due to sediment deposits inside the bores. Further, after comparing the sampling results with the ANZECC (2000) water quality trigger values some groundwater quality parameters exceed the trigger values. This is not unexpected given the highly disturbed and urbanised Project area and existing surrounding water quality.

After reviewing the baseline conditions of the borehole data, the ecosystems surrounding the boreholes are moderate to high-risk areas for contamination. As noted in EIS Technical Paper 7, background data showed that some heavy metals and ammonia concentration was above the trigger level prior to the commencement of works. Thus, it can be concluded that CTP works have not adversely impacted any concentration of heavy metals. Given the low fluctuation in the levels of the groundwater, at this stage of the project, the construction works have not caused drawdown on the surrounding water tables. The groundwater samples generally increased and decreased in line with rainfall changes.

There were fluctuations in pH and EC during the monitoring period, which could be due to the ongoing excavation and piling, but there is no substantial evidence supporting this theory. If these levels stabilised after piling a potential link could be attributed to piling and concrete works causing an increased EC and pH.

APPENDIX A NOISE MONITORING RESULTS

Noise Monitoring Results June - December 2022

Date	Time	Report No.	Conducted by	Site	Purpose	OOHW Permit No.	Location	Works	Model Prediction (LAeq)	LAeq	LA90	LAmax	Exceed prediction?	Mitigation measures implemented?	Notes	Instrumentation Details	Calibration Validity
28/06/2022	9pm-11pm	21028-20220628-01	S.Hughes	The Bays	OOHW	101	End of Mansfield Street	drilling and Vibro piling	40.4	56	47	69	YES	Y	The ambient noise environment during the monitoring period consisted of car and truck pass-bys on Roberts Road, local road works on Roberts Road, distant earthworks/road works near the Anzac Bridge on ramp. Road works on Robert Street were the dominant noise source when active. Additional influences at this time included patron noise from the Black Rock Hotel and frequent plane noise on approach and take-off from the airport.From the monitoring location at the end of Mansfield Street where there is line of sight to the station box area, work from the CTP site was not specifically identifiable in the period from 9-9:30 pm when ambient noise levels were still high. Noise levels at the residential receiver location in Smith Street indicated that no CTP construction noise was audible from 9:30-10 pm. No activity or measurable noise from CTP site 10-11pm. While CTP activities for drilling and Vibro piling were not primary influences on the noise environment during the monitoring period, it is recommended that additional monitoring be undertaken to confirm CTP contributions when there are no other concurrent activities.	1. Bruel and Kjaer 2270S/N 3008237 2. Calibrator Bruel and Kjaer 4231 S/N 3013508	Until January 2024
	9pm-11pm						6 Smith Street		35.5	46	38	71	YES	Y			
24/07/2022	9am-10:30am	21028-20220724-01	J.Hutchinson	NST	OOHW	36	99 Queen Street	Earthworks	N/A	68.9	57	88	No	Y	Location 1 was relatively undisturbed by construction activity. Traffic passing in frontof receivers was dominant source of noise. Some minor activity on ancillary site barely contributed to overall noise. At Location 2, continuousexcavator operation was around same contribution as traffic to overall noise. Noise predicted to be around 71 dBA so measurement demonstrated lower. This is due to fewer and smaller plant not necessarily operating in worst-case position.	1. Bruel and Kjaer 2270S/N 3008237 2. Calibrator Bruel and Kjaer 4231 S/N 3013508	Until January 2024
	9am-10:30am						121 Queen Street		N/A	69	65	80.6	No	Y			
1/08/2022	9pm-10:30pm	21028-20220801-01	S.Hughes	NST	OOHW	24	103-105 Queen Street North Strathfield	Utilities Relocation	94	82	74	96.5	No	Y	Ambient noise environment when no construction sources operating consists of frequent car and truck pass-bys on Burwood Road. Dominant noise sources during monitoring were from vacuum truck and rock hammer (when operational). Highest measured noise levels at the nearest residential receiver location during rock hammering however, the vacuum truck was constant background noise source.	1. Svan 958A S/N 59158 2.Calibrator Bruel and Kjaer 4231 S/N 3013508.	1. Until Nov 2022 2. until January 2024
23/08/2022		OOHW25_220823_FD	O. Gilroy-Sarkies	Five Dock	OOHW	25	110 Great North Road	HV relocation	79	82.0	74	87.4	Yes	Y	Works occurred in Section 1 of OOHW permit - southernmost section of Great North Road (both sides). Dominant noise sources were from Vaccum Truck and breaker and concrete saw (when operational). Note, breaker and concrete saw were limited to 11pm. Highest measured level was during concrete breaking.		
							147-149 Great North Road		79	78.1	69	85.5	No	Y			
							118 Great North Road		67	66.3	53	84.2	No	Y			
1/09/2022	8:30pm-10:30pm	21028-20220901-01	S.Hughes	Burwood	OOHW	139	Burwood Road Corner Neich Lane	Sewer connection	93	78.0	65	92	No	Y	Measurements completed in accordance with AFJV noise monitoring program. Permit t 139 was in operation with excavation/cutover works planned at 3 locations including Pavement removal rock breaking, pumping sewer lines using vacuum truck.	1. Bruel and Kjaer 2270S/N 3008237 2. Calibrator Bruel and Kjaer 4231 S/N 3013508	Until January 2024
	8:30pm-10:30pm						Front of 21 Burton St		62	67	56	80	Yes	Y			
	8:30pm-10:30pm						Front of 7 Moreton St		62	67	63	77	Yes	Y			
9/09/2022	6am	1	C Kennedy	TBY	OOHW	114	6 Rosser St, Rozelle	Early Start Concrete Pours		36	37	58	No	Y	Measurements completed in accordance with AFJV noise monitoring program. OOHW Permit 114 was in operation with loading operations and haulage being undertaken. Testing of 36t excavator was undertaken to determine noise levels at a representative receiver. During the OOHW Monitoring, the dominant noise source was traffic noise, with regular high pitched bird chirps which likely raised the monitored levels and likely the source of the LAMax readings. During the two monitoring sessions it was apparent that more frequent traffic pass by's along Mansfield Road, and background traffic noise was increasing as the morning progressed. Noise from construction activities was not audible at the monitoring location, although faint horn noises were noted. Discussions with the site Foreman determined that these horns were being used to signal to the truck drivers. It was determined that the horn noises would cease and radios would be the preferential form of communication, in line with noise mitigation measures.	1. Rion NL-42 (S/N 00145400) 2. Calibrator Pulsar 106 (S/N 70390)	25th May 2023
28/09/2022		HW25+131_220928_	A. McLean	Five Dock	OOHW	25+131	2 Second Avenue	HV relocation GNR (25) + HV relocation Second Ave (131)		72	61	82	No	Y	*Due to more than activity occuring, predictions taken from weekly cumulative assessment Works occurred in Section 4 of OOHW permit 25 (ie closest to Second Ave) and on Second Ave under permit 131. Monitoring undertaken post-11pm (once high noise activites ceased) as opposed to previous monitoring event. Dominant noise source was from vacuum truck and excavator - mostly vacuum truck. Note, breaker and concrete saw were limited to 11pm. Levels below that predicted, likely due to all equipment in permit/model not being used simultaneously as per modelling.		
							147-149 Great North Road		83	53	43	62	No	Y			
							37 Waterview Street		66	56	45	66	No	Y			
							110 Great North Road		75	79	69	86	Yes	Y	Work program 2 in OOHW permit 183 being undertaken - on Great North Road and southern extent of works. Dominant noise source was vac truck, plus concrete saw and breaker (when in use). Other sources of background noise		
							147-149 Great North Road		77	82	70	88	Yes	Y			

21/10/2022		OHW183_221021_FD	G. Wilson	Five Dock	OOHW	183	5 East Street	Cable pulling	79	62	54	82	No	Y	concrete saw and breaker (when in use). Other sources of background noise include traffic, particularly busses, on Great North Road. Good practice observed - effort being made to minimise use of breaker and use saw instead. No shouting or horns observed. Works were slightly above that predicted, but generally in line with predictions.		
31/10/2022	5:45am-6:45am	OHW205_221031_SO	G. Wilson	SOP	OOHW	205	Adjacent to Pullman Hotel	Early start spoil loadout	51	53.1	48	69.1	Yes	Y	Monitoring was conducted in accordance with the AP JV noise monitoring program. Permit 205 was the only permit scheduled for the monitoring period. Ambient noise environment was dominated by traffic pass-by's. At the time of monitoring pass-by's were regular and frequent, but not constant. In addition, there were also nearby train pass-by's at the M2 location as well a single plane pass-by overhead at relatively low altitude. At M1 noise from the Pullman Hotel air con was also constant.	Rion NL-42	Until May 2023
	5:45am-6:45am						Adjacent to 2 Figtree Drive		46	60.4	49	77.9	Yes	Y			
4/11/2022	5:25am-6:40am	OHW205_221104_SO	G. Wilson	SOP	OOHW	205	Adjacent to Pullman Hotel	Early start spoil loadout	51	51.3	50	65.1	Yes	Y	Monitoring was conducted in accordance with the AP JV noise monitoring program. Permit 205 was the only permit scheduled for the monitoring period. Ambient noise environment was dominated by traffic pass-by's. At the time of monitoring pass-by's were regular and frequent, but not constant. In addition, there were also nearby train pass-by's at the M2 location as well a single plane pass-by overhead at relatively low altitude. At M1 noise from the Pullman Hotel air con was also constant. Both monitoring locations were somewhat screened from construction activities	Rion NL-42	Until May 2023
	5:25am-6:40am						Adjacent to 2 Figtree Drive		46	60.8	50	71.9	Yes	Y			
6/12/2022	9:57am	OOHW211_221206_TBY	M.Kleine	TBY	OOHW	211	49 The Crescent Rozelle	CPT Robert St	66	56.5	53	70.1	No	Y	Two monitoring events were undertaken along The Crescent in line with the OOHW Permit. The first at 49 and the second at 43A. During both monitoring events, the dominant noise source was the vac truck operation. Background noise included traffic along Robert Street, with vehicles travelling along The Crescent and traffic taking off from a stationary position at the traffic light intersection along Robert Street observed to be at increased levels and likely the source of LAMax readings.	1. Rion NL-42 (S/N 00145400) 2. Calibrator Pulsar 106 (S/N 70390)	Until 25th May 2023
	10:14am						43A The Crescent Rozelle		76	55.3	50	82.8	No	Y			
14/12/2022	10:53am	OOHW213_221214_TBY		TBY	OOHWP	213	43A The Crescent Rozelle	Service locating Robert St for TBM water supply	73	66.7	65	87.8	No	Y	Three monitoring events were undertaken along The Crescent and Quirk St in line with the OOHW Permit. The first and second along The Crescent at 49 and 43A, with the third at 5/12 Quirk St. During all monitoring events, the dominant noise source was the vac truck operation. Background noise included traffic along Victoria Rd, Quirk St and Robert Street, with vehicles travelling along the streets directly adjacent to the monitoring location and traffic taking off from a stationary position at the traffic light intersection along Robert Street observed to be at increased levels and likely the source of LAMax readings.	1. Rion NL-42 (S/N 00145400) 2. Calibrator Pulsar 106 (S/N 70390)	Until 25th May 2023
	11:15am						49 The Crescent Rozelle		82	72.4	69	88	No	Y			
	11:48am						5/12 Quirk St Rozelle		72	63.6	53	70.4	No	Y			

