WestConnex
Rozelle Interchange

JOHN HOLLAND | CPB CONTRACTORS

JHCPB Joint Venture

Groundwater Monitoring Program

RIC-JHC-MPL-00-PL-300-002

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Glossary / Abbreviations

Abbreviations	Definition
ANZECC	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
Bi-monthly	Every two months
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
CFU	Colony Forming Unit
DPIE	NSW Department of Planning, Industry and Environment
DoI Water	NSW Department of Industry Water (formerly DPI Water)
DPI Water	NSW Department of Primary Industries - Water
DPIE Water	NSW Department of Planning, Industry and Environment – Water (formerly DoI Water)
EC	Electrical Conductivity
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
ER	Environmental Representative
GMP	Groundwater Management Sub-Plan
GMR	Groundwater Modelling Report
GWMP	Groundwater Monitoring Program
GWL	Groundwater level
GWQ	Groundwater quality
HSS	Hawkesbury Sandstone
JHCPB	John Holland CPB Contractors Joint Venture
mAHD	elevation in metres with respect to the Australian Height Datum
mBGL	metres below ground level
mTOC	metres below top of casing
m/day	metres per day
NRAR	Natural Resources Access Regulator
POEO Act	*Protection of the Environment Operations Act 1997*
µS/cm	micro-Siemens per centimetre

Abbreviations	Definition
REMM	Revised Environmental Management Measures
Roads and Maritime	Roads and Maritime Services (now Transport for NSW)
SP	Standpipe piezometer
SPIR	Submissions and Preferred Infrastructure Report
SSTV	Site Specific Trigger Value
TfNSW	Transport for NSW
VWP	Vibrating Wire Piezometer
WTP	Water Treatment Plant

1. Introduction

1.1. Context

This Groundwater Monitoring Program (GWMP or Program) has been prepared for the construction of the Design and Construction of Rozelle Interchange Project (the Project). This document acknowledges the authors of the Stage One Groundwater Management Sub-plan for the M4-M5 Link Mainline Tunnels and the Project's groundwater report for the Environmental Impact Statement (EIS) (AECOM 2017), in which words have been appropriated within certain sections of this document to provide continuity across the relevant requirements of the Project, which this document address.

This GWMP has been prepared to address the requirements of the Minister's Conditions of Approval (CoA), Project Approvals and all applicable guidance and legislation.

1.2. Scope of the groundwater monitoring program

The scope of this GWMP is to describe how JHCPB propose to monitor the extent and nature of potential impacts to groundwater quality during construction of the Project. Operational monitoring and operation measures do not fall within the scope of the construction phase and therefore are not included in the processes contained within the GWMP.

1.3. Implementation of the groundwater monitoring program

The Construction Monitoring Programs must be endorsed by the Environmental Representative (ER) and then submitted to the Secretary for approval at least one (1) month prior to commencement of construction.

Construction will not commence until the Secretary has approved all required Construction Monitoring Programs relevant to that activity and all the necessary baseline data for the required monitoring programs has been collected, to which the CEMP relates.

The Construction Monitoring Programs, as approved by the Secretary, including any minor amendments approved by the ER, must be implemented for the duration of construction and for any longer period set out in the monitoring program or specified by the Secretary, whichever is the greater.

2. Purpose and Objectives

2.1. Purpose

The purpose of the GWMP is to describe how JHCPB propose to monitor the extent and nature of potential impacts to the groundwater level and quality during construction of the Project.

The GWMP will be implemented to monitor the effectiveness of mitigation measures applied during the construction phase of the Project. Monitoring of groundwater will be undertaken to identify potential impacts and ensure a comprehensive management regime can be implemented to address those impacts and manage local groundwater quality.

This Program provides details of the groundwater monitoring network, frequency of monitoring, and test parameters. This GWMP supplements the Groundwater Management Sub-plan (GMP), which itself is an appendix of the CEMP.

This GWMP is based on baseline studies developed for the Project EIS (AECOM 2017) and continued baseline monitoring reports (AECOM 2018).

