

Surface Water Quality Construction Monitoring Report:

28 May 2021 – 27 November 2021

M4-M5 Link Mainline Tunnels

WestConnex M4-M5 Link Tunnels



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Abbreviations/Glossary

Abbreviation	Expanded text
ANZECC (2000)	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
ASBJV	Acciona Samsung Bouygues Joint Venture (ASBJV)
BoM	Bureau of Meteorology
BACI	Before-After Impact-Control Sampling Design
CEMP	Construction Environmental Management Plan
CMR	Construction Monitoring Report
CSSI	Critical State Significant Infrastructure
CoA	Conditions of Approval
DO	Dissolved Oxygen
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EPA	Environment Protection Agency
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
Minister, the	Minister of the NSW Department of Planning, Industry and Environment (or delegate)
NSW	New South Wales
NTU	Nephelometric Turbidity Units
ORP	Oxidation Reduction Potential
PBR	Pymont Bridge Road Civil and Tunnel Site
PREW	Parramatta Road East and West civil sites
Project, the	M4-M5 Link Mainline Tunnels
SPI	Campbell Road Civil and Tunnel Site (also known as St Peters Interchange)
SPIR	Submissions and Preferred Infrastructure Report
SSI	State Significant Infrastructure
SSTV	Site-Specific Trigger Value
SSWMP	Soil and Surface Water Management Plan
SWQMP	Surface Water Quality Monitoring Program
WTP	Water Treatment Plant

1 Introduction

1.1 Background

WestConnex is one of the NSW Government's key infrastructure projects which aims to ease congestion, create jobs and connect communities. The 33-kilometre WestConnex motorway will link Sydney's west and south-west with the Sydney Central Business District, Sydney Airport and Port Botany. WestConnex is one component of an integrated solution to meet Sydney's growing transport and infrastructure needs and is consistent with NSW Government transport and planning policies and strategies.

The project was declared by Ministerial Order to be State Significant Infrastructure (SSI) and Critical State Significant Infrastructure (CSSI), under Section 5.12 (4) and Section 5.13 (previously referred to as 115U(4) and 115V prior to amendment of the *Environmental Planning and Assessment Act 1979* (EP&A Act)) as well as under clause 16 of the State Environmental Planning Policy (State and Regional Development) 2011. The project remains subject to assessment under the EP&A Act and requires the approval of the NSW Minister for Planning. The proposal is critical State significant infrastructure by virtue of Schedule 5, clause 4 of State Environmental Planning Policy (State and Regional Development) 2011.

An Environmental Impact Statement (EIS) (AECOM 2017) was prepared and placed on public exhibition from 18 August 2017 to 16 October 2017. Submissions were received from government, agencies, organisations and the public in response to the project. A Submissions and Preferred Infrastructure Report (SPIR) was prepared by Roads and Maritime in response to submissions received during the exhibition period. The Project was approved by the Minister for Planning on 17 April 2018.

Subsequently, a Project Modification report (AECOM, September 2018) was prepared and placed on public exhibition for 14 days from 12 September 2018. The Project Modification was approved by the Minister for Planning on 25 February 2019 and the Minister's conditions of approval were also modified.

A Modification Report for MOD 2 was prepared and placed on public exhibition by between 21 August 2019 to 25 September 2019. A Response to Submissions Report was prepared to respond to submissions received during the public exhibition period. This report and a Design Amendment Report were lodged with the Department of Planning, Industry and Environment (DPIE) in April 2020. The Modification was determined by the NSW Minister for Planning on 30 September 2020, along with modification to CoAs.

A Modification Report for MOD 3 was prepared and placed on public exhibition by between 20 November and 18 December 2019. A Response to Submissions Report was prepared to respond to submissions received during the public exhibition period. This report was lodged with DPIE in March 2020. The Modification was determined by the NSW Minister for Planning and Public Space on 28 July 2020, along with modification to CoAs.

A Modification Report for MOD 4 was prepared and lodged with DPIE in June 2020. The Modification was determined by DPIE on 28 July 2020, along with modification to CoAs.