ATTENDED NOISE MONITORING EXAMPLES

Noise monitoring report

Project: Sydney Metro West – Central Tunnelling Package		**Report No.**	**21028-20220724-01**
Data collected by: J Hutchison		**Date**: 24 July 2022	
Time: 9:30 am to 10:30 am			
Location of construction activity (see Attachment A) A. North Strathfield ancillary site (Queen Street North Strathfield)		**Monitoring locations** 1. 99 Queen Street 2. 121 Queen Street	
Observed construction activity Some minor earthworks with bobcat, hydrema and excavator			
Meteorological conditions			
Wind	Calm		
Temperature (°C):	~12	**Cloud cover**: Clear	
Instrumentation details:	Bruel and Kjaer 2270 S/N 3008237 Calibrator Bruel and Kjaer 4231 S/N 3013508	**Calibration valid until**:	January 2024 January 2024

Instrumentation and method

Monitoring was performed with sound level meter fixed to a tripod at a height of 1.5 meters above ground. The SLM was field calibrated prior to and upon completion of monitoring to ensure measurement consistency. Monitoring was conducted over 15-minute periods at nearest receiver in each location with the fast weighted LAeq, LA90 and LAmax parameters recorded in all cases. See Appendix A for monitoring locations.

Results summary

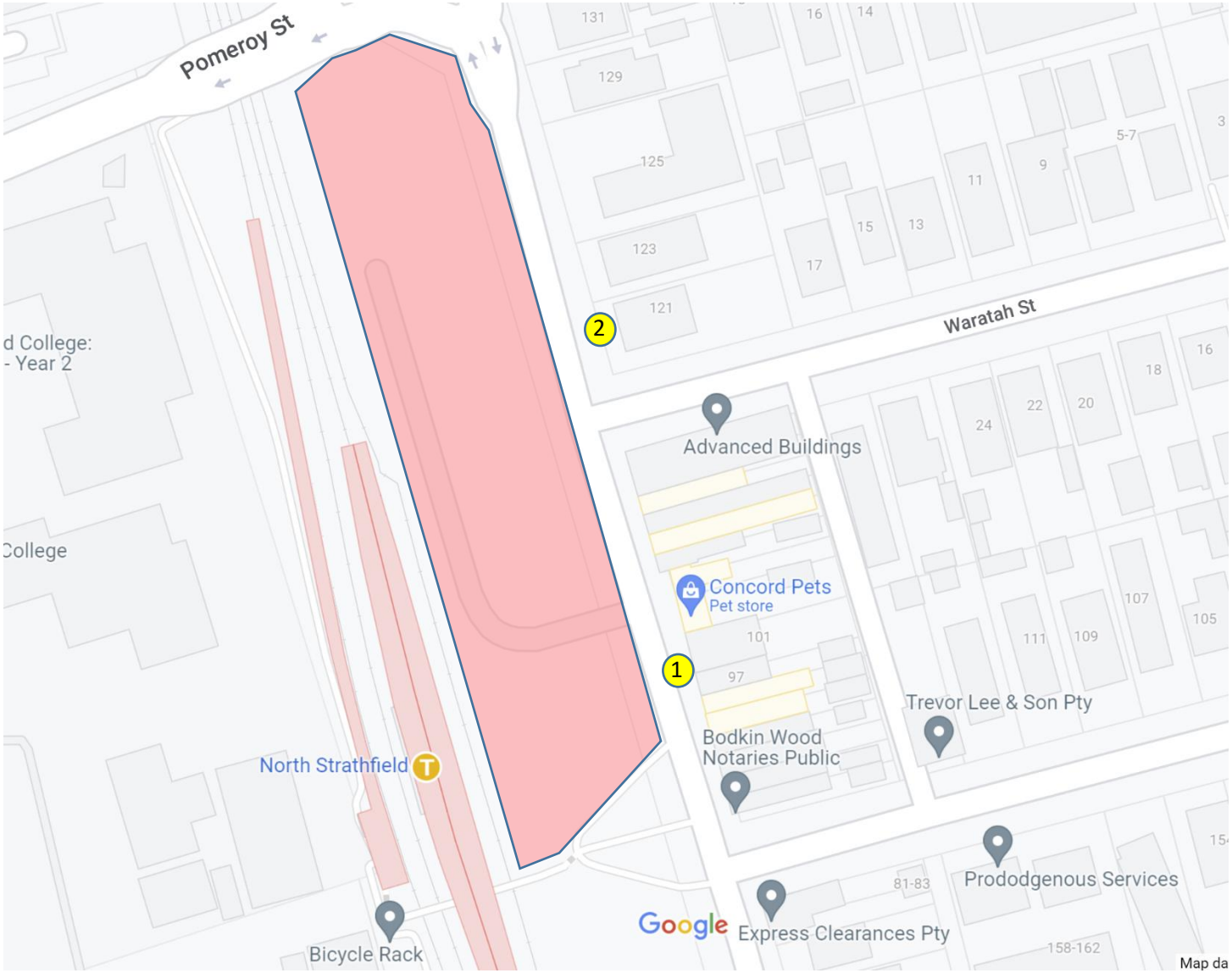
Location 1 was relatively undisturbed by construction activity. Traffic passing in front of receivers was dominant source of noise. Some minor activity on ancillary site barely contributed to overall noise.

At Location 2, continuous excavator operation was around same contribution as traffic to overall noise.

Noise predicted to be around 71 dBA so measurement demonstrated lower. This is due to fewer and smaller plant not necessarily operating in worst-case position.

Location	Time	Observations	LAeq	LA90	LAmax
M1	9:35 AM	Traffic is dominant source of noise in this location ~67 – 79 for light and heavy vehicle pass-by Construction activity not contributing significantly to overall noise Bobcat loading Hydrema, wheeled excavator moving around the site (barely audible) Street sweeper Lmax during pass-by ~ 88 dBA Truck parking in street (non-construction) – 68 dBA Planes overhead x 3 ~ 69 dBA Hydrema idling @ 30 metres – 57 dBA Bob cat 67 dBA at 19 metres	68.9	57.3	88
M2	10:14 AM	Two excavators operating together ~ 69-70 dBA After a few minutes, one left the area 68 dBA at 28 metres for remaining. Local pass-bys 70 – 72 dBA but most of Leq value is due to excavator operation – estimate 66 – 67 dBA. Street sweeper pass-by ~ 80 dBA at 10 m.	69.0	64.7	80.6

Attachment A Monitoring and work locations



Monitoring location

Work location

Noise monitoring report

Project: Sydney Metro West – Central Tunnelling Package		**Report No. OOHW205_221031_SOP**	
Data collected by: G Wilson		**Date**: 31/10/22	
Time: 5.45am – 6-45am			
Location of construction activity (see Attachment A) Sydney Olympic Park		**Monitoring locations** M1. Adjacent to Pullman Hotel M2. Adjacent to 2 Fig Tree Drive	
Observed construction activity Spoil load out.			
Meteorological conditions			
Wind	Calm conditions, no wind		
Temperature (°C):	15	**Cloud cover**: Clear skies ~ 5% cloud cover	
Instrumentation details:	1. Rion NL-42	**Calibration valid until**:	May 2023

Instrumentation and method

Monitoring was performed with sound level meter fixed to a tripod at a height of 1.5 meters above ground. The SLM was field calibrated prior to and upon completion of monitoring to ensure measurement consistency. Monitoring was conducted over 15-minute periods at nearest receiver in each location with the fast weighted LAeq, LA90 and LAmax parameters recorded in all cases. See Appendix A for monitoring locations.

Results summary

Monitoring was conducted in accordance with the AFJV noise monitoring program. Permit 205 was the only permit scheduled for the monitoring period.

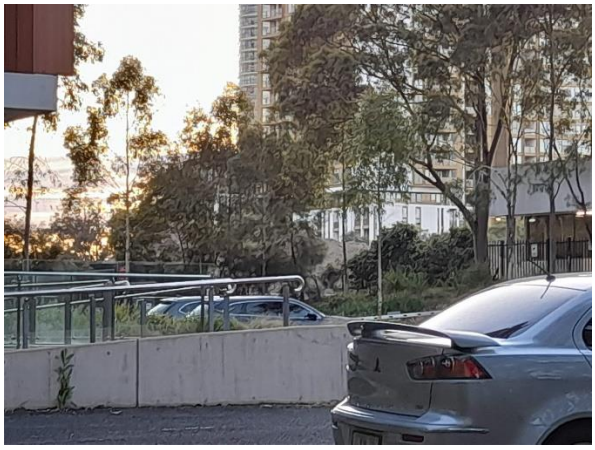
Ambient noise environment was dominated by traffic pass-by's. At the time of monitoring pass-by's were regular and frequent, but not constant. In addition, there were also nearby train pass-by's at the M2 location as well a single plane pass-by overhead at relatively low altitude. At M1 noise from the Pullman Hotel air con was also constant.