2.2. Objectives

This GWMP has been prepared to ensure all CoA, REMM, and licence/permit requirements relevant to groundwater monitoring are described, scheduled, and assigned responsibility as outlined in:

- All documents listed in CoA A1,
- Conditions of Approval: SSI-7485,
- Roads and Maritime specifications G36, G38 and G40
- The Project's Environment Protection Licence (EPL)
- All relevant legislation and other requirements

2.3. Consultation

This program was provided to The Water Group (DPIE Water), Sydney Water, City of Sydney Council, Inner West Council in accordance with CoA C9(b). In addition, the document was also offered to the EPA and NSW Fisheries for review and comment in accordance with REMM OGW9. Refer to Section 2 of the CEMP for consultation requirements relating to the CEMP and all sub-plans.

The Project is proposing to utilise bores from the existing baseline monitoring network established by RMS for construction monitoring. RMS developed this network in consultation with DPIE Water with the objective of providing good coverage along the alignment and to be located near sensitive environmental features or potentially contaminated areas.

A summary of consultation undertaken during the development of the GMP and GWMP is included in Section 3.4 of the GMP.

Consultation with DPIE has been be undertaken to determine monitoring well locations and when monitoring groundwater pore pressures in the Hawkesbury Sandstone aquifers adjacent to the tunnel alignment in accordance with CoA C12 (c).

Community feedback and complaints relating to groundwater will be managed in accordance with the Communication Strategy and Complaints Management System.

3. Groundwater monitoring

3.1. Baseline monitoring

3.1.1. Monitoring network

Baseline groundwater level and groundwater quality monitoring data has been collected from the Project groundwater monitoring network since June 2016. This baseline dataset is augmented by baseline data and construction data collected since October 2015 for the adjacent M4 East and New M5 projects.

The Project baseline monitoring network was installed between May 2016 and May 2017 and consists of 34 monitoring bores, located within the confines of the Project construction works, intersecting groundwater within the alluvium and Hawkesbury Sandstone. Monitoring bores were designed and constructed to target the expected tunnel zone and allow the assessment of potential impacts to groundwater. At one location where alluvium was present, nested monitoring bores were constructed.

Monitoring bores have been designed to target the following hydrogeological formations:

- Alluvium
  - 5 at the Crescent
  - 4 at Rozelle
- Hawkesbury Sandstone
  - 18 at Rozelle
  - 3 at the Crescent
  - 2 at Iron Cove
  - 2 at Easton Park

In addition to the collection of groundwater quality and groundwater level data, baseline studies to inform the Project EIS (AECOM 2017) included the collection of hydraulic data for the local aquifer systems (including packer tests). This data is not discussed further in this document as it has no relevance to the ongoing monitoring program.

The baseline monitoring bore network is shown in Table 1 and Figure 1.

The following sections summarise the factors influencing groundwater within the Project. The Project transects a highly urbanised environment that consists of established industrial, commercial, recreational, and residential areas. The alignment encompasses the Rozelle interchange network that is situated within Rozelle and Easton Park and extends from the proposed Iron Cove Link joining Victoria Road at Parramatta River to the north, the intersection of Victoria Road and the Crescent at Rozelle Bay to the east, and through to Lilyfield in the south, before linking with the Mainline Tunnel at Leichardt.

The key reference document is Chapter 19, Groundwater, of the EIS (AECOM 2017).

