SYDNEY METRO - WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

Surface Water Monitoring Report

Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works

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Rev	Date	Prepared by	Reviewed by	Approved by
0	06/06/23	A. Hillany	J. Cosier	J. Slattery
Signature:				

Details of Revision Amendments

Document Control

The Project Director is responsible for ensuring that this report is reviewed and approved. The Project Discipline Director is responsible for updating this plan to reflect changes to construction, legal and other requirements, as required.

Amendments

Any revisions or amendments must be approved by the Project Director and/or client before being distributed/implemented.

Revision Details

Revision	Details
0	6-Monthly Final issued to stakeholders

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1. Introduction

1.1. Background

The Sydney Metro Western Sydney Airport will become the transport spine for Greater Western Sydney, connecting communities and travellers with the new Western Sydney International (Nancy-Bird Walton) Airport (referred to as Western Sydney International) and the growing region.

The Project forms part of the broader Sydney Metro network. It involves the construction and operation of a 23km new metro rail line that extends from the existing Sydney Trains suburban T1 Western Line (at St Marys) in the north and the Aerotropolis (at Bringelly) in the south. The alignment includes a combination of tunnels and civil structures, including viaduct, bridges, surface and open-cut troughs between the two tunnel sections (Figure 1: Overview of the Project)

The Sydney Metro Western Sydney Airport EIS was prepared in October 2020 to assess the impacts of construction and operation of the Project and was placed on public exhibition between 21 October 2020 and 2 December 2020. The Project was declared a Critical State Significant Infrastructure (CSSI) Project and is listed in Schedule 5 of *State Environmental Planning Policy (State and Regional Development)*.

The Sydney Metro Western Sydney Airport was approved by the Minister for Planning and Public Spaces on 23 July 2021 (SSI 10051) under section 5.19 of the *Environmental Planning and Assessment Act 1997* (EP&A Act).

The Project will be delivered through the following stages:

- **Advanced and Enabling Works (AEW)** – Site investigations, modification of the existing transport network, power and water supply for construction sites, utility and stormwater diversions and some demolition works.
- **Station Boxes and Tunnelling Works (SBT)** – delivered through the following sub-stages:
  - Preparatory Works (the subject of this Plan) – Including NSW (off-airport) demolition works, site levelling/grading, site access and parking, utility and temporary services works, erection of demountable buildings and noise barriers, tunnelling preparatory works and use of ancillary facilities including onsite parking.
  - Bulk Excavation and Tunnelling Works – Preparatory Works (works not completed prior to Final CEMP approval), bulk excavation, acoustic shed installation, tunnelling and cross passage installation.
- **Surface and Civil Alignment Works (SCAW)** – Construction of bridges and viaducts to cross floodplains, watercourses and existing and proposed permanent infrastructure.
- **Stations, Systems, Trains, Operations and Maintenance (SSTOM)–** Station design and fitout, testing and commissioning, and operation of the Western Sydney Airport metro service
- **Finalisation Auxiliary Works.**

Each package of work is to be delivered under separate contracts on behalf of the proponent Sydney Metro.

Figure 1: Overview of the Project

1.1.1. Station Boxes and Tunnelling Works

The CPB Ghella JV has been engaged to deliver the SBT Works. The SBT Works include the design and construction of:

- Two sections of twin tunnels with a total combined length of approximately 9.8km, including associated portal structures; Orchard Hills to St Marys and Western Sydney International (WSI) airport to the new Aerotropolis Station in NSW
- Excavations at either end to enable trains to turn back and stub tunnels to enable future extensions
- Station box excavations with temporary ground support for four stations at St Marys, Orchard Hills, Airport Terminal and Aerotropolis
- Excavations for two intermediate service facilities, one in each of the tunnel sections at Claremont and Bringelly.

Completed sections of the SBT Works, including established construction worksites, will be progressively handed over to Sydney Metro to enable follow-on contractors to commence works. The exception is the on-airport Precast Segment Storage Facility which will be decommissioned and hydroseeded following the completion of segment manufacture.

1.2. Purpose of this report

The purpose of this report is to present results of the Surface Water Quality Monitoring Program outlined in the SBT Construction Environmental Management Plan (CEMP) and associated Sub-plans, including the results of the construction monitoring programs referred to in Condition C13 of the Infrastructure Approval.

This Surface Water Monitoring Report has been prepared to address Minister's Condition of Approval (CoA) C22 of the Infrastructure Approval (refer to Table 1-1). This report will be provided to the relevant regulatory authorities as detailed in the relevant Sub-plan (refer to Table 1-2).

Environmental monitoring is undertaken to:

- Validate the predicted impacts of the Infrastructure Works
- Measure the effectiveness of environmental controls in minimising and managing environmental impacts
- Demonstrate compliance with relevant stakeholder conditions

The monitoring requirements for nominated aspects are included in the relevant environmental management sub-plans and summarised in Table 1-1.