Both monitoring locations were somewhat screened from construction activities, with a stockpile between activities and location M1 and the site sheds between the activities and M2.

Noise from construction activities were only just audible above ambient noise levels at the monitoring locations, and at certain times were not audible at all. Occasionally the noise of spoil being placed in trailer was audible, presumably at the start of filling a new trailer. At M2 a non-tonal alarm (squawker) was briefly audible. No horns or tonal alarms were observed during the monitoring period. No shouting was observed.

The estimation of construction noise contribution was difficult to determine due to only intermittently and faintly being audible over ambient levels. As such, it is not considered that construction noise is making a substantial contribution to the measured LAeq's. Measured noise level prior to construction was greater than RBL.

However, it should also be noted that the Figtree Drive exit was not in use. Monitoring should be re-undertaken once this driveway is in use.

Location	Time	Observations	LAeq	LA90	LAmax
M1	5.57am – 6.12am	Located adjacent to Pullman Hotel, between the hotel and site (see Appendix A). Monitoring started just prior to 6am to capture noise before construction activities. Noise level prior to 6am ~ 49-55dB. Trucks arriving to site via Olympic Boulevard just prior to 6am. Dominant noise source is air con from hotel (constant humming sound) – 49dB, and frequent car and truck pass by's on Olympic Boulevard and Herb Elliot Avenue – 55-65 dB. 6.07am truck driving on Olympic Boulevard generated LAMax – 69dB Noise of loading trucks and trucks moving on site was barely perceptible above background noise, and was only perceptible intermittently. View towards construction site: 	53.1	48.2	69.1
M2	6.24am – 6.39am	Located adjacent to 2 Figtree Drive, next to corner with Kookaburras Lane (see Appendix A). Dominant noise source was passing traffic on Figtree Drive – 60-71 dB – particularly vehicles turning into and out of Kookaburras Lane. 6.25am small truck turning into Kookaburras Lane generated LAmax – 78dB. 6.33am train pass by audible twice – was the same train, once from east and second from south as it came around apartment block. 6.37am dog barking in nearby apartment terrace ~ 65dB. View towards construction site: 	60.4	49.1	77.9

Attachment A Monitoring and work locations

Noise monitoring report

Project: Sydney Metro West – Central Tunnelling Package	**Report No.** **21028-20220726-01**
Data collected by: J Hutchison	**Date**: 26 July 2022
Time: 11:30 pm to 12:30 am	
Location of construction activity (see Attachment A) A. Intersection of Robert Street and Crescent St, Rozelle	**Monitoring locations** 1. 7 Quirk Street Rozelle
Observed construction activity Vacuum truck and small excavator carrying out utility works	

Meteorological conditions			
Wind	Calm		
Temperature (°C):	~11	**Cloud cover**: Clear	
Instrumentation details:	Bruel and Kjaer 2270 S/N 3008237 Calibrator Bruel and Kjaer 4231 S/N 3013508	**Calibration valid until**:	January 2024 January 2024

Instrumentation and method

Monitoring was performed with sound level meter fixed to a tripod at a height of 1.5 meters above ground. The SLM was field calibrated prior to and upon completion of monitoring to ensure measurement consistency. Monitoring was conducted over 15-minute periods at nearest receiver in each location with the fast weighted LAeq, LA90 and LAmax parameters recorded in all cases. See Appendix A for monitoring locations.

Results summary

Works proposed for monitoring during the survey period were within the WBPS site and inaudible in this location.

Additional works at intersection of Crescent Street and Robert Street were clearly audible with the vacuum truck at similar level of noise to traffic.

Sporadic compactor noise and reverse alarms (quacker).

Location	Time	Observations	LAeq	LA90	LAmax
M1	11:30 PM	Vacuum truck started up and is clearly audible and continuous at around 70 metres with 57 dBA Traffic approximately equal contribution when combined ~ 60 – 62 dBA Vac truck continued for 10 mins then stopped. When no traffic and no vac truck ~ 51 – 52 dBA. Traffic without vac truck 57 – 58 dBA Vac truck restarted – 59 – 60 dBA	59.6	56.0	71.0
M1	11:46 PM	Vac truck and traffic combined – 60 dBA No traffic – 57 – 58 dBA Local motorbike – 76 dBA pass-by Wacka packa started around midnight for a short time, then a plate compactor as well (more distant)	59.5	55.6	76.4

Attachment A Monitoring and work locations

APPENDIX B VIBRATION MONITORING LOCATIONS AND RESULTS

Sydney Metro West - CTP

Monitoring Locations - The Bays

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

MONITORING

Noise and Vibration

Sound

Vibration

0 50 100 m

This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

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Sydney Metro West - CTP

Monitoring Locations- Five Dock

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

MONITORING

Noise and Vibration

Sound

Vibration

0 20 40 m

This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

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Sydney Metro West - CTP

Monitoring Locations- Burwood North

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

MONITORING

Noise and Vibration

Sound

Vibration

0 25 50 m

This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

afJV

Sydney Metro West - CTP

Monitoring Locations-North Strathfield

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

MONITORING

Noise and Vibration

Sound

Vibration

0 40 80 m

This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

afJV

Sydney Metro West - CTP

Monitoring Locations - Sydney Olympic Park

Legend

CONSTRUCTION

Site Schedule Boundary / EPL

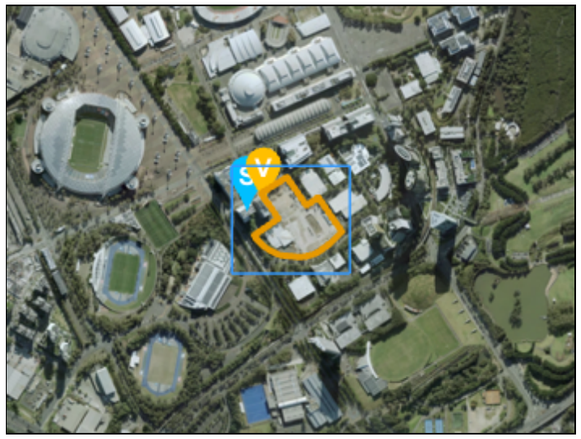
MONITORING

Noise and Vibration

Sound

Vibration

0 30 60 m



This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

afJV

Vibration Exceedance Register

				Exceedance (2.5mm/s trigger)				
Date	**Time**	**Site**	**Logger Location**	**mm/s**	**Hz**	**Works being undertaken**	**Investigation Notes**	**Corrective / Preventative Actions**
6/12/2022	7:51	FYD	Saint Albans Church	13	410	Works being undertaken included- the installation of new air-conditioning units.	the subcontractors engaged by the church have stored materials on top of The geophone and have been using hammer drills for installation of The brackets required to fix The air-conditioning unit to The wall and for The installation of the air-conditioning switches.	Having received the text notification of The exceedance, The site environmental advisor contacted the project engineer to understand the source of the vibration. He noted no vibratory works had been occurring on site.
21/12/2022	15:43	The Bays	WBPS Silos	3.2	228	No AFJV work at eastern end of station box	Not associated with AFJV works. Car noted in viewer parked close to monitor location which maybe associated with exccedance.	N/A