A Modification Report for MOD 5 was prepared and lodged with DPIE in October 2020. The Modification was determined by DPIE on 17 November 2020, along with modification to CoAs.

1.2 Project Description

The WestConnex M4-M5 Link project is being constructed in two stages:

- Stage 1 (the Project and subject of this document): M4-M5 Link Mainline tunnels
- Stage 2: Rozelle interchange.

WestConnex Transurban has engaged Acciona Samsung Bouygues Joint Venture (ASBJV) to design and construct Stage 1 of the project. The key features of the Mainline tunnels project include:

- Twin mainline motorway tunnels between the M4 at Haberfield and the M8 at St Peters. Each tunnel would be around 7.5 kilometres long and would generally accommodate up to four lanes of traffic in each direction
- Connections of the mainline tunnels to the M4 project, comprising:
 - A tunnel-to-tunnel connection to the M4 mainline stub tunnels east of Parramatta Road near Alt Street at Haberfield
 - Entry and exit ramp connections between the mainline tunnels and the Wattle Street interchange at Haberfield (constructed as part of the M4 project)
 - Minor physical integration works with the surface road network at the Wattle Street interchange including road pavement and line marking
- Connections of the mainline tunnels to the M8 project, comprising:
 - A tunnel-to-tunnel connection to the M8 mainline stub tunnels north of the Princes Highway near the intersection of Mary Street and Bakers Lane at St Peters
 - Entry and exit ramp connections between the mainline tunnels and the St Peters interchange at St Peters (which is currently being constructed as part of the M8 project)
 - Minor physical integration works with the surface road network at the St Peters interchange including road pavement and line marking
- Construction of tunnel stubs to provide for future underground connection of the mainline tunnels to the Rozelle interchange and Iron Cove Link
- A motorway operations complex at St Peters (Campbell Road) (MOC5). The types of facilities that would be contained within the motorway operations complexes would include substations, water treatment plants, ventilation facilities and outlets (the Campbell Road ventilation facility), offices, on-site storage and parking for employees
- Tunnel ventilation systems, including ventilation supply and exhaust facilities, ventilation fans, ventilation outlets and ventilation tunnels
- Fitout (mechanical and electrical) of part of the Parramatta Road ventilation facility at Haberfield (constructed as part of M4 project) for use by the M4-M5 Link project
- Drainage infrastructure to collect surface and groundwater for treatment at dedicated facilities
- Water treatment would occur at the operational water treatment facility at the Campbell Road motorway operations complex
- Ancillary infrastructure and operational facilities for electronic tolling and traffic control and signage (including electronic signage)
- Emergency access and evacuation facilities, including pedestrian and vehicular cross and long passages and fire and life safety systems

- Utility works, including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- Temporary construction ancillary facilities to facilitate construction of the project at the following locations:
 - Northcote Street civil and tunnel site (C3a), Haberfield
 - Haberfield civil site (C2b), Haberfield
 - Parramatta Road East civil site (C3b), Haberfield
 - Parramatta Road West civil site (C1b), Ashfield
 - Wattle Street civil and tunnel site (C1a), Haberfield
 - Pyrmont Bridge Road tunnel site (C9), Camperdown/Annandale
 - Campbell Road civil and tunnel site (C10), St Peters.

An overview of the project footprint and ancillary facilities is presented in the Construction Environmental Management Plan (CEMP). Further detail of the project description is presented in Section 1.3 of the CEMP.

1.3 Purpose of this report

This Surface Water Quality Construction Monitoring Report (CMR) has been prepared to address Minister's Condition of Approval (CoA) C17 of the planning approval (refer to Table 1-1). This report will be provided to the relevant regulatory authorities as detailed in the Soil and Surface Water Management Sub-Plan (SSWMP) (refer to Table 1-2).

This CMR documents the surface water monitoring results recorded during the reporting period on the WestConnex M4-M5 Link Mainline Tunnels Project (the Project) from 28 May 2021 to 27 November 2021.

Monitoring was undertaken in accordance with the Surface Water Quality Monitoring Program (SWQMP) required under CoA C9(a) to monitor potential surface water impacts and the effectiveness of mitigation measures applied during construction of the Project.