Table 1: Baseline groundwater monitoring network

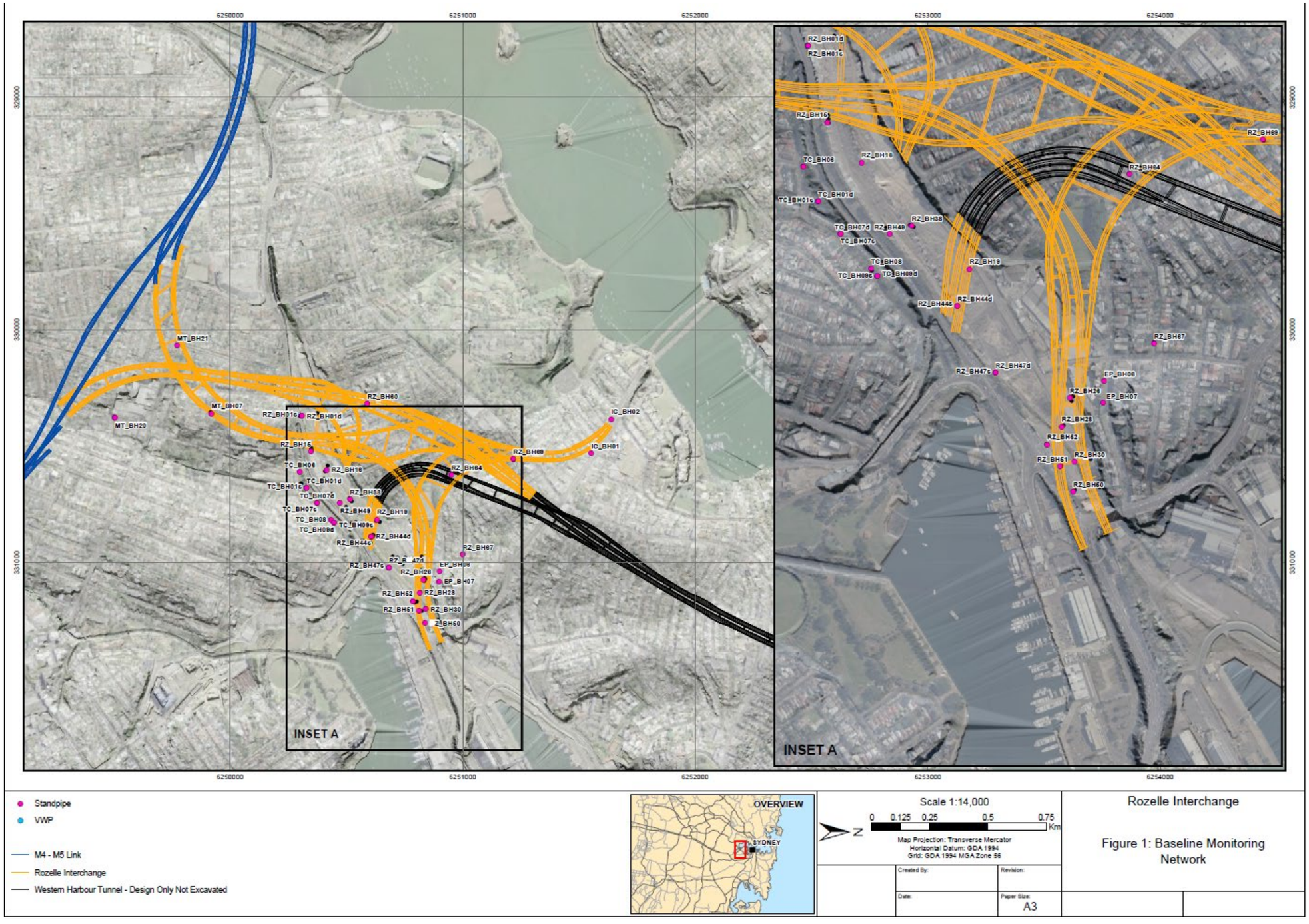
Bore ID	Location	Easting	Northing	Screened interval (mBGL)	Lithology	Used in EIS for baseline groundwater level monitoring	Number of water quality samples analysed during baseline monitoring
Rozelle							
RZ_BH01d	Rozelle Rail Yard	330608.87	6250381.26	22-25	HSS	Yes	22
RZ_BH01s	Rozelle Rail Yard	330611.47	6250381.61	7-10	Alluvium	Yes	22