APPENDIX C WTP SAMPLING AND DISCHARGE TRACKER

The Bays T-WTP Sampling and Discharge Summary

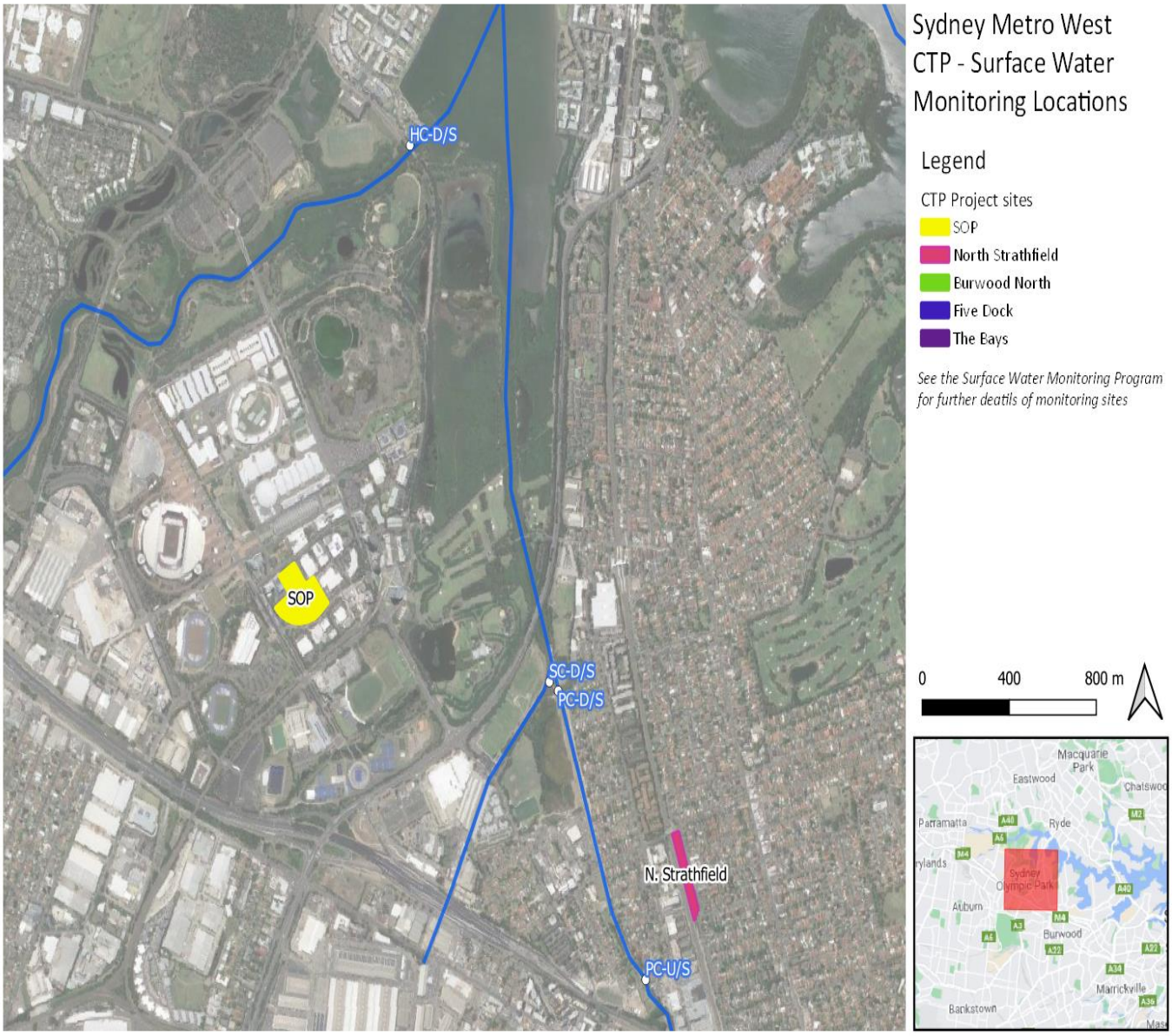
Sample Date	Site / WTP	Source Water	Lab ID	Notes	pH	Turbidity	Oil and Grease	Hydrocarbons TRH (C6-C9)	Arsenic	Cobalt	Copper	Iron	Manganese	Nickel	Zinc	Ammonia	Nitrate + nitrite (oxidised nitrogen)	Nitrogen (total)	Perfluorooctane sulphonate (PFOS)	Phosphorus (total)
					Lab	TSS (Lab)	Visual	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab
				UoM	pH units	mg/L	Y/N	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
				WPIA Criteria	6.5-8.5	50		100	90	1	1.3	300	1900	70	8	900	200	700	0.13	1000
				PL Criteria	6.5-8.5	50	N	None	90	None	None	None	1900	70	None	None	200	700	0.13	1000
1/07/2022	TBY	Untreated	299522	**Fortnight 2** Sampling of untreated water from mixing tank	11.8	54	N	10	1	1	6	60	5	1	1	310	820	2200	0.02	60
1/07/2022	TBY / T-WTP 1	Treated	299523	**Fortnight 2** Water discharge continued under EPL.	7.6	10	N	10	1	1	1	10	5	1	1	150	100	200	0.01	50
15/07/2022	TBY	Untreated	300585	**Fortnight 3** Sampling of untreated water from mixing tank	12	13000	N	10	1	1	9	30	5	1	2	980	300	3400	0.02	3300
15/07/2022	TBY / T-WTP 1	Treated	300586	**Fortnight 3** Water discharged continued under EPL.	8.4	66	N	10	1	1	8	1200	36	2	44	430	300	900	0.01	50
18/07/2022	TBY	Treated	300706	**Retest**		2.5	N	10	1	1	1	20	5	1	2	630	7	900	0.02	50
26/07/2022	TBY	Untreated	301379	**Fortnight 4** Sampling of untreated water from mixing tank.	9.2	2300	N	10	10	1	3	10	5	1	1	1400	550	2800	0.02	1800
26/07/2022	TBY / T-WTP 1	Treated	301377	**Fortnight 4** Water discharge continued under EPL.	7.2	5	N	10	1	1	1	10	5	1	1	95	60	200	0.01	50
9/08/2022	TBY	Untreated	302679	**Fortnight 5** Sampling of untreated water from mixing tank.	11.5	35000	N	11	1	1	7	80	5	1	2	1400	400	4700	0.01	4700
9/08/2022	TBY / T-WTP 1	Treated	302695	**Fortnight 5** Water discharge continued under EPL.	6.5	19	N	10	1	1	1	10	5	1	1	250	100	400	0.01	50
22/08/2022	TBY	Untreated	303725	**Fortnight 6** Sampling of untreated water from mixing tank.	11.2	72000	N	10	4	1	3	40	5	1	1	210	770	1700	0.02	200
22/08/2022	TBY / T-WTP 1	Treated	303724	**Fortnight 6** Water discharge continued under EPL.	7.6	5	N	10	1	1	1	10	5	2	2	23	80	100	0.01	50
5/09/2022	TBY	Untreated	304830	**Fortnight 7** Sampling of untreated water from mixing tank.	11.2	3600	N	10	2	1	9	80	5	1	1	1200	1300	4100	0.02	1400
5/09/2022	TBY / T-WTP 1	Treated	304829	**Fortnight 7** Water discharge continued under EPL.	7.6	26	N	10	1	1	1	80	5	1	4	270	100	400	0.01	50
9/09/2022	TBY	Untreated	305309	**Fortnight 7** Sampling for commissioning of T-WTP 2.	8.1	600	N	10	3	1	2	10	15	1	1	3000	690	6200	0.02	400
9/09/2022	TBY / T-WTP 2	Treated	305311	**Fortnight 7** Sampling for commissioning of 2nd WTP. No discharge occurred from T-WTP 2.	6.6	10	N	10	1	1	1	10	5	1	1	44	30	100	0.01	50
				Fortnightly sampling period complete. Commence sampling in accordance with EPL Clause M2.2.																
5/10/2022	TBY / T-WTP	Untreated	307284	**Month 1** Sampling of untreated water from mixing tank.	9.9	2000	N	10	8	5	18	8200	150	14	79	690	400	2500	0.01	600
5/10/2022	TBY / T-WTP	Treated	307283	**Month 1** Water discharge continued under EPL. Sampling of discharge from T-WTP (both 1 & 2).	8.5	10	N	10	1	1	1	190	5	1	1	85	70	100	0.01	50
2/11/2022	TBY / T-WTP	Untreated	309550	**Month 2** Sampling of untreated water from mixing tank.	11.4	46000	N	10	1	1	3	100	5	1	1	510	200	1800	0.01	8600
2/11/2022	TBY / T-WTP	Treated	309551	**Month 2** Water discharge continued under EPL. Sampling of discharge from T-WTP (1).	6.5	5	N	10	1	1	1	20	5	1	3	60	90	300	0.01	50
2/11/2022	TBY / T-WTP	Treated	309552	**Month 2** Water discharge continued under EPL. Sampling of discharge from T-WTP (2).	7	5	N	10	1	1	1	10	5	1	1	130	60	300	0.01	50
1/12/2022	TBY / T-WTP	Untreated	312057	**Month 3** Sampling of untreated water from mixing tank.	11.8	7900	N	29	1	1	3	60	5	1	1	190	300	4100	0.01	2000

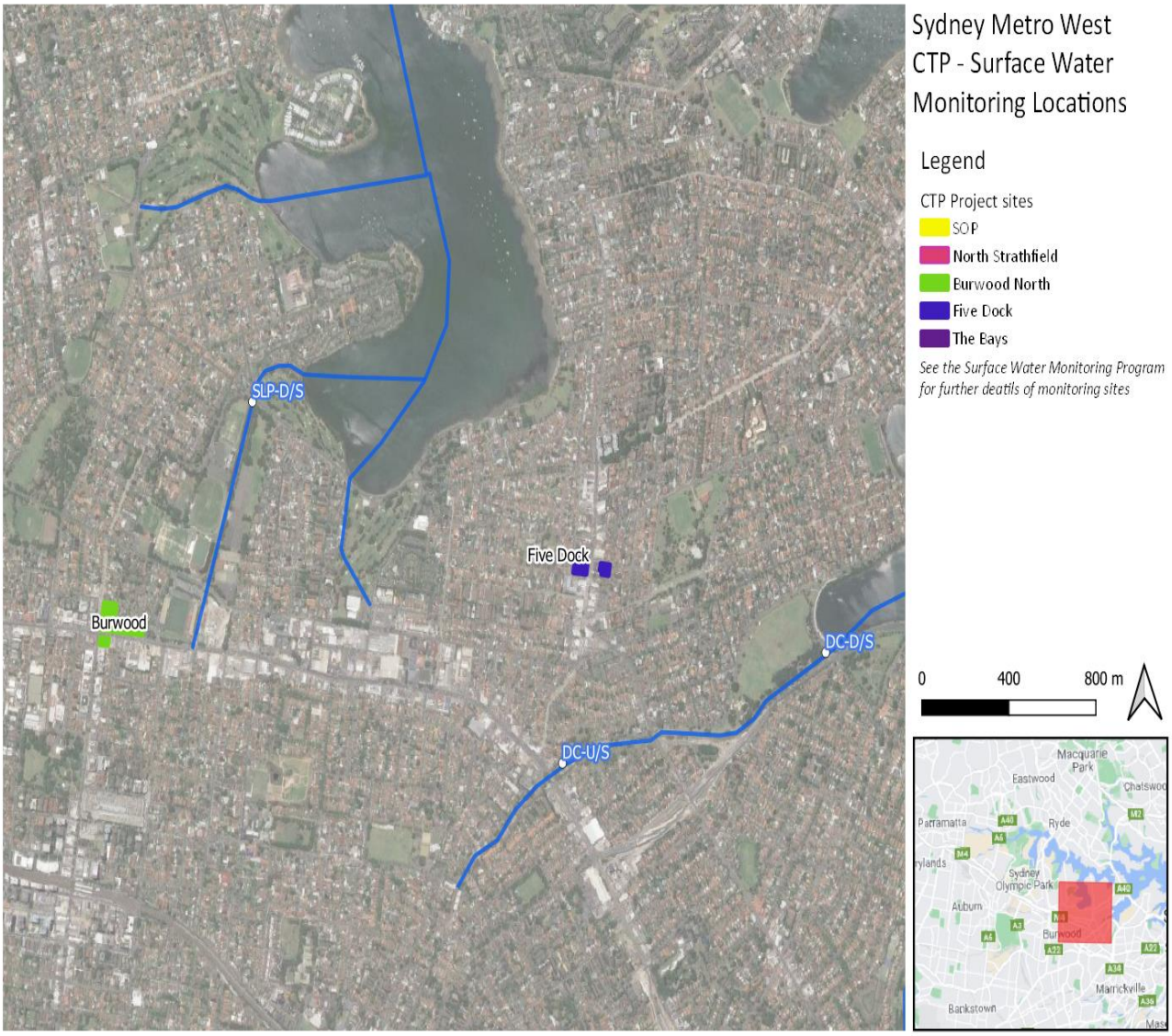
1/12/2022	TBY / T-WTP	Treated	312058	**Month 3** Water discharge continued under EPL. Sampling of discharge from T-WTP (1).	7.7	5	N	10	1	1	1	10	5	1	1	82	30	100	0.01	200
1/12/2022	TBY / T-WTP	Treated	312055	**Month 3** Water discharge continued under EPL. Sampling of discharge from T-WTP (2).	8.3	5	N	31	1	1	1	10	5	1	15	54	90	100	0.01	50