Table 1-1 CoA requirements for this CMR

CoA no.	Requirement	Reference
C17	The results of the Construction Monitoring Programs must be submitted to the Secretary, and relevant regulatory authorities, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.	This Document

Table 1-2 CMR Recipients

SSWMP Ref.	Report Recipients
Section 7.7 Reporting	<ul style="list-style-type: none">• Department of Planning, Industry and Environment (DPIE)• Department of Planning, Industry and Environment – Water (DPIE Water)• Sydney Water• Environment Protection Authority (EPA)

2 Monitoring Results and Management Response

In accordance with the Surface Water Quality Monitoring Program (SWQMP), surface water monitoring was undertaken monthly and quarterly following a wet weather event during the reporting period.

To monitor potential Project surface water quality impacts, a Before-After Control-Impact (BACI) design style has been adopted with sampling occurring upstream (control) and downstream (impact) of the Project alignment and relevant ancillary facilities. Monitoring locations are summarised in Table 2-1 and Figure 2-1.

Due to the urban setting of the waterways, the ideal BACI 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 the Project outlets, however multiple non-Project discharge points with the potential to alter water quality also fall within the sampling zone.

Table 2-1 Surface Water Monitoring Locations

Waterway	Ancillary Facility	Site ID	Sample Location Type	Analysis Suite
Johnstons Creek	Pymont Bridge Road (PBR)	SW04	Downstream (Impact)	Temperature pH
		SW14	Upstream (Control)	Oxidation Redox Potential (ORP)
Dobroyd Canal (Iron Cove Creek)	Haberfield Sites (PREW, Northcote and Wattle)	SW09	Downstream (Impact)	Turbidity (NTU)
		LSB02	Upstream (Control)	Dissolved Oxygen (DO)
Sheas Creak / Alexandra Canal	Campbell Road	LSB01	Downstream (Impact)	
		SW10	Upstream (Control)	

2.1 Performance Criteria

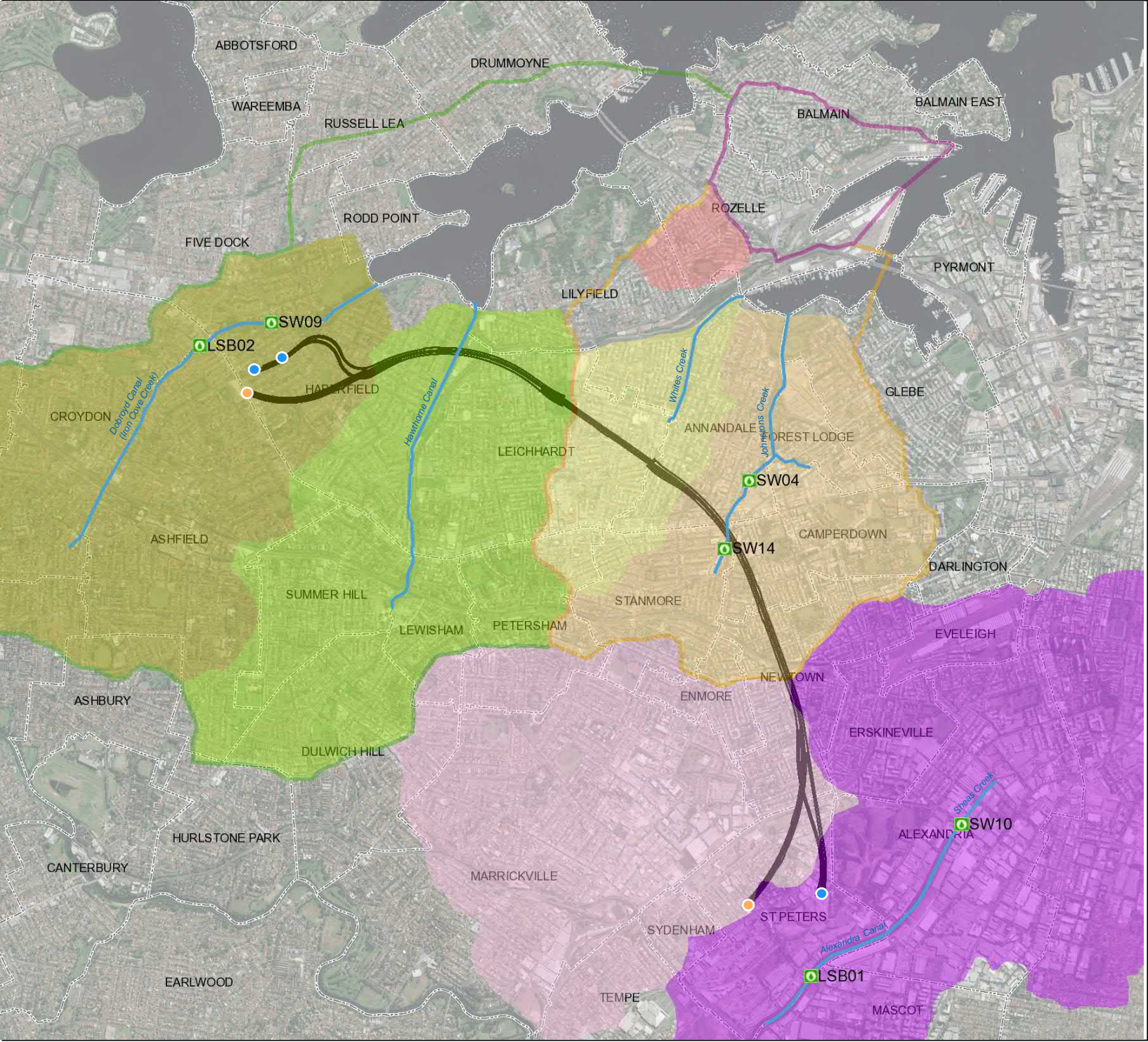
Location specific performance criteria (site specific trigger values (SSTV)) were developed for downstream (impact) surface water monitoring locations.