Table 1: Environmental Monitoring Reporting Requirements

CEMP or Sub-plan	Monitoring Program	Report	Distribution	Schedule (during construction)
Soil and Water Management Sub-Plan	Surface Water Quality Monitoring Program	Water Monitoring Report	EPA, DPE	Semiannual

1.3. On-site Activity

All station and service facility sites have been established and currently have sediment basins and Water Treatment Plants. The support services at all sites are almost complete. WTPs are installed at all sites but are only just coming on-line, with commissioning of all WTPs expected by end of June. Tunnelling has not yet commenced in the north of the Project. In the south of the Project, tunnelling is commencing on-airport.

Sediment basins are installed at all sites in the configurations they will remain in for the duration of the Project. This has been achieved progressively from Project construction commencement as the sites have been established. During November 2022 Bringelly Service Facility was the first site to discharge to surface water from sediment basins, with Aerotropolis being the last site in February 2023.

1.4. Surface Water Monitoring in receiving waters

The SBT Works footprint lies entirely within the South Creek catchment. South Creek, a major tributary of the Hawkesbury-Nepean catchment, flows in a generally northerly direction from its headwaters near Narellan through to Windsor where it joins the Hawkesbury River.

Table 2: Site Specific Receiving Waterways

Waterway	Worksite
South Creek	All
South Creek	St Marys Claremont Meadows Service Facility
South Creek	Orchard Hills
Badgerys Creek	Bringelly Service Facility
Thompsons Creek	Aerotropolis Core

South Creek is the receiving waterway for all creeks within the Project alignment.

During the reporting period, quarterly and wet-weather monitoring was undertaken in accordance with the Surface Water Monitoring Program.

As noted in Section 6.1 of the Soil and Water Management Sub-plan, pre-construction monitoring in receiving waterways was carried out by CPBG between July 2022 and September 2022 to inform the preparation of a Discharge Impact Assessment and to assess baseline environmental conditions prior to potential impact from project construction activities. The pre-construction monitoring locations are detailed in Table 3: Pre-Construction Monitoring Locations below.

Table 3: Pre-Construction Monitoring Locations

Sampling Location ID	Sampling Location Description	Rationale	Easting	Northing
SBT-1	South Creek at Claremont Meadows	Downstream of Orchard Hills Discharge, and all other monitoring points	292826.416	6263376.829
SBT-2	Claremont Creek at Werrington	Downstream of Claremont Meadows Discharge	292414.553	6261639.247
SBT-3	South Creek at St Mary's	Downstream of St Marys Discharge	293221.851	6261549.896
SBT-4	Badgerys Creek	Downstream of Bringelly Discharge	290828.193	6246740.045
SBT-5	Thompsons Creek, Bringelly	Adjacent to Aerotropolis Discharge	291596.151	6244007.727

The monitoring program has reflected the development of site establishment with the first two rounds of construction monitoring being undertaken at the above locations in order to provide continuity of the dataset and detect any changes in surface water quality that may be attributed to the SBT Works. With site surface water discharges beginning in November, the quarterly monitoring requirement was met in January.

In February the EPL surface water monitoring program commenced which has resulted in surface water sampling occurring weekly since February. On 9 February 2023, a variation to EPL 21672 was approved, and Condition E2.1 of the licence was included which outlines the following requirements:

> *The licensee must undertake weekly surface water monitoring of receiving waterways at locations upstream, downstream and adjacent to each discharge point: 6, 7, 8, 9 and 10 identified in Condition P1.1. This monitoring must be undertaken for a minimum of 6 months from the date that points 6, 7, 8, 9 and 10 were added to the licence. Fortnightly monitoring results must include:*
>
> > *a) quality and quantity of all parameters that are identified in the table in M2.2 for each discharge point: 6, 7, 8, 9 and 10;*

As a result, monitoring locations were amended to allow for compliance with the EPL

Locations upstream, downstream and adjacent to the receiving waterway where treated groundwater water would be discharged were identified. Given that water discharged from water treatment plants and sediment basins / settling containers will enter receiving waterways at the same location for all sites, surface water monitoring sites were updated to allow for the additional monitoring requirements stipulated by Condition E2.1.

Table 4. Condition E2.1 Monitoring Locations

EPA ID (Condition M2.2)	Site	Receiving Waterway	Sample ID		
			Upstream	Adjacent	Downstream
Point 6	Orchard Hills	Unnamed tributary of South Creek	SBT-6U	SBT-6A	SBT-6D
Point 7	Claremont Meadows	Claremont Creek	SBT-7U	SBT-7A	SBT-7D

EPA ID (Condition M2.2)	Site	Receiving Waterway	Sample ID		
			Upstream	Adjacent	Downstream
Point 8	St Marys	South Creek	SBT-8U	SBT-8A	SBT-8D
Point 9	Bringelly	Badgerys Creek	SBT-9U	SBT-9A	SBT-9D
Point 10	Aerotropolis	Thompsons Creek	SBT-10U	SBT-10A	SBT-10D

Due to the setting of the waterways, the ideal sampling design was not possible as safe and public access immediately upstream and downstream of the Project's discharge outlets is not possible. Locations have been selected as close as possible to where discharges enter receiving waterways, however multiple non-Project discharges with the potential to alter water quality also fall within the sampling zone.