Bore ID	Location	Easting	Northing	Screened interval (mBGL)	Lithology	Used in EIS for baseline groundwater level monitoring	Number of water quality samples analysed during baseline monitoring
RZ_BH15	Rozelle Rail Yard	330522.59	6250349.91	18-21	HSS	Yes	22
RZ_BH16	Rozelle Rail Yard	330609.43	6250409.41	17-20	HSS	Yes	22
RZ_BH19	Rozelle Rail Yard	330822.45	6250626.95	19-22	HSS	Yes	20
RZ_BH26	East of RRY	331066.28	6250835.05	20-23	HSS	Yes	22
RZ_BH28d	Rozelle Rail Yard	331126.56	6250818.78	27-30	HSS	Yes	19
RZ_BH30	Rozelle Rail Yard	331192.90	6250834.96	16-19	HSS	Yes	18
RZ_BH38	Rozelle Rail Yard	330726.61	6250812.07	28-31	HSS	Yes	21
RZ_BH44d	Rozelle Rail Yard	330885.77	6250613.96	25-28	HSS	Yes	20
RZ_BH44s	Rozelle Rail Yard	330884.43	6250613.29	12-15	Alluvium	Yes	21
RZ_BH47d	Rozelle Rail Yard - RZ Bay	331025.23	6250701.67	27-30	HSS	No	21
RZ_BH47s	Rozelle Rail Yard - RZ Bay	331027.87	6250703.96	15-18	Alluvium	Yes	21
RZ_BH49s	Rozelle Rail Yard	330730.38	6250461.58	13-16	Alluvium	No	20
RZ_BH50	Rozelle Rail Yard	331255.63	6250841.07	22-25	HSS	Yes	19
RZ_BH51	Rozelle Rail Yard	331206.58	6250813.32	19-22	HSS	Yes	18
RZ_BH52	Rozelle Rail Yard	331163.77	6250784.58	32-35	HSS	Yes	20
RZ_BH53	SHFA	331100.88	6250738.06	18-21	HSS	No	0
RZ_BH60	Opposite 46 Justin St, Lilyfield	330317.83	6250589.57	56-59	HSS	Yes	13
RZ_BH64	Brockley Street, Rozelle	330623.50	6250949.00	46-49	HSS	Yes	13
RZ_BH67	Alfred St, Rozelle	330961.48	6250999.73	46-49	HSS	No	10
RZ_BH69	Albion St, Rozelle	330558.20	6251218	38-41	HSS	No	4
The Crescent							
TC_BH01d	RailCorp, Lilyfield	330661.99	6250305.25	25-28	HSS	No	23
TC_BH01s	RailCorp, Lilyfield	330660.57	6250304.92	3-6	Alluvium	Yes	22
TC_BH06s	Railway Pde, Annandale	330610.16	6250298.14	4.5-7.5	Alluvium	Yes	19

Bore ID	Location	Easting	Northing	Screened interval (mBGL)	Lithology	Used in EIS for baseline groundwater level monitoring	Number of water quality samples analysed during baseline monitoring
TC_BH07d	Railway Pde, Annandale	330746.03	6250373.53	19-22	HSS	Yes	16
TC_BH07s	Railway Pde, Annandale	330747.41	6250374.95	3-6	Alluvium	Yes	22
TC_BH08s	Railway Pde, Annandale	330818.34	6250435.89	5-8	Alluvium	Yes	22
TC_BH09d	Railway Pde, Annandale	330830.31	6250444.46	21-24	HSS	Yes	22
TC_BH09s	Railway Pde, Annandale	330830.70	6250445.81	2-5	Alluvium	No	11
Iron Cove							
IC_BH01	Waterloo St, Rozelle	330514.22	6251504.54	23-26	HSS	Yes	15
IC_BH02	Toelle St, Rozelle	330334.97	6251646.37	8-11	HSS	No	9
Easton Park							
EP_BH06	Lilyfield Rd, Rozelle	331025.39	6250903.92	10-13	HSS	Yes	18
EP_BH07	Starling St, Lilyfield	331082.28	6250898.80	10-13	HSS	Yes	18
Main Tunnel							
MT_BH07	White Creek Reserve, Lilyfield	330355.81	6249914.91	43-46	HSS	Yes	16
MT_BH20	John Street, Leichhardt	330379.4	6246735.87	41-44	HSS	No	6
MT_BH21	Ainsworth St, Lilyfield	330066.72	6249771	47-50	HSS	Yes	7
Rozelle Rail Yard once off contamination sampling							
RZ_BH081	Rozelle Rail Yard	330831.19	6250767.25	2.5-3.2	Alluvium	N/A	N/A
RZ_BH101	Rozelle Rail Yard	330871.54	6250706.63	1.0-4.0	Alluvium	N/A	N/A
RZ_BH103	Rozelle Rail Yard	330943.03	6250752.15	0.7-2.7	Alluvium	N/A	N/A
RZ_BH105	Rozelle Rail Yard	331013.16	6250752.15	1.5-4.5	Alluvium	N/A	N/A
RZ_BH107	Rozelle Rail Yard	330888.30	6250817.43	2.5-4.5	Alluvium	N/A	N/A
RZ_BH109	Rozelle Rail Yard	330898.71	6250716.34	0.9-3.1	Alluvium	N/A	N/A