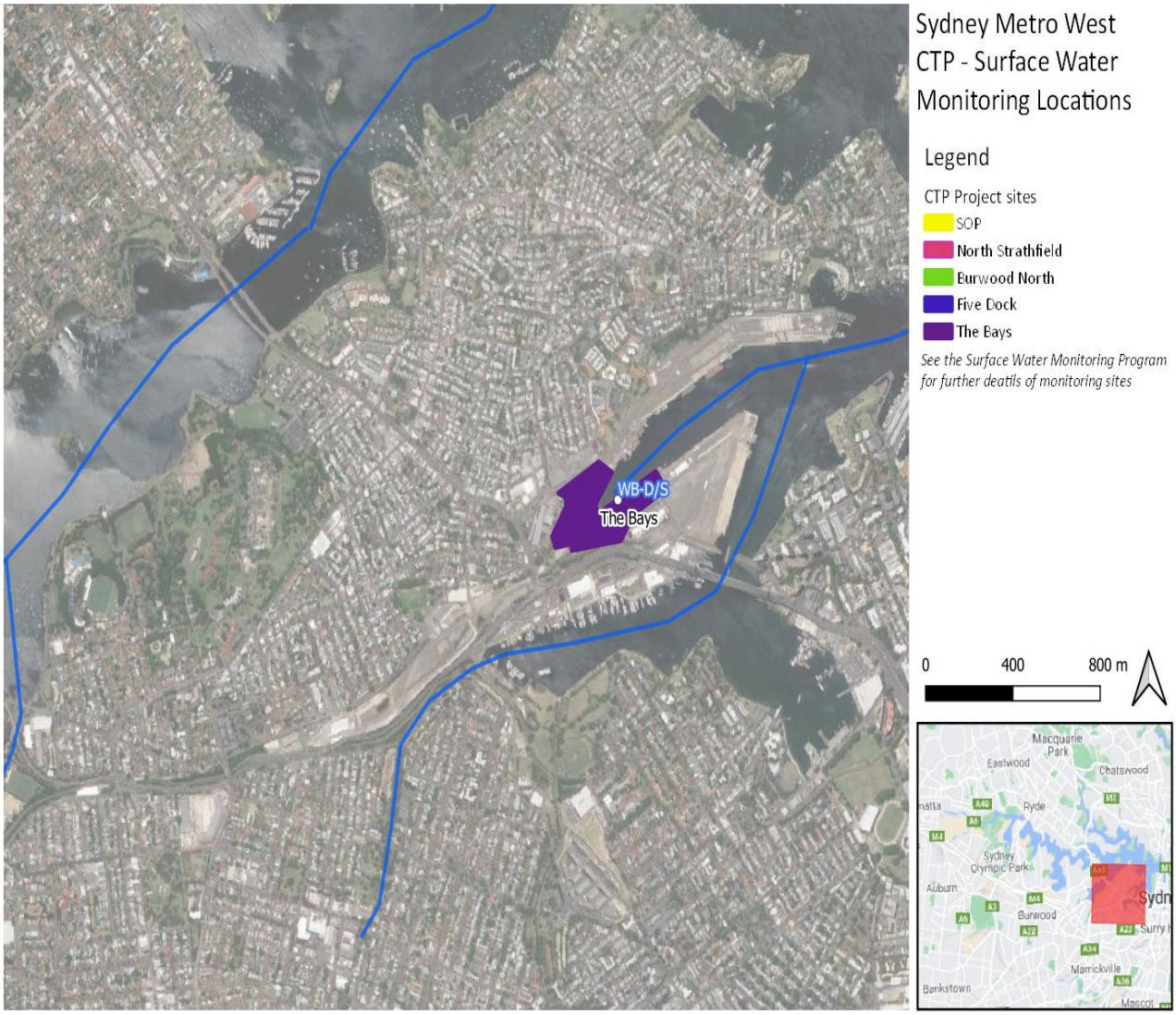
Burwood WTP Sampling and Discharge Summary

Sample Date	Site / WTP	Source Water	Lab ID	Notes	pH	Turbidity	Oil and Grease	Hydrocarbons TRH (C6-C9)	Aluminium	Arsenic	Cadmium	Chromium (VI) Compounds	Cobalt	Copper	Iron	Lead	Manganese	Nickel	Zinc	Ammonia	Nitrate + nitrite (oxidised nitrogen)	Nitrogen (total)	Perfluorooctane sulphonate (PFOS)	Phosphorus (total)
				Sampling	Lab	TSS (Lab)	Visual	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab	Lab
				UoM	pH units	mg/L	Y/N	ug/L	ug/l	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
				EPL Criteria	6.5-8.5	15	N	100	55	None	0.7	4.4	1	1.3	300	4.4	80	7	8	910	200	300	0.00023	30
20/12/2022	BWD	Untreated	313599	DAY 1	11.2	12	N	0.014	790	1	0.1	11	1	12	150	1	7	1	2	0.15	0.97	2	0.0023	0.05
20/12/2022	BWD	Treated	313592	DAY 1	7	5	N	0.001	60	1	0.1	1	1	1	10	1	5	1	1	0.005	0.164	0.2	0.0003	0.05

APPENDIX D SURFACE WATER MONITORING


Sydney Metro West
CTP - Surface Water
Monitoring Locations
Legend
CTP Project sites
SOP
North Strathfield
Burwood North
Five Dock
The Bays
See the Surface Water Monitoring Program for further deatils of monitoring sites
0
400
800 m
HC-D/S
SOP
SC-D/S
PC-D/S
N. Strathfield
PC-U/S
Macquarie Park
Eastwood
Chatswood
Parramatta
Ryde
Sydney Olympic Park
Auburn
Burwood
Marrickville
Bankstown


Sydney Metro West
CTP - Surface Water
Monitoring Locations
Legend
CTP Project sites
SOP
North Strathfield
Burwood North
Five Dock
The Bays
See the Surface Water Monitoring Program for further deatils of monitoring sites
SLP-D/S
Five Dock
Burwood
DC-D/S
DC-U/S
0
400
800 m
Macquarie Park
Eastwood
Parramatta
Ryde
Sydney Olympic Park
Auburn
Burwood
Marrickville
Bankstown


Sydney Metro West
CTP - Surface Water
Monitoring Locations
Legend
CTP Project sites
SOP
North Strathfield
Burwood North
Five Dock
The Bays
See the Surface Water Monitoring Program for further deatils of monitoring sites
WB-D/S
The Bays
0
400
800 m
Macquarie Park
Eastwood
Chatswood
Ryde
Sydney Olympic Park
Auburn
Burwood
Marrickville
Bankstown
Mascot

Existing water quality conditions before construction

Watercourse	Water quality characteristics relevant to ANZECC/ARMCANZ (2000) Indicators
White bay	• Elevated nutrient concentrations • Elevated heavy metal concentrations • High turbidity
Dobroyd Canal	• Low dissolved oxygen levels • Elevated nutrient concentrations • Elevated heavy metal concentrations • High turbidity
St Lukes Park Canal	• Low dissolved oxygen levels • Elevated nutrient concentrations • Elevated heavy metal concentrations • High turbidity
Powells Creek	• Low dissolved oxygen levels • Elevated nutrient concentrations • Elevated heavy metal concentrations • High turbidity
Saleyards Creek	• Low dissolved oxygen levels • Elevated nutrient concentrations • Elevated heavy metal concentrations • High turbidity
Haslams Creek	• Elevated nutrient concentrations • Elevated heavy faecal coliforms