1.5. Performance Criteria

Location specific performance criteria (site specific trigger values (SSTV)) were developed for downstream (impact) surface water monitoring locations. SSTV were initially developed for appropriate parameters using baseline monitoring data and ANZECC (2000) guideline criteria for slightly to moderately disturbed ecosystems (generally protecting 95% of species). ‘

As noted in the Surface Water Quality Monitoring Program (SWQMP), at the time of writing, there was no baseline data available for heavy metals, as such, SSTV were to be developed once at least three samples had been collected and tested, the average concentrations of heavy metals were to be established as the SSTV based on the data.

Average concentrations of parameters that were established based on pre-construction monitoring were applied at all monitoring locations. Additionally, the SSTVs outlined in Table 9 of the SWQMP have been applied where monitoring locations are located in proximity to baseline monitoring locations as detailed below in (Table 5: Application of SSTVs).

Table 5: Application of SSTVs

SWQMP SSTVs (Table 9)	Monitoring prior to Condition E2.1	Condition E2.1 Monitoring
SBT1	SBT-1	SBT-6
	SBT-3	SBT-8
SBT3	SBT-4	SBT-9
SBT5	SBT-5	SBT-10

Annexure A January 2023 Surface Water Monitoring Results

Table 6: January 2023 Surface Water Monitoring Results

Analyte		SBT-1	SBT-2	SBT-3	SBT-4	SBT-5
	Post Rain Event	Yes				
	Unit	12/01/2023				
pH	pH	7.81	7.86	7.96	7.76	7.78
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	1340	1210	3890	668	4710
Total Suspended Solids	mg/L	46	31	18	32	16
Aluminum	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium (VI)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	0.001	<0.001	0.002	<0.001	0.005
Zinc	mg/L	0.005	0.008	0.022	<0.005	<0.005
Total Phosphorous	mg/L	0.07	0.07	0.17	0.18	0.14
Total Nitrogen	mg/L	0.9	3.1	1.1	0.9	1.3
Ammonia	mg/L	<0.01	0.02	0.07	0.04	0.01

Annexure B February 2023 Surface Water Monitoring Results

Table 7: February 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 6 (CMF)

Analyte		SBT-6U	SBT-6A	SBT-6D	SBT-6U	SBT-6A	SBT-6D	SBT-6U	SBT-6A	SBT-6D
	Post Rain Event	No			No			No		
	Unit	14/02/2023			21/02/2023			28/02/2023		
pH	pH	7.59	8.28	7.48	7.31	7.28	7.26	7.81	7.86	7.92
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	211	1040	1470	796	920	910	1090	784	485
Total Suspended Solids	mg/L	14	34	45	196	238	303	1080	253	127
Aluminum	mg/L	0.27	6.21	1.08	2.60	4.83	5.06	7.44	3.64	3.42
Chromium (VI)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	<0.001	0.013	0.001	0.006	0.002	0.003	0.022	0.006	0.005
Zinc	mg/L	<0.005	0.016	0.005	0.024	0.023	0.022	0.076	0.02	0.013
Total Phosphorous	mg/L	0.08	0.29	0.06	0.41	0.43	0.24	1.1	0.26	0.11
Total Nitrogen	mg/L	1.1	4.01	0.8	1.83	1.9	2.8	3.5	1.7	1.4
Ammonia	mg/L	0.07	0.07	0.02	0.10	0.05	0.05	0.09	0.15	0.11

Table 8: February 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 7 (CMF)

Analyte		SBT-7U	SBT-7A	SBT-7D	SBT-7U	SBT-7A	SBT-7D	SBT-7U	SBT-7A	SBT-7D
	Post Rain Event	No			No			No		
	Unit	14/02/2023			21/02/2023			28/02/2023		
pH	pH	7.48	7.39	8.47	7.25	7.35	7.25	7.8	8.04	7.85
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	6200	1280	5970	884	862	883	4850	1170	3860
Total Suspended Solids	mg/L	<5	20	<5	42	57	7	<5	29	<5
Aluminum	mg/L	0.05	0.62	0.14	1.62	1.50	0.12	0.11	0.94	0.15
Chromium (VI)	mg/L	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	0.001	0.001	0.002	0.002	0.002	<0.001	0.005	0.009	0.005
Zinc	mg/L	<0.005	0.015	<0.005	0.028	0.023	<0.005	0.015	0.025	0.014
Total Phosphorous	mg/L	0.022	0.03	0.1	0.15	0.10	0.11	0.07	0.04	0.05
Total Nitrogen	mg/L	0.29	1.81	1.33	2.22	1.78	1.84	1.3	2.4	1.5
Ammonia	mg/L	0.21	0.24	0.11	0.3	0.28	0.08	0.21	0.21	0.09