Bore ID	Location	Easting	Northing	Screened interval (mBGL)	Lithology	Used in EIS for baseline groundwater level monitoring	Number of water quality samples analysed during baseline monitoring
RZ_BH111	Rozelle Rail Yard	330946.47	6250745.17	1.1-3.4	Alluvium	N/A	N/A
BH57	Rozelle Rail Yard	330945.60	6250740.73	2.0-5.0	Alluvium	N/A	N/A
BH60	Rozelle Rail Yard	330995.16	6250763.70	1.0-4.0	Alluvium	N/A	N/A

Figure 1: Baseline Monitoring Network



3.1.2. Groundwater level

Baseline groundwater level data has included monthly manual dips and continuous data from dedicated pressure logging transducers (dataloggers). Dataloggers were installed in key groundwater monitoring bores and programmed to record baseline data on an hourly basis. The data has since been corrected for barometric pressure effects, converted to a groundwater level measurement and compared to local rainfall.

The purpose of the baseline groundwater level monitoring was to establish pre-construction groundwater level and flow conditions across the Project area to inform groundwater modelling and the EIS (AECOM 2017). The EIS presents interpretation of the baseline groundwater level conditions, summarised in Section 3 of this GWMP.

Identified potential Project impacts will be routinely monitored during construction and include:

- Groundwater level decrease (see Section 3.2 and 3.2.2)
- Saline intrusion (see Section 3.2.3).

Manual baseline groundwater level monitoring results are included in Appendix A.

3.1.3. Groundwater quality

Baseline monthly groundwater quality monitoring commenced in June 2016 or later as each monitoring location became operational. The objectives for the baseline groundwater quality monitoring program included:

- Characterise the existing hydrogeochemistry in the three main hydrogeological units (alluvium, Ashfield Shale (note: this unit is absent in the current Project area), and Hawkesbury Sandstone)
- Establish the environmental value and beneficial use of groundwater under existing (pre-construction) conditions
- Develop a groundwater quality baseline dataset to inform the EIS
- Characterise the potential aggressiveness of the native groundwater to the building material used to construct the Project infrastructure
- Obtain a preliminary understanding of the groundwater treatment requirements prior to discharge during the construction and operation phases.

A summary of the groundwater quality samples collected from June 2016 for each hydrogeological unit within the confines of the Project is shown in Table 2.

Table 2: Baseline groundwater quality sampling program

	Alluvium	Hawkesbury Sandstone	Total
# of samples	180	406	586

The baseline groundwater quality sampling program included the following analytes:

- Physico-chemical field parameters (temperature, dissolved oxygen, electrical conductivity (EC), pH, and redox potential)
- Major ions (calcium, magnesium, sodium, potassium, chloride, sulphate, carbonate and bicarbonate)
- Dissolved metals (arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel and zinc)
- Nutrients (nitrite as N, nitrate as N, reactive phosphorus and ammonia)
- Benzene, toluene, ethylbenzene, xylene, and naphthalene (BTEXN)
- Total recoverable hydrocarbons (TRHs)
- Polycyclic aromatic hydrocarbons (PAHs)
- Organochlorine pesticides (OCPs)
- Organophosphate pesticides (OPPs)
- Semi-volatile organic hydrocarbons (SVOCs)
- Volatile organic compounds (VOCs)

- Sulphate reducing bacteria.

Interpretation of the baseline groundwater monitoring data is included in the EIS (AECOM 2017) and is summarised in Table 3.