SSTV were initially developed for appropriate parameters using baseline monitoring data and ANZECC (2000) guideline criteria for slightly to moderately disturbed ecosystems (generally protecting 90% of species). Following 12 months of construction monitoring, SSTV were reviewed and updated to ensure they remained appropriate.

During the reporting period, potential changes in surface water quality were assessed and a management response initiated following any exceedance of the SSTV. SSTV are detailed in Table 2-2.

WestConnex M4-M5 Link Tunnels

Figure 2-1: Construction Surface Water Monitoring



Key

- Surface water monitoring points**
- M4-M5 Link Tunnels
- Sydney Harbour and Parramatta River catchment**
- Rozelle Catchment
 - Iron Cove Catchment
 - White Bay Catchment
 - Easton Park Drain Subcatchment
 - Johnstons Creek Subcatchment
 - Whites Creek Subcatchment
 - Dobroyd Canal Subcatchment
 - Hawthorne Canal Subcatchment
 - Eastern Channel Subcatchment
 - Alexandria Canal Subcatchment
- Existing features**
- Watercourse / drainage line
- Project Features**
- M4-M5 Link Mainline Tunnel alignment
 - Tunnel portal
 - Tunnel connection

2.2 Monitoring Results

In summary, downstream monitoring results were compliant with SSTV limits except on a few occasions as discussed below. Improvements in water quality downstream of Project discharge outlets were also recorded during the reporting period.

Surface water monitoring results, SSTV exceedances and corresponding management responses are summarised in Table 2-2.

2.2.1 Dobroyd Canal (Haberfield)

No downstream exceedances of the pH criterion were recorded during the reporting period. On all but one occasion, improvements in water quality downstream were also observed with SSTV exceedances consistently recorded at the upstream control site.

The NTU SSTV was exceeded downstream on one occasion after a wet weather event where 72.4 mm was recorded at the Bureau of Meteorology (BoM) Observatory Hill weather station in the 48 hours prior to the monitoring event on 25 August 2021. On this occasion, NTU was higher at the upstream control site indicating non-Project impacts and improved water quality downstream. Following this exceedance, site WTP records were reviewed and confirmed all outgoing water discharged from the Northcote WTP was within EPL limits. Therefore, no evidence was found to attribute the changes in water quality to the Project and instead a result of catchment-wide wet weather.