Table 9: February 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 8 (STM)

Analyte		SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D
	Post Rain Event	No			No			No		
	Unit	14/02/2023			21/02/2023			28/02/2023		
pH	pH	8.47	7.74	7.84	7.27	7.27	7.26	5.73	5.51	5.54
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	715	711	708	743	741	720	730	789	724
Total Suspended Solids	mg/L	107	99	106	37	42	51	35	47	33
Aluminum	mg/L	3.16	3.61	3.54	1.32	2.01	1.6	1.06	0.68	0.17
Chromium (VI)	mg/L	0.003	0.004	0.004	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/L	0.006	0.006	0.006	<0.001	0.002	0.016	0.006	0.004	0.003
Zinc	mg/L	0.016	0.017	0.016	0.006	0.016	0.026	0.014	0.008	0.006
Total Phosphorous	mg/L	0.36	0.32	0.32	0.17	0.18	0.12	0.06	0.07	0.08
Total Nitrogen	mg/L	3.54	1.71	0.08	1.39	1.48	1.19	0.7	0.7	0.7
Ammonia	mg/L	0.08	0.08	0.08	0.04	0.04	0.04	0.2	0.2	0.3

Table 10: February 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 9 (BSF)

Analyte		SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D
	Post Rain Event	No			No			No		
	Unit	14/02/2023			21/02/2023			28/02/2023		
pH	pH	7.89	8.22	8.07	7.13	7.13	7.13	7.09	6.58	7.11
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	3290	3140	2950	2720	2720	2700	4800	4840	3770
Total Suspended Solids	mg/L	10	13	8	10	12	8	65	8	12
Aluminum	mg/L	0.11	0.35	0.06	0.04	0.32	0.02	0.11	0.07	0.12
Chromium (VI)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01
Copper	mg/L	0.001	0.002	0.001	<0.001	<0.001	<0.001	0.003	0.002	0.002
Zinc	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	<0.005
Total Phosphorous	mg/L	0.12	0.14	0.11	0.1	0.13	0.13	0.14	0.1	0.13
Total Nitrogen	mg/L	1.1	1.61	1.3	1.1	1.6	1.6	1.2	0.8	1.1
Ammonia	mg/L	0.01	0.06	0.07	<0.01	<0.01	0.02	0.01	0.04	0.01

Table 11: February 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 10 (AEC)

Analyte		SBT-10U	SBT-10A	SBT-10D	SBT-10U	SBT-10A	SBT-10D	SBT-10U	SBT-10A	SBT-10D
	Post Rain Event	No			No			No		
	Unit	14/02/2023			21/02/2023			28/02/2023		
pH	pH	8.12	8.11	8.12	7.25	7.25	7.23	7.11	7.16	7.16
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	1060	1300	1220	1250	1250	1240	2140	2110	2110
Total Suspended Solids	mg/L	6	<5	<5	6	<5	5	7	8	8
Aluminum	mg/L	0.46	0.46	0.42	0.03	0.02	0.03	0.04	0.04	0.03
Chromium (VI)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Total Phosphorous	mg/L	0.05	0.05	0.07	0.05	0.06	0.04	0.04	0.02	0.14
Total Nitrogen	mg/L	0.74	0.58	0.87	0.61	0.61	0.6	0.5	0.5	1.9
Ammonia	mg/L	0.07	0.06	0.07	0.03	0.03	0.03	0.04	0.04	0.03

Annexure C March Surface Water Monitoring Results

Table 12: March 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 6 (OHE)

Analyte	Site ID	SBT-6U	SBT-6A	SBT-6D	SBT-6U	SBT-6A	SBT-6D	SBT-6U	SBT-6A	SBT-6D
	Post Rain Event	No			No			No		
	Unit	7/03/2023			14/03/2023			20/03/2023		
pH	pH	8.66	8.61	8.59	8.87	8.63	8.63	7.48	7.26	7.46
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	1220	1130	1130	152	1290	1160	1220	1040	990
Total Suspended Solids	mg/L	94	124	81	68	529	150	54	57	102
Aluminum	mg/L	2.28	2.8	1.35	1.05	10.8	1.62	0.56	0.68	0.48
Chromium (VI)	mg/L	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.004	0.005	<0.001
Copper	mg/L	0.002	0.003	<0.001	0.003	0.019	0.002	0.002	0.002	0.001
Zinc	mg/L	0.012	0.008	<0.005	0.006	0.04	0.007	0.018	0.009	0.011
Total Phosphorous	mg/L	0.15	0.12	0.06	0.53	<0.20	<0.10	0.18	0.21	0.14
Total Nitrogen	mg/L	1.3	1.1	1	1.9	3.1	2.6	1.3	1.5	1.4
Ammonia	mg/L	0.13	0.02	0.02	0.12	0.06	0.04	0.02	0.01	0.02