Table 3: Summary of baseline groundwater quality within the Project area

Parameter	Alluvium	Hawkesbury Sandstone
EC	Variable fresh to brackish Range: 328 to 74,800 µS/cm	Fresh to moderately saline Range: 149 to 9,910 µS/cm
pH	Weakly acidic to weakly basic Range: 5.96 to 8.06	Slightly acidic to strongly basic Range: 5.77 to 12.69
Major ions	Dominated by sodium, magnesium, chloride and bicarbonate. The dominance of sodium and chloride is attributed to tidal influences.	Dominated by sodium and chloride, which may be in part due to the influence of saline water intrusion.
Metals	Maximum levels exceeded guideline concentration values for all but cadmium and nickel. In most cases the exceedance is marginal, indicating that background levels are already elevated.	Maximum levels exceeded guideline concentration values for chromium, copper, iron, lead, manganese, nickel, and zinc. Consistently elevated iron and manganese, which is typical for Hawkesbury Sandstone (McKibbon and Smith 2000).
Nutrients	Nitrite and nitrate concentrations indicate that background nutrient levels are low. Reactive phosphorous levels are also low. Ammonia values exceeded guideline[1] concentration values.	Nitrite and nitrate concentrations indicate that background nutrient levels are low. Reactive phosphorous levels are very low. Ammonia values marginally exceeded guideline[1] concentration value.
Sulfate reducing bacteria[2]	Not assessed	No pattern was assessed for sulfate reducing bacteria because many samples were above the measurement limit (500,000 CFU/mL). Groundwater from the Hawkesbury Sandstone has high sulfate concentrations. When reducing conditions are present, SRB flourish in the absence of oxygen.
Groundwater aggressivity	Not assessed	Mildly aggressive towards concrete piles for average concentrations of chloride, pH, and sulfate. Mildly aggressive towards steel piles for average concentrations of chloride and pH. Severely aggressive towards steel piles for groundwater with low conductivity.

EC = electrical conductivity; µS/cm = micro-Siemens per centimetre
[1] Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000)
[2] measured as a colony forming unit (CFU) per 100 mL

3.2. Construction monitoring

3.2.1. Overview

As discussed in Section 3, potential impacts on groundwater during construction are identified as:

- Groundwater level decrease in the vicinity of the Project tunnels (groundwater drawdown)
- Intrusion of saline water in tidal zones.

Groundwater level and groundwater quality (salinity) monitoring will be carried out during construction at the monitoring network listed in Table 4 and shown in Figure 2 utilising background monitoring wells where functional for consistency. The data will be assessed (Section 5.1.2) and reported in the six-monthly water monitoring report as identified in Table 9. Where a well becomes inoperable, damaged or within the works footprint the Environment and Sustainability Manager will identify a

suitable replacement in consultation with a suitably qualified hydrogeologist. Groundwater inflows intercepted during tunnelling, and subsequent discharge via the Project WTP, will also be monitored. Construction phase groundwater level and quality (EC) data will be fed into the groundwater model.

The construction groundwater monitoring program will monitor:

- Groundwater level
- Groundwater quality (EC) at key bores
- Groundwater inflow to the tunnels.

Monitoring bores target the two main hydrogeological formations within the confines of the Project area (alluvium and Hawkesbury Sandstone) with a minimum of two groundwater monitoring wells located in the following key project locations (in accordance with CoA C12 d)):

- Rozelle area to the north of Rozelle Bay,
- Annandale area to the west of Rozelle Bay, and
- Rozelle area to the south east of Iron Cove

The locations of these wells have been determined in consultation with DPIE Water.

For those wells that are to be installed prior to the commencement of adjacent tunnelling works, their locations are indicated in Table 4 and . The position of each future well has a 100 metre buffer to facilitate re-positioning, where necessary, to avoid potential utility clashes, minimise vegetation clearance, avoid heritage impacts and reduce impacts to traffic and pedestrians where possible.

It may be necessary to construct additional monitoring bores if some of the existing bores are inaccessible or damaged during tunnel construction or as a possible management action as part of an investigation into discrepancies in monitoring data, if required.