Sydney Metro West - Central Tunnelling Package
Surface Water Monitoring

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

Rev: 00	Last Updated:	20/01/2023

LEGEND

Preliminary Trigger Value Exceedance

							Field Measurement														Monitoring Equipment			
SW Monitoring ID	Waterway Name	Coordinates	Date	Person (Undertaking Measurements)	Sample Time	Monitoring Category	pH	Temp (degrees)	DO (mg/L)	DO (%)	Electrical Conductivity (mS/cm)	Electrical Conductivity (µS/cm)	Turbidity (NTU)	Visual Inspection (Oil & Grease)	Current Weather Conditions	Rainfall in last 24hrs Sydney (Observatory Hill) (mm)	Rainfall in last 24hrs ydney Olympic Park AWS (Archery Centre) (mm)	Additional Comments	Brand of Instrument	Model of Instrument	Serial No	Calibration Certification
WB-D/S	White Bay	-33.866245° S, 151.180450° E	5/07/2022	Oliver Gilroy-Sarkies	9:53 AM	Post-Rainfall Monitoring	7.78	15.49	12.77	138	20.8	20800	11.9	None	Light rain with moderate wind	72.6	92.8	Tidal flow	Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	5/07/2022	Oliver Gilroy-Sarkies	10:20 AM	Post-Rainfall Monitoring	7.65	15.49	13.76	138	0.356	356	60.2	None	Moderate rain, strong wind	72.6	92.8	Tidal flow, water visibly turbid	Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	5/07/2022	Oliver Gilroy-Sarkies	10:38 AM	Post-Rainfall Monitoring	7.33	15.89	10.55	106.8	0.299	299	62.3	None	Light rain, moderate wind	72.6	92.8	High flow, water visibly turbid	Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	5/07/2022	Oliver Gilroy-Sarkies	10:51 AM	Post-Rainfall Monitoring	7.37	15.73	10.28	103.7	0.377	377	34.7	None	Light rain, Light wind	72.6	92.8	Low flow, water visibly turbid	Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	5/07/2022	Oliver Gilroy-Sarkies	11:11 AM	Post-Rainfall Monitoring	7.45	15.65	13.07	131.6	0.37	370	59.5	None	Light rain, Light wind	72.6	92.8	High flow, water visibly turbid	Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	5/07/2022	Oliver Gilroy-Sarkies	11:23 AM	Post-Rainfall Monitoring	7.17	15.63	10.96	110.3	0.596	596	48	None	Overcast conditions, Strong wind	72.6	92.8	Tidal flow, water visibly turbid	Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	5/07/2022	Oliver Gilroy-Sarkies	11:28 AM	Post-Rainfall Monitoring	7.56	15.08	10.08	100.2	0.264	264	57.6	None	Overcast conditions, Strong wind	72.6	92.8	Tidal flow, water visibly turbid	Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	5/07/2022	Oliver Gilroy-Sarkies	11:47 AM	Post-Rainfall Monitoring	7.45	14.97	12.82	127.4	1.03	1030	39.6	None	Overcast conditions, light wind	72.6	92.8	Tidal flow	Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
WB-D/S	White Bay	-33.866245° S, 151.180450° E	29/07/2022	Oliver Gilroy-Sarkies	10:18 AM	Monthly Monitoring	8.13	16.37	6.92	82.7	41	41000	2.4	None	Sunny, moderate wind	0	0	Tidal flow	Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	29/07/2022	Oliver Gilroy-Sarkies	11:13 AM	Monthly Monitoring	7.77	15.56	11.02	126.2	34.6	34600	18.2	None	Sunny, moderate wind	0	0	Tidal flow	Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	29/07/2022	Oliver Gilroy-Sarkies	11:20 AM	Monthly Monitoring								None	Sunny, moderate wind	0	0	Water level to low to sample	Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	29/07/2022	Oliver Gilroy-Sarkies	11:34 AM	Monthly Monitoring	7.69	15.76	8.31	91.9	25.1	25100	36.2	None	Sunny, light wind	0	0	low flow, odour present surroundign w	Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	29/07/2022	Oliver Gilroy-Sarkies	11:47 AM	Monthly Monitoring	8.7	13.41	12.66	121.9	1.87	1870	33.3	None	Sunny, moderate wind	0	0	Low flow	Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	29/07/2022	Oliver Gilroy-Sarkies	11:58 AM	Monthly Monitoring	7.75	15.07	9.94	107.6	23.2	23200	19.4	None	Sunny, moderate wind	0	0	Tidal flow, Evidence of illeagl fish dum	Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	29/07/2022	Oliver Gilroy-Sarkies	12:02 PM	Monthly Monitoring	7.53	15.52	5.01	55.1	25	25000	13.9	None	Sunny, moderate wind	0	0	Tidal flow	Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	29/07/2022	Oliver Gilroy-Sarkies	12:18 PM	Monthly Monitoring	7.77	15.29	5.66	64.2	34.1	34100	8.3	None	Sunny, moderate wind	0	0	Tidal flow	Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
WB-D/S	White Bay	-33.866245° S, 151.180450° E	12/08/2022	Oliver Gilroy-Sarkies Aaheli Chattopadhyay	11.13 AM	Monthly Monitoring	7.75	16.05	10.52	127.1	44.8	44800	7.3	None	Cloudy, no wind, light rain	0.6	0.4	Tidal flow	Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	12/08/2022	Oliver Gilroy-Sarkies Aaheli Chattopadhyay	11.38 AM	Monthly Monitoring	7.85	14.16	9.28	95.8	20.9	20900	19.2	Shean streak visible on water surface	Light rain, no wind, cloudy	0.6	0.4	Tidal flow, Visible Debris on surface of water	Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	12/08/2022	Oliver Gilroy-Sarkies Aaheli Chattopadhyay	11:48 AM	Monthly Monitoring						0		None	Cloudy, no wind	0.6	0.4	Water level too low to sample	Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	12/08/2022	Oliver Gilroy-Sarkies Aaheli Chattopadhyay	12:02 PM	Monthly Monitoring	7.79	15.33	9.43	104.1	27	27000	16.7	None	Cloudy, no wind	0.6	0.4	Low flow, muddy water	Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	12/08/2022	Oliver Gilroy-Sarkies Aaheli Chattopadhyay	12:14 PM	Monthly Monitoring						0		None	Cloudy, no wind	0.6	0.4	Water level too low to sample	Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	12/08/2022	Oliver Gilroy-Sarkies Aaheli Chattopadhyay	12:27 PM	Monthly Monitoring	8.11	15.06	12.97	141.2	24.9	24900	18.7	None	Cloudy, no wind	0.6	0.4	Moderate Flow	Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	12/08/2022	Oliver Gilroy-Sarkies Aaheli Chattopadhyay	12:31 PM	Monthly Monitoring	7.67	14.94	6.91	78.1	34.8	34800	13.4	None	Cloudy, no wind	0.6	0.4	Moderate flow, odour from the dead fish dumped	Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	12/08/2022	Oliver Gilroy-Sarkies Aaheli Chattopadhyay	12:48 PM	Monthly Monitoring	7.96	14.79	8.04	94.2	43.6	43600	7.8	None	Cloudy, no wind	0.6	0.4	Tidal Flow	Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
27.9	White Bay	-33.866245° S, 151.180450° E	6/09/2022	Aaheli Chattopadhyay Kelvin Nmereole	10:26 AM	Post-Rainfall Monitoring	6.28	16.19	12.08	123	41	41000	8	None	Partly cloudy	2.4	2.2	Todal flow	Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	6/09/2022	Aaheli Chattopadhyay Kelvin Nmereole	10:54 AM	Post-Rainfall Monitoring	7.47	15.25	13.41	137.4	9.03	9030	59.2	None	Partly cloudy	2.4	2.2		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	6/09/2022	Aaheli Chattopadhyay Kelvin Nmereole	11:10 AM	Post-Rainfall Monitoring						0		None	Partly cloudy	2.4	2.2		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	6/09/2022	Aaheli Chattopadhyay Kelvin Nmereole	11:28 AM	Post-Rainfall Monitoring	6.97	17.26	10.39	104	3.08	3080	60	None	Sunny	2.4	2.2		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	6/09/2022	Aaheli Chattopadhyay Kelvin Nmereole	11:42 AM	Post-Rainfall Monitoring						0		None	Sunny	2.4	2.2		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	6/09/2022	Aaheli Chattopadhyay Kelvin Nmereole	11:56 AM	Post-Rainfall Monitoring	8.01	17.49	11.4	124.3	12.3	12300	17.6	Debris in water (dead fish and carss)	Sunny	2.4	2.2		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	6/09/2022	Aaheli Chattopadhyay Kelvin Nmereole	11:59 AM	Post-Rainfall Monitoring	7.49	16.02	12.08	131.9	20.4	20400	22.4	Shean streak visible on water surface	Sunny	2.4	2.2		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	6/09/2022	Aaheli Chattopadhyay Kelvin Nmereole	12:17 PM	Post-Rainfall Monitoring	7.79	17.38	11.12	134.2	38.6	38600	12	None	Sunny	2.4	2.2		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
WB-D/S	White Bay	-33.866245° S, 151.180450° E	11/10/2022	Aaheli Chattopadhyay Andris Mclean	11:20 AM	Monthly Monitoring/ Post-Rainfall Monitoring	8.12	17.95	10.57	132	44	44000	17.2	Some debris on the side of water	Partly cloudy	2.2	0		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	11/10/2022	Aaheli Chattopadhyay Kelvin Nmereole	12:20 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7.69	18	7.6	90	39.9	39900	39	None	Partly cloudy	2.2	0		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	11/10/2022	Aaheli Chattopadhyay Kelvin Nmereole	12:28 PM	Monthly Monitoring/ Post-Rainfall Monitoring						0		None	Partly cloudy	2.2	0		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	11/10/2022	Aaheli Chattopadhyay Kelvin Nmereole	12:45 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.4	18.61	10.34	111.4	2.29	2290	179	Turbid water	Partly cloudy	2.2	0		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	11/10/2022	Aaheli Chattopadhyay Kelvin Nmereole	1:00 PM	Monthly Monitoring/ Post-Rainfall Monitoring						0		None	Partly cloudy	2.2	0		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	11/10/2022	Aaheli Chattopadhyay Kelvin Nmereole	1:09 PM	Monthly Monitoring/ Post-Rainfall Monitoring	8.66	18.86	15.78	172.4	5.18	5180	57.3	Slightly turbid	Partly cloudy	2.2	0		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	11/10/2022	Aaheli Chattopadhyay Kelvin Nmereole	1:15 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.85	17.9	8.21	90.4	5.08	5080	75.2	Slightly turbid	Partly cloudy	2.2	0		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	11/10/2022	Aaheli Chattopadhyay Kelvin Nmereole	1:38 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.32	17.55	6.01	66.7	17	17000	85.3	None	Partly cloudy	2.2	0		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
WB-D/S	White Bay	-33.866245° S, 151.180450° E	15/11/2022	Aaheli Chattopadhyay Andris Mclean	2:28 PM	Monthly Monitoring/ Post-Rainfall Monitoring	8	21.33	6.98	95.2	42.9	42900	5.5	None	Sunny	37.6	29		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	15/11/2022	Aaheli Chattopadhyay Andris Mclean	1:36 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.74	23.17	5.7	80.4	49.6	49600	10.1	None	Sunny	37.6	29		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	15/11/2022	Aaheli Chattopadhyay Andris Mclean	1:27 PM	Monthly Monitoring/ Post-Rainfall Monitoring	9.03	22.69	10.75	124.9	0.731	731	39.8	None	Sunny	37.6	29		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	15/11/2022	Aaheli Chattopadhyay Andris Mclean	1:17 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.66	23.17	8.25	105.4	25.4	25400	25.3	None	Sunny	37.6	29		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	15/11/2022	Aaheli Chattopadhyay Andris Mclean	12:50 PM	Monthly Monitoring/ Post-Rainfall Monitoring								None	Sunny	37.6	29		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	15/11/2022	Aaheli Chattopadhyay Andris Mclean	12:57 PM	Monthly Monitoring/ Post-Rainfall Monitoring	6.77	23.58	7.83	94.8	7.22	7220	45	None	Sunny	37.6	29		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	15/11/2022	Aaheli Chattopadhyay Andris Mclean	1:00 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.45	22.43	83.32	39.5	9.44	9440	15.5	None	Sunny	37.6	29		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	15/11/2022	Aaheli Chattopadhyay Andris Mclean	2:01 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.82	22.92	7.05	93.6	36.3	36300	10.5	None	Sunny	37.6	29		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
WB-D/S	White Bay	-33.866245° S, 151.180450° E	20/12/2022	Aaheli Chattopadhyay Kelvin Nmeoreole	2:28 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.91	20.89	7.09	96.8	51.7	51700	2	None	Sunny	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
DC-D/S	Dobroyd Canal / Iron Cove Creek	-33.870604° S, 151.141474° E	20/12/2022	Aaheli Chattopadhyay Kelvin Nmeoreole	1:36 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.69	21.38	6.44	88.3	50.9	50900	16.6	None	Sunny	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM

DC-U/S	Dobroyd Canal / Iron Cove Creek	-33.873828 ° S, 151.128243° E	20/12/2022	Aaheli Chattopadhyay Kelvin Nmeoreole	1:27 PM	Monthly Monitoring/ Post-Rainfall Monitoring								None	Sunny	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SLP-D/S	St Lukes Park Canal	-33.861571° S , 151.113347° E	20/12/2022	Aaheli Chattopadhyay Kelvin Nmeoreole	1:17 PM	Monthly Monitoring/ Post-Rainfall Monitoring								None		5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-U/S	Powells Creek	-33.862145° S, 151.086294° E	20/12/2022	Aaheli Chattopadhyay Kelvin Nmeoreole	11:01 AM	Monthly Monitoring/ Post-Rainfall Monitoring								None	Sunny	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\13. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
PC-D/S	Powells Creek	-33.852589° S, 151.082359° E	20/12/2022	Aaheli Chattopadhyay Kelvin Nmeoreole	11:12 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7	23.58	8.23	98.6	7.22	7220	45	None	Sunny	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
SC-D/S	Saleyards Creek	-33.852282° S, 151.081934° E	20/12/2022	Aaheli Chattopadhyay Kelvin Nmeoreole	11:16 AM	Monthly Monitoring/ Post-Rainfall Monitoring	7.36	21.36	4.57	60.9	43.8	43800	35.3	None	Sunny	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\10. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM
HC-D/S	Haslams Creek	-33.834564° S, 151.075772° E	20/12/2022	Aaheli Chattopadhyay Kelvin Nmeoreole	12:10 PM	Monthly Monitoring/ Post-Rainfall Monitoring	7.41	20.65	5.91	78.5	46.5	46500	7.3	None	Sunny	5.8	0.4		Horriba	U-52	NU90SAUM	10.09 Project Management\12. Equipment Register\02 Calibration Records\Horriba U-52 WQM - NU90SAUM

APPENDIX E GROUNDWATER MONITOR

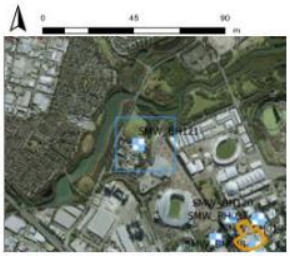
Sydney Metro West - CTP

Tunnel North West of SOP

Legend

Site boundary

Groundwater well



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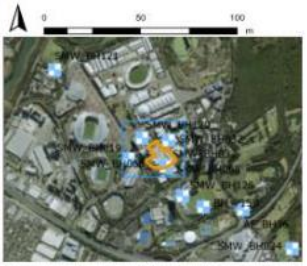
afJV

Sydney Metro West - CTP

Sydney Olympic Park

Legend

- Site boundary
- Groundwater well



This map is drawn for reference purposes only. Acciona Fernovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Fernovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

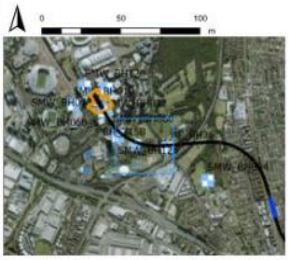
afJV

Sydney Metro West - CTP

Tunnel - Sydney Olympic Park to Nort...

Legend

- Site boundary
- Groundwater well



This map is shown for reference purposes only. Aecom Fernow JV provides this information 'as is' with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Aecom Fernow JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

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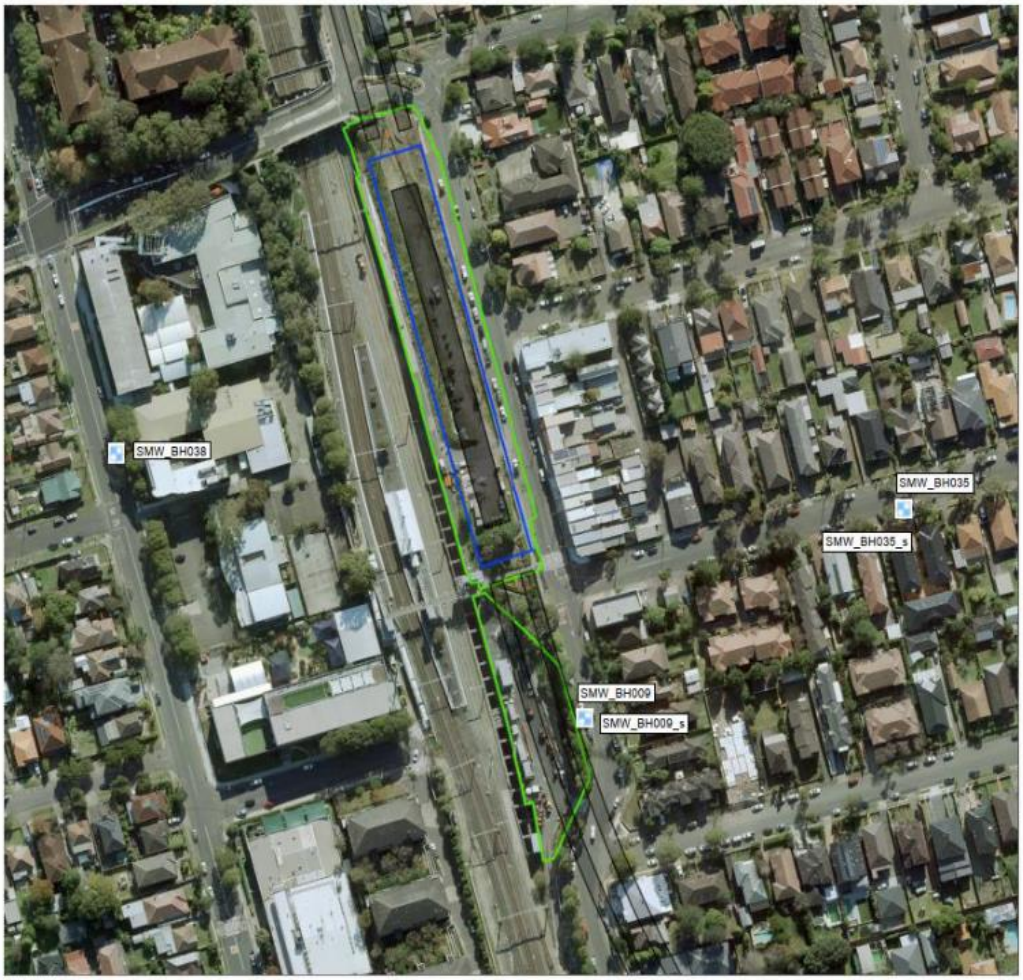
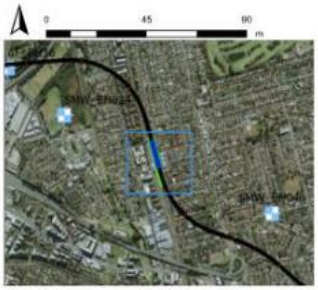


Sydney Metro West - CTP

North Strathfield

Legend

- Site boundary
- Groundwater well



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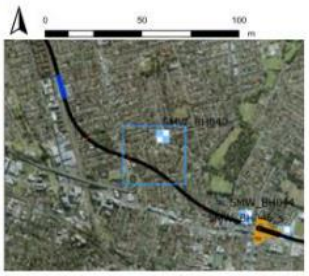
Sydney Metro West - CTP

Tunnel - NST to BWD

Legend

Site boundary

Groundwater well



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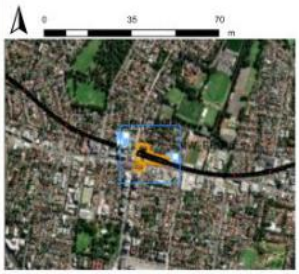
Sydney Metro West - CTP

Burwood North

Legend

- Site boundary
- Groundwater well



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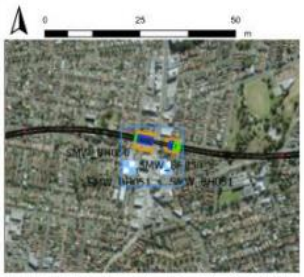
Sydney Metro West - CTP

Five Dock

Legend

- Site boundary
- Groundwater well



This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.