Table 13: March 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 7 (CMF)

Analyte	Site ID	SBT-7U	SBT-7A	SBT-7D	SBT-7U	SBT-7A	SBT-7D	SBT-7U	SBT-7A	SBT-7D
	Post Rain Event	No			No			No		
	Unit	7/03/2023			14/03/2023			20/03/2023		
pH	pH	8.32	8.6	8.26	8.63	8.51	8.2	7.74	6.92	7.99
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	5340	1550	6240	369	1650	1160	6140	2560	6300
Total Suspended Solids	mg/L	25	45	7	216	36	10	15	25	9
Aluminum	mg/L	0.19	1.14	0.13	7.13	2.40	0.48	0.19	0.27	0.08
Chromium (VI)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	0.002	<0.001
Copper	mg/L	0.004	0.003	0.001	0.024	0.026	0.008	0.001	0.001	0.002
Zinc	mg/L	0.014	0.016	<0.005	0.104	0.172	0.98	0.011	0.017	<0.005
Total Phosphorous	mg/L	0.09	0.05	0.06	<0.20	0.13	0.07	0.18	0.04	0.07
Total Nitrogen	mg/L	1	1.4	1.6	<2.0	1.1	1.2	1	1	1.6
Ammonia	mg/L	0.2	0.29	0.11	0.02	<0.01	0.06	0.18	0.29	0.12

Table 14: March 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 8 (STM)

Analyte	Site ID	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D
	Post Rain Event	No			No			No		
	Unit	7/03/2023			14/03/2023			20/03/2023		
pH	pH	7.48	7.51	7.52	7.62	8.51	8.1	7.57	7.43	7.41
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	1030	862	863	9120	6250	7550	500	492	489
Total Suspended Solids	mg/L	24	37	30	18	6	29	21	24	18
Aluminum	mg/L	0.92	0.90	0.88	0.33	0.03	0.34	0.33	0.45	0.51
Chromium (VI)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	0.002
Copper	mg/L	0.002	0.002	0.002	0.003	0.002	0.002	0.001	0.001	0.001
Zinc	mg/L	0.006	0.012	0.009	0.019	0.641	0.013	<0.005	<0.005	<0.005
Total Phosphorous	mg/L	0.12	0.07	0.07	0.09	0.01	0.15	0.08	0.08	0.09
Total Nitrogen	mg/L	0.9	0.8	0.7	1	0.3	1	0.8	0.7	0.7
Ammonia	mg/L	0.06	0.07	0.04	0.03	0.1	0.05	0.07	0.02	0.02

Table 15: March 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 9 (BSF)

Analyte	Site ID	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D
	Post Rain Event	No			No			No		
	Unit	7/03/2023			14/03/2023			20/03/2023		
pH	pH	8.37	8.34	8.09	8.34	8.33	8.28	7.7	7.7	7.6
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	4570	4620	4700	4820	4820	4770	2380	2310	2240
Total Suspended Solids	mg/L	<5	10	26	126	6	<5	30	10	10
Aluminum	mg/L	0.05	0.06	0.04	0.05	0.16	1.43	0.16	0.17	0.28
Chromium (VI)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001
Copper	mg/L	0.004	<0.001	<0.001	0.002	0.002	0.006	0.002	0.002	0.002
Zinc	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005
Total Phosphorous	mg/L	0.06	0.08	0.4	0.08	0.13	0.11	0.08	0.11	0.08
Total Nitrogen	mg/L	0.9	1	1.1	1.1	1.2	1.2	0.9	0.9	0.8
Ammonia	mg/L	<0.01	<0.01	0.1	0.02	0.01	0.04	0.03	0.04	0.04

Table 16: March 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 10 (AEC)

Analyte	Site ID	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D
	Post Rain Event	No			No			No		
	Unit	7/03/2023			14/03/2023			20/03/2023		
pH	pH	7.75	7.71	7.58	7.63	7.71	7.69	7.68	7.69	7.69
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	2690	2700	2660	2110	2090	2110	4200	4180	4210
Total Suspended Solids	mg/L	<5	26	62	8	9	7	9	14	16
Aluminum	mg/L	0.01	0.02	0.11	0.12	0.15	0.16	0.22	0.05	0.06
Chromium (VI)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
Zinc	mg/L	<0.005	<0.005	0.005	<0.005	0.009	0.006	<0.005	0.013	<0.005
Total Phosphorous	mg/L	0.03	0.04	0.1	0.08	0.15	0.08	0.05	0.06	0.05
Total Nitrogen	mg/L	0.7	0.7	1.4	0.15	1	0.8	0.6	0.9	0.7
Ammonia	mg/L	<0.01	<0.01	<0.01	0.04	0.04	0.03	0.02	0.06	0.02