Two monitoring wells are installed in the north Rozelle/Lilyfield area to the west of the ventilation tunnel at Iron Cove to monitor salinity as per CoA12 (h) in consultation with The Water Group (DPIE Water)These are identified as IC_BH03 and IC_BH04 and locations shown in Figure 2 below

Vibrating wire piezometers (VWPs) will be used to validate drawdown predictions from the groundwater model. More than three VWPs will be installed in accordance with REMM OGW10 as close as possible to the tunnel centrelines to allow for the comparison of pore pressure (recorded by the VWPs) and standing water level (recorded by standpipe groundwater monitoring bore). As stated in REMM OGW10, the wells could be constructed about five to ten meters above the top of the tunnel crown to allow for groundwater drawdown during monitoring within the Hawkesbury sandstone. The location of these VWPs has been undertaken in consultation with DPIE Water. The details of the VWPs are included in this Monitoring Program accordingly.

Table 4: Construction phase groundwater monitoring bores

Bore ID	Location	Easting	Northing	Elevation (mAHD)	Lithology	Type	Parameters
RZ_BH60 Log	Justin St, Lilyfield	330994	6250766	24.96	Hawkesbury Sandstone	SP	GWL, GWQ (EC)
RIC_PSM_BH008_VMP_01[1]	Street between Justin St and Lamb St, Lilyfield	330338.3	6250772	-5.54	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_PSM_BH008_VMP_02[1]	Street between Justin St and Lamb St, Lilyfield	330338.3	6250772	-26.54	Hawkesbury Sandstone	VWP	Pore pressure/ GWL