2.2.2 Johnstons Creek (Pymont Bridge Road (PBR))

No downstream exceedances of the pH criterion were recorded during the reporting period.

The NTU SSTV was exceed downstream once after the same wet weather even in August 2021 detailed above. On this occasion, NTU was higher at the upstream control site indicating non-Project impacts and improved water quality downstream. A review of PBR WTP records also confirmed all outgoing water discharges were complaint with EPL limits for NTU. Therefore, the changes in water quality observed were attributed to catchment-wide wet weather.

2.2.3 Sheas Creek/Alexandra Canal (Campbell Road)

No downstream exceedances of the pH and NTU SSTV were recorded during the reporting period.

Improvements in water quality were also observed at the downstream impact site on three occasions.

Table 2-2 Surface Water Quality Monitoring Results and Management Responses

Parameter	SSTV (SW09)	Mean Baseline Data values (SW09)	June 2020 8/06/2021		July 2021 6/07/2021		August 2021 6/08/2021		August 2021 ¹ 25/08/2021		September 2021 8/09/2021		October 2021 6/10/2021		November 2021 ¹ 5/11/201	
			Control	Impact	Control	Impact	Control	Impact	Control	Impact	Control	Impact	Control	Impact	Control	Impact
Haberfield Dobroyd Canal – Control: LSB02 and Impact: SW09																
Temperature (°C)	-	21.3	16.5	15.1	12.6	13.6	12.5	14.9	13.6	14.5	13.5	13.1	13.0	15.2	19.4	19.0
pH	7 – 8.5	8.45	8.63	7.94 ²	8.64	8.23 ²	8.60	7.74 ²	8.61	8.05 ²	8.82	7.45 ²	8.69	7.33 ²	7.78	8.13
ORP (mV)	-	341	274	203	132	162	140	146	143	177	112	141	148	181	237	228
Turbidity (NTU)	42	39	16.8	14.8	22.1	9.5	7.7	6.1	145.2	49.3 ²	67	8.4 ²	31.6	25.8	103.6	9.2 ²²
DO (%)	-	-	103.1	70.4	87.3	98.1	89.3	50.4	76.4	59.1	98.1	41.1	67.5	49.8	62.0	64.6
Management Response (if required)			pH SSTV exceedance occurring upstream of Project and improving downstream. Therefore, attributed to non-Project sources.		pH SSTV exceedance occurring upstream of Project and improving downstream. Therefore, attributed to non-Project sources.		pH SSTV exceedance occurring upstream of Project and improving downstream. Therefore, attributed to non-Project sources.		pH SSTV exceedance occurring upstream of Project and improving downstream. Upstream and downstream NTU exceeding SSTV but water quality improving downstream. A review of site WTP discharge records confirmed all outgoing water quality was within EPL limits for NTU. All erosion and sediment controls were installed and maintained on site in accordance with the ESCP. Therefore, attributed to non-Project sources and rainfall across the catchment.		pH and NTU SSTV exceedance occurring upstream of Project and improving downstream. Therefore, attributed to non-Project sources.		pH SSTV exceedance occurring upstream of Project and improving downstream. Therefore, attributed to non-Project sources.		NTU SSTV exceedance occurring upstream of Project and improving downstream. Therefore, attributed to non-Project sources and rainfall across the catchment.	

¹ Monitoring on 25 August 2021 occurred following a wet weather event (>25 mm in 24 hours). Monitoring on 5 November 2021 was undertaken following rainfall, however the formal wet weather trigger did not occur.

² Improvement of water quality downstream (values approaching target parameters)

XX Parameter exceeds SSTV and triggers a management response.