Annexure D April Surface Water Monitoring Results

Table 17: April 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 6 (OHE)

Analyte	Site ID	SBT-6U	SBT-6A	SBT-6D	SBT-6U	SBT-6A	SBT-6D	SBT-6U	SBT-6A	SBT-6D	SBT-6U	SBT-6A	SBT-6D
	Post Rain Event	No			No			No			No		
	Unit	4/04/2023			11/04/2023			18/04/2023			24/04/2023		
pH	pH	6.95	6.97	6.84	7.86	7.85	7.83	6.19	8.49	8.42	7.17	7.29	7.31
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	2430	1690	4580	1740	1670	1650	363	2330	2360	2280	2310	2310
Total Suspended Solids	mg/L	28	43	30	54	69	61	204	36	37	50	48	61
Aluminum	mg/L	1.61	1.5	1.64	0.62	0.85	1.62	6.75	0.51	0.26	0.26	0.24	0.24
Chromium (VI)	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.001	0.001	0.001
Copper	mg/L	0.004	0.004	0.004	0.002	0.002	0.002	0.016	0.002	0.002	<0.001	<0.001	<0.001
Zinc	mg/L	0.017	0.019	0.018	0.008	0.008	0.008	0.051	<0.005	0.005	<0.005	0.013	<0.005
Total Phosphorous	mg/L	0.07	0.07	0.07	0.008	0.016	0.008	0.48	0.05	0.04	0.16	0.08	0.11
Total Nitrogen	mg/L	1.5	1.6	1.5	0.9	1.6	1.1	2	0.8	0.7	1.6	1.1	1.3
Ammonia	mg/L	0.07	0.07	0.07	0.02	<0.01	0.04	0.06	0.03	0.03	0.04	0.02	0.03

Table 18: April 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 7 (CMF)

Analyte	Site ID	SBT-7U	SBT-7A	SBT-7D	SBT-7U	SBT-7A	SBT-7D	SBT-7U	SBT-7A	SBT-7D	SBT-7U	SBT-7A	SBT-7D
	Post Rain Event	No			No			No			No		
	Unit	4/04/2023			11/04/2023			18/04/2023			24/04/2023		
pH	pH	7.12	7.04	6.99	7.85	7.75	7.71	8.34	8.12	8.06	7.68	5.37	7.67
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	997	924	1030	4370	2650	4550	1560	4080	4850	1240	921	3060
Total Suspended Solids	mg/L	21	18	18	<5	15	<5	30	6	8	34	47	10
Aluminum	mg/L	0.12	0.24	0.18	0.03	0.36	0.10	1.08	0.06	0.14	0.51	0.50	0.34
Chromium (VI)	mg/L	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.004	0.006	0.002	0.003	0.002	0.003	0.005	0.002	0.001	0.006	0.029	<0.001
Zinc	mg/L	0.013	0.014	0.008	0.006	0.013	0.009	0.04	0.007	<0.005	0.024	0.036	0.008
Total Phosphorous	mg/L	0.04	0.04	0.04	0.06	0.015	0.06	0.06	0.06	0.06	0.11	0.15	0.07
Total Nitrogen	mg/L	1.5	0.9	1.0	1.8	1.0	1.7	1.3	0.7	1.6	1.6	1.8	1.2
Ammonia	mg/L	0.1	0.11	0.04	0.18	0.31	0.08	0.26	0.14	0.08	0.21	0.18	0.08

Table 19: April 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 8 (STM)

Analyte	Site ID	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D
	Post Rain Event	No			No			No			No		
	Unit	4/04/2023			11/04/2023			18/04/2023			24/04/2023		
pH	pH	7.17	7.15	7.07	5.41	7.78	5.15	8.18	8.07	8.15	7.72	7.7	7.69
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	1150	1160	1310	1110	1140	1110	1530	1450	1450	1470	1480	1460
Total Suspended Solids	mg/L	28	33	21	28	21	23	19	18	14	15	16	18
Aluminum	mg/L	0.56	1.38	0.68	0.45	0.30	0.34	0.45	0.50	0.39	0.24	0.29	0.11
Chromium (VI)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.002	0.006	0.003	0.002	0.002	0.002	0.002	0.002	0.002	<0.001	<0.001	<0.001
Zinc	mg/L	0.008	0.027	0.009	0.01	0.008	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Total Phosphorous	mg/L	0.08	0.05	0.08	0.05	0.05	0.07	0.07	0.06	0.04	0.05	0.05	0.06
Total Nitrogen	mg/L	0.9	0.6	0.9	0.8	0.7	2.9	0.8	0.7	0.7	0.8	1.3	0.9
Ammonia	mg/L	0.03	0.02	0.04	0.06	0.06	0.07	0.01	0.01	0.02	0.08	0.06	0.04