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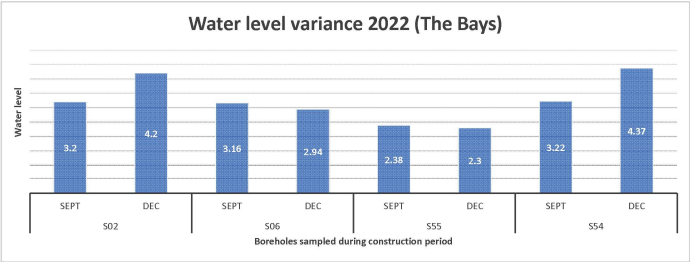
Water level each month

Month	Location	Borehole Number	Water level (TO	Sampled/gauged	Monitoring
July	Burwood	BH046R	N/A	N/A	WQ/EC/L
August			12.72m	sampled	
November			N/A	N/A	
July	Burwood	BH044	8.84m	gauged	WQ/EC/L
August			7.89m	sampled	
November			8.01m	gauged	
July	Five Dock	BH050	22.85m	gauged	WQ/EC/L
August			22.96m	gauged	
November			22.54m	gauged	
July	Five Dock	BH051	2.81m	sampled	WQ/EC/L
August			2.71m	sampled	
November			2.75m	sampled	
		Deep, Shallow			
September	TBY	s02d, s02s	3.2m,1.2	sampled, gauged	WQ/EC/L
December			4.2m,1.32	sampled, gauged	
September	TBY	s06	3.16m	sampled	WQ/EC/L
December			2.94m	sampled	
September	TBY	s58d,s58s	2.46m,1.2m	sampled, gauged	WQ/EC/L
December			N/A, 1.3m	N/A,gauged	
September	TBY	s55	2.38m	sampled	WQ/EC/L
December			2.30m	sampled	
September	TBY	AF_CGW1	3.35m	N/A	WQ/EC/L
December			N/A	N/A	
September	TBY	s40d,s40s	4.71m, 3.3m	sampled,gauged	WQ/EC/L
December			N/A	N/A	
September	TBY	s54	3.22m	sampled	WQ/EC/L
December			4.37m	sampled	
		Deep/Shallow			
July	SOP	BH019	14.80m	gauged	WQ/EC/L
August			14.56m	sampled	
September			N/A	N/A	
December			N/A	N/A	
July	SOP	BH120	17.65m	gauged	WQ/EC/L
August			17.64m	gauged	
September			17.66m	sampled	
December			17.57m	sampled	
July	SOP	BH068, BH068s	8.35m	sampled,gauged	WQ/EC/L
August			12.3m	sampled,gauged	
September			11.17m	sampled,gauged	
December			8.86m	sampled,gauged	
July	SOP	BH121	3.44m	gauged	WQ/EC/L
August			3.50m	sampled	
September			3.44m	sampled	
December			3.36m	sampled	
July	SOP	BH715b	13.01m	gauged	WQ/EC/L
August			13m	sampled	
September			13.3m	sampled	
December			13.3m	sampled	
July	SOP	BH36	5.01m	sampled	WQ/EC/L
August			4.98m	sampled	
September			4.77m	gauged	
December			4.82m	gauged	
July	SOP	BH126	3.51m	sampled	WQ/EC/L
August			3.57m	sampled	
September			3.16m	sampled	
December			4.89m	sampled	
July	SOP	BH034	3.12m	gauged	WQ/EC/L
August			3.20m	gauged	

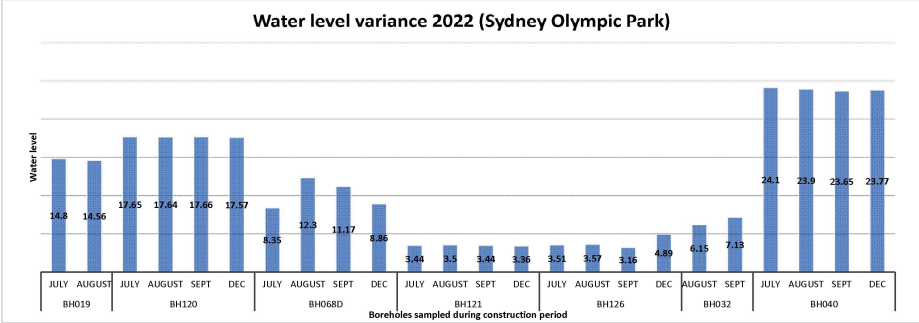
September			3.16m	gauged	
December			3.19	gauged	
July	SOP	BH032, BH032s	N/A	N/A	EC/L
August			6.15m	gauged, gauged	
September			7.13	gauged, gauged	
December			N/A	N/A	
July	SOP	BH040	24.10m	gauged	EC/L
August			23.9m	gauged	
September			23.65m	gauged	
December			23.77m	gauged	

Groundwater level variance

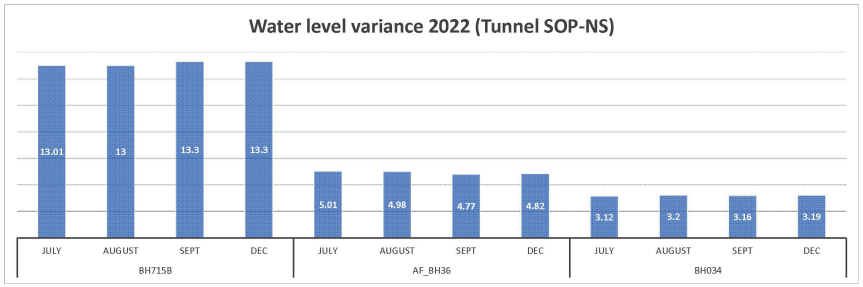
Site	Borehole numbers							
The Bays	S02		S06		s55		S54	
	Sept	Dec	Sept	Dec	Sept	Dec	Sept	Dec
	3.2	4.2	3.16	2.94	2.38	2.3	3.22	4.37



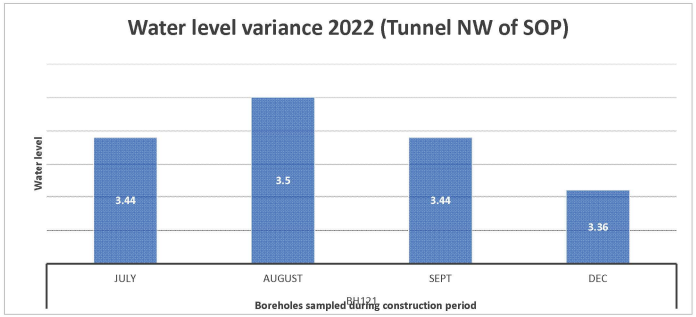
Site	Borehole numbers																							
Sydney Olympic Park	BH019		BH120				BH068D				BH121				BH126				BH032		BH040			
	July	August	July	August	Sept	Dec	July	August	Sept	Dec	July	August	Sept	Dec	July	August	Sept	Dec	August	Sept	July	August	Sept	Dec
	14.8	14.56	17.65	17.64	17.66	17.57	8.35	12.3	11.17	8.86	3.44	3.5	3.44	3.36	3.51	3.57	3.16	4.89	6.15	7.13	24.1	23.9	23.65	23.77



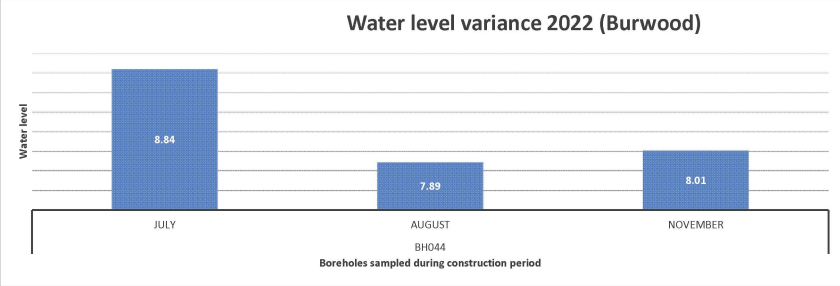
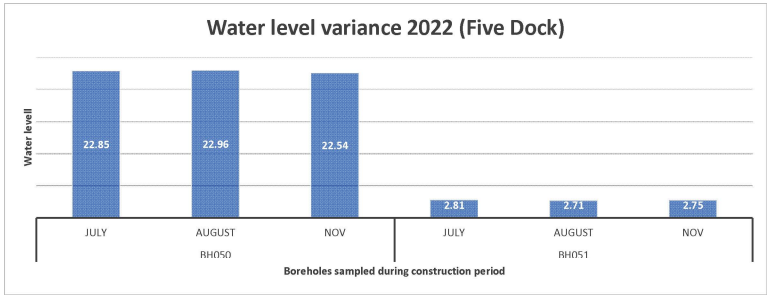
Site	Borehole numbers											
Tunnel SOP-NS	BH715B				AF_BH36				BH034			
	July	August	Sept	Dec	July	August	Sept	Dec	July	August	Sept	Dec
	13.01	13	13.3	13.3	5.01	4.98	4.77	4.82	3.12	3.2	3.16	3.19



Site	Borehole number			
Tunnel NW of SOP	BH121			
	July	August	Sept	Dec
	3.44	3.5	3.44	3.36



Site	Borehole number		
Burwood	BH044		
	July	August	November
	8.84	7.89	8.01



Site	Borehole number					
Five Dock	BH050			BH051		
	July	August	Nov	July	August	Nov
	22.85	22.96	22.54	2.81	2.71	2.75