Parameter	SSTV (SW09)	Mean Baseline Data values (SW09)	June 2020 8/06/2021		July 2021 6/07/2021		August 2021 6/08/2021		August 2021 ¹ 25/08/2021		September 2021 ³ 8/09/2021		October 2021 6/10/2021		November 2021 ¹ 5/11/201	
			Control	Impact	Control	Impact	Control	Impact	Control	Impact	Control	Impact	Control	Impact	Control	Impact
PBR Johnstons Creek – Control: SW14 and Impact: SW04																
Temperature (°C)	-	19	16.2	16.2	15	12.9	12.4	12.1	15.2	15.6	N/A	14.8	15.0	14.1	21.2	20.7
pH	7.0-8.5	7.79	8.10	7.99	8.14	8.26	8.10	8.05	7.69	8.14	N/A	8.22	8.22	7.94	7.69	7.45
ORP (mV)	-	295	162	115	134	143	111	73	137	147	N/A	116	149	119	209	247
Turbidity (NTU)	107	57	29.9	23.7	55.4	62.7	9.1	15.2	363	125.7 ²	N/A	32	37.4	29.3	173.2	62.3 ²
DO (%)	-	-	70.1	41.6	62.8	58.1	75.8	57.6	58.4	60.9	N/A	62.9	61.8	39.8	76.2	79.6
Management Response (if required)			Not required.		Not required.		Not required.		Upstream and downstream NTU exceeding SSTV but water quality improving downstream. A review of site WTP discharge records confirmed all outgoing water quality was within EPL limits for NTU. All erosion and sediment controls were installed and maintained on site in accordance with the ESCP. Therefore, attributed to non-Project sources and rainfall across the catchment.		Not required.		Not required.		NTU SSTV exceedance occurring upstream of Project and improving downstream. Therefore, attributed to non-Project sources and rainfall across the catchment.	

¹ Monitoring on 25 August 2021 occurred following a wet weather event (>25 mm in 24 hours). Monitoring on 5 November 2021 was undertaken following rainfall, however the formal wet weather trigger did not occur.

² Improvement of water quality downstream (values approaching target parameters).

³ No sample taken from the upstream control site due to strong odour and suspected contamination from sewage overflow.

☒ Parameter exceeds SSTV and triggers a management response.

Parameter	SSTV (LSB01)	Mean Baseline Data values (SW15) ³	June 2020 8/06/2021		July 2021 6/07/2021		August 2021 6/08/2021		August 2021 ¹ 25/08/2021		September 2021 8/09/2021		October 2021 6/10/2021		November 2021 ¹ 5/11/201	
			Control	Impact	Control	Impact	Control	Impact	Control	Impact ⁴	Control	Impact	Control	Impact	Control	Impact
SPI Sheas Creek / Alexandra Canal – Control: SW10 and Impact: LSB01																
Temperature (°C)	-	20.14	16.5	16.5	14.3	14.6	15.7	12.7	15.3	14.1	16.8	14.9	15.3	17.6	20.9	21.5
pH	7.0 - 8.5	7.46	8.27	7.41	8.07	7.34	8.37	7.38	7.80	7.59	8.51	7.36 ²	8.24	7.48	8.10	7.32
ORP (mV)	-	320.17	151	143	131	159	128	162	148	137	126	125	135	170	209	241
Turbidity (NTU)	24	4.93	24.4	9.5 ²	4.1	7	5.3	3.9	3172	23 ²	3	5.6	8.6	5.1	2.2	10.6
DO (%)	-	-	64.4	47.2	74.8	55.1	85.1	55.9	65.1	62.4	72.9	57.1	54.4	31.1	82.4	64.8
Management Response (if required)			NTU SSTV exceedance occurring upstream of Project and improving downstream. Therefore, attributed to non-Project sources.		Not required.		Not required.		NTU SSTV exceedance occurring upstream of Project and improving downstream. Therefore, attributed to non-Project sources and rainfall across the catchment.		pH SSTV exceedance occurring upstream of Project and improving downstream. Therefore, attributed to non-Project sources.		Not required.		Not required.	

¹ Monitoring on 25 August 2021 occurred following a wet weather event (>25 mm in 24 hours). Monitoring on 5 November 2021 was undertaken following rainfall, however the formal wet weather trigger did not occur.

² Improvement of water quality downstream (values approaching target parameters)

³ Downstream (impact) location was changed from SW15 to LSB01 due to no safe and public access. No baseline data available for LSB01

XX Parameter exceeds SSTV and triggers a management response.