Table 20: April 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 9 (BSF)

Analyte	Site ID	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D
	Post Rain Event	No			No			No			No		
	Unit	4/04/2023			11/04/2023			18/04/2023			24/04/2023		
pH	pH	7.12	7.06	7.61	7.72	7.81	7.69	8.29	8.15	8.08	7.91	7.9	7.89
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	2320	1780	1860	3240	3220	3270	2670	2730	2720	2860	2860	2850
Total Suspended Solids	mg/L	18	18	39	7	<5	<5	17	8	8	10	14	10
Aluminum	mg/L	1.7	1.8	1.77	0.27	0.27	0.27	0.81	0.59	0.54	0.31	0.34	0.26
Chromium (VI)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.008	0.008	0.008	0.005	0.005	0.005	0.006	0.006	0.001	0.003	0.002	0.002
Zinc	mg/L	0.006	0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Phosphorous	mg/L	0.06	0.05	0.07	0.04	0.04	0.03	0.05	0.04	0.04	0.04	0.05	0.06
Total Nitrogen	mg/L	3	2.3	1.7	1.0	1.0	1.0	0.9	0.7	0.8	0.8	1.0	0.9
Ammonia	mg/L	0.08	0.09	0.09	0.06	0.012	0.03	0.02	0.01	<0.01	0.04	0.02	0.02

Table 21: April 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 10 (AEC)

Analyte	Site ID	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D	SBT-8U	SBT-8A	SBT-8D
	Post Rain Event	No			No			No			No		
	Unit	4/04/2023			11/04/2023			18/04/2023			24/04/2023		
pH	pH	7.07	7.12	7.16	5.52	5.83	5.5	6.09	6.2	6.06	5.62	5.61	5.6
Oil/Grease	Visible/Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible	Non-Visible
Electrical Conductivity	µS/cm	61	532	468	816	860	789	512	536	508	542	541	539
Total Suspended Solids	mg/L	7	6	9	11	8	9	6	8	8	12	12	12
Aluminum	mg/L	0.75	0.96	0.98	0.78	0.59	0.40	0.86	0.75	0.9	1.21	1.19	0.9
Chromium (VI)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	<0.001	<0.001	<0.001
Zinc	mg/L	<0.005	<0.005	0.006	0.012	0.006	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Phosphorous	mg/L	0.04	0.04	0.05	0.03	0.05	0.04	0.03	0.04	0.03	0.07	0.05	0.05
Total Nitrogen	mg/L	0.7	0.8	0.7	0.5	0.5	0.5	0.4	0.4	0.4	0.7	0.6	0.6
Ammonia	mg/L	0.01	0.02	0.02	0.02	0.07	0.01	0.02	<0.01	0.01	0.02	0.03	0.02

Annexure E May Surface Water Monitoring Report

Table 22: May 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 6 (OHE)

Analyte	Site ID	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D
	Post Rain Event	No			No			No		
	Unit	2/05/2023			9/05/2023			16/05/2023		
pH	pH	7.03	7.27	7.36	7.87	7.91	7.95	6.98	6.99	7
Oil/Grease	Visible/Non-Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
Electrical Conductivity	µS/cm	1380	1350	1370	734	722	705	1610	1630	1650
Total Suspended Solids	mg/L	21	21	21	49	84	75	35	31	28
Aluminum	mg/L	0.33	0.44	0.36	1.95	1.85	2.89	1.49	1.35	1.05
Chromium (VI)	mg/L	0.008	0.009	0.01	0.005	0.006	0.007	<0.01	<0.01	<0.01
Copper	mg/L	0.004	0.004	0.004	0.004	0.005	0.006	0.002	0.003	0.003
Zinc	mg/L	<0.005	<0.005	<0.005	0.02	0.025	0.026	0.007	0.009	0.008
Total Phosphorous	mg/L	0.09	0.08	0.04	0.11	0.13	0.13	0.07	0.006	0.07
Total Nitrogen	mg/L	1.4	1.4	1.3	1.3	1.5	1.6	0.048	0.86	0.52
Ammonia	mg/L	0.22	0.22	0.23	0.09	0.05	0.04	0.18	0.15	0.14

Table 23: May 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 7 (CMF)

Analyte	Site ID	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D
	Post Rain Event	No			No			No		
	Unit	2/05/2023			9/05/2023			16/05/2023		
pH	pH	7.62	7.57	7.71	8.24	7.79	8.23	16.36	12.65	14.42
Oil/Grease	Visible/Non-Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
Electrical Conductivity	µS/cm	1550	1690	1580	2320	1880	3580	232	18.1	35.8
Total Suspended Solids	mg/L	104	<5	108	22	28	22	70	6	11
Aluminum	mg/L	0.48	0.22	0.77	0.93	0.92	1.13	0.53	0.12	0.27
Chromium (VI)	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.01	<0.01	<0.01
Copper	mg/L	0.003	0.003	0.004	0.002	0.003	0.003	0.006	0.004	0.003
Zinc	mg/L	0.87	0.26	0.008	0.013	0.022	0.011	0.016	0.009	0.007
Total Phosphorous	mg/L	0.15	0.02	0.15	0.07	0.05	0.08	0.09	0.04	0.05
Total Nitrogen	mg/L	1.7	0.7	1.6	1.1	1.2	2.1	0.86	0.48	0.4
Ammonia	mg/L	0.11	0.02	0.12	0.15	0.18	0.06	0.08	0.14	0.04

Table 24: May 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 8 (STM)

Analyte	Site ID	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D
	Post Rain Event	No			No			No		
	Unit	2/05/2023			9/05/2023			16/05/2023		
pH	pH	7.31	7.96	7.94	8	7.85	7.89	7.88	7.76	7.73
Oil/Grease	Visible/Non-Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
Electrical Conductivity	µS/cm	1520	1680	508	1340	1260	1260	838	822	837
Total Suspended Solids	mg/L	39	<5	12	41	31	31	112	12	110
Aluminum	mg/L	0.87	0.25	0.36	1.3	0.99	0.87	1.67	1.51	2.72
Chromium (VI)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01
Copper	mg/L	0.004	0.004	0.003	0.005	0.003	0.003	0.006	0.005	0.007
Zinc	mg/L	0.012	0.038	0.007	0.034	0.008	0.01	0.014	0.013	0.017
Total Phosphorous	mg/L	0.07	0.06	0.17	0.17	0.15	0.16	0.21	0.2	0.17
Total Nitrogen	mg/L	1	1.6	1.7	4	4	4	0.98	0.99	0.97
Ammonia	mg/L	0.1	0.16	0.06	0.07	0.08	0.08	0.04	0.02	0.04

Table 25: May 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 9 (BSF)

Analyte	Site ID	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D
	Post Rain Event	No			No			No		
	Unit	2/05/2023			9/05/2023			16/05/2023		
pH	pH	7.6	7.44	7.49	7.8	7.66	7.85	7.08	6.86	7.16
Oil/Grease	Visible/Non-Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
Electrical Conductivity	µS/cm	464	525	527	528	1830	1830	1940	1780	2000
Total Suspended Solids	mg/L	128	101	97	52	54	53	23	141	26
Aluminum	mg/L	6.13	7.77	6.71	2.53	2.35	2.68	0.61	4.7	0.59
Chromium (VI)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01
Copper	mg/L	0.01	0.012	0.01	0.007	0.006	0.006	0.005	0.008	0.005
Zinc	mg/L	0.023	0.025	0.023	0.01	0.009	0.008	0.023	0.024	0.009
Total Phosphorous	mg/L	0.22	0.18	0.21	0.08	0.08	0.09	0.11	0.04	0.04
Total Nitrogen	mg/L	1.3	1.2	1.1	2.2	2.1	2.2	3.31	3.38	3.2
Ammonia	mg/L	0.03	0.04	0.03	0.06	0.06	0.06	0.08	0.1	0.09

Table 26: May 2023 Surface Water Monitoring Results at Receiving Waterways at SBT 9 (BSF)

Analyte	Site ID	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D	SBT-9U	SBT-9A	SBT-9D
	Post Rain Event	No			No			No		
	Unit	2/05/2023			9/05/2023			16/05/2023		
pH	pH	7.47	7.62	7.6	7.56	7.24	7.57	7.91	7.86	7.39
Oil/Grease	Visible/Non-Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
Electrical Conductivity	µS/cm	2900	2810	1420	591	601	594	77.8	65.5	111
Total Suspended Solids	mg/L	52	52	64	19	18	23	10	14	12
Aluminum	mg/L	0.88	1.16	1.27	1.28	1.38	1.46	0.58	0.57	0.55
Chromium (VI)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01
Copper	mg/L	0.004	0.004	0.004	0.002	0.002	0.002	0.001	0.001	0.002
Zinc	mg/L	0.008	0.007	0.007	0.005	0.005	0.006	0.006	0.009	<0.005
Total Phosphorous	mg/L	0.18	0.12	0.12	0.06	0.05	0.05	0.05	0.04	0.04
Total Nitrogen	mg/L	4.6	4.8	4.5	0.8	0.6	0.7	0.06	0.06	0.06
Ammonia	mg/L	0.2	0.11	0.17	0.02	<0.01	<0.01	0.01	0.02	0.01

Annexure F Surface Water Monitoring Locations

Figure 2: Surface Water Monitoring Locations (Northern Sites)

Figure 3: Surface Water Monitoring Locations (Southern Sites)