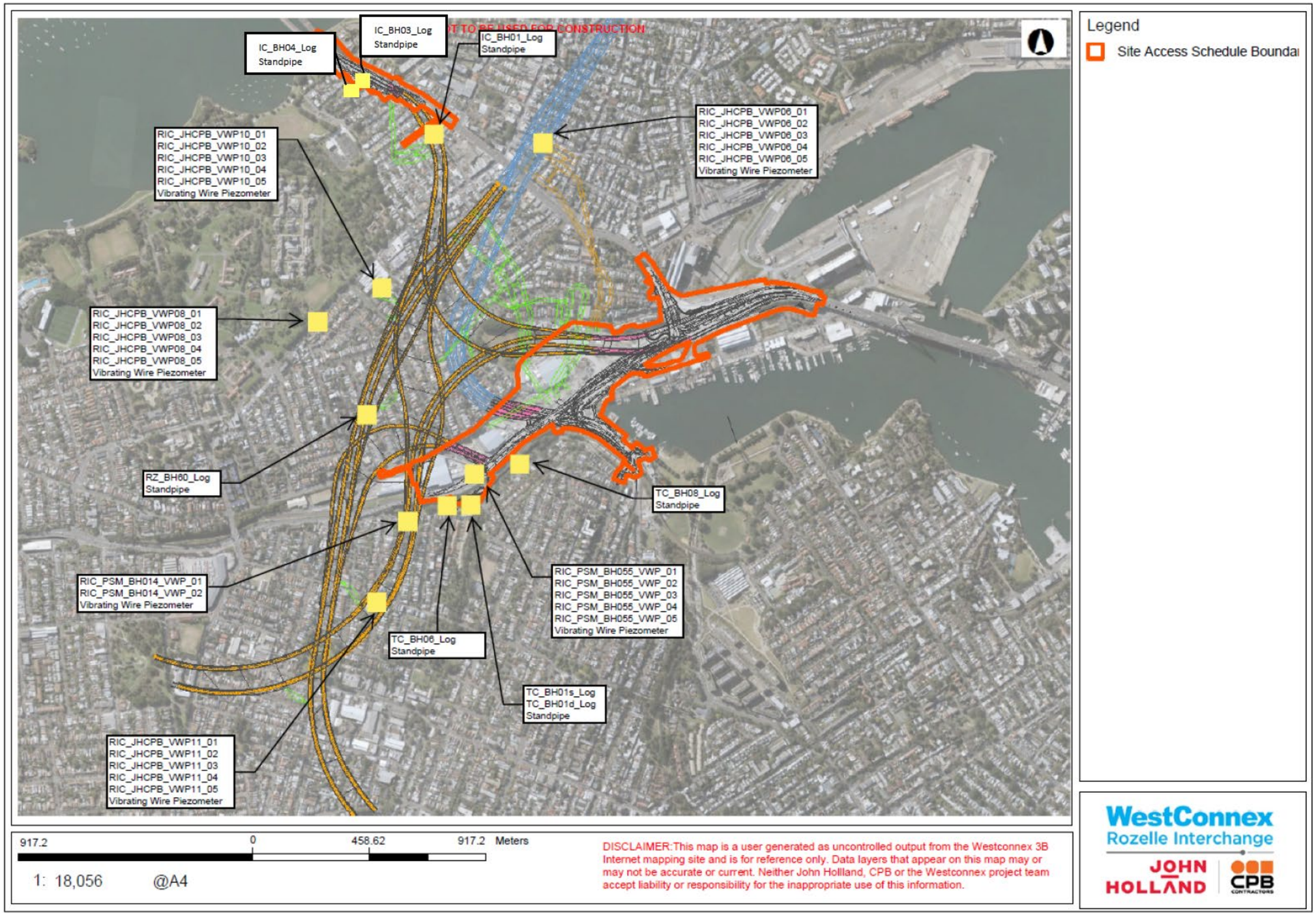
RIC_PSM_BH 008_VMP_03[1]	Street between Justin St and Lamb St, Lilyfield	330338.3	6250772	-47.54	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
TC_BH01d Log	RailCorp, Lilyfield	330660.6	6250304.9	2.54	Hawkesbury Sandstone	SP	GWL, GWQ (EC)
TC_BH01s Log	RailCorp, Lilyfield	330660.6	6250304.9	2.55	Alluvium	SP	GWL, GWQ (EC)
TC_BH06_Log	Railway Pde, Annandale	330611.4	6250298.3	2.65	Alluvium	SP	GWL, GWQ (EC)
TC_BH08_Log	Railway Pde, Annandale	330818.3	6250435.9	2.24	Alluvium	SP	GWL, GWQ (EC)
IC_BH01 Log	Waterloo St, Rozelle	330514.2	6251505	26.77	Hawkesbury Sandstone	SP	GWL, GWQ (EC)
RIC_JHCPB_V WP06_01	National St, Rozelle	330875.4	6251485	10.03	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP06_02	National St, Rozelle	330875.4	6251485	0.03	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP06_03	National St, Rozelle	330875.4	6251485	-9.97	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP06_04	National St, Rozelle	330875.4	6251485	-39.97	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP06_05	National St, Rozelle	330875.4	6251485	-79.97	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP8_01	Balmain Rd, Lilyfield	330150.8	6250888	10.04	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP8_02	Balmain Rd, Lilyfield	330150.8	6250888	-9.9593	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP8_03	Balmain Rd, Lilyfield	330150.8	6250888	-29.9593	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP8_04	Balmain Rd, Lilyfield	330150.8	6250888	-49.9593	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP8_05	Balmain Rd, Lilyfield	330150.8	6250888	-79.9593	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP10_01	Fred St, Lilyfield	330357.2	6250996	10	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP10_02	Fred St, Lilyfield	330357.2	6250996	-10	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP10_03	Fred St, Lilyfield	330357.2	6250996	-30	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP10_04	Fred St, Lilyfield	330357.2	6250996	-50	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_V WP10_05	Fred St, Lilyfield	330357.2	6250996	-80	Hawkesbury Sandstone	VWP	Pore pressure/ GWL

RIC_JHCPB_VWP11_01	Paling St, Lilyfield	330360.6	6249979	-0.0473	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_VWP11_02	Paling St, Lilyfield	330360.6	6249979	-10.0473	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_VWP11_03	Paling St, Lilyfield	330360.6	6249979	-20.0473	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_VWP11_04	Paling St, Lilyfield	330360.6	6249979	-40.0473	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_JHCPB_VWP11_05	Paling St, Lilyfield	330360.6	6249979	-60.0473	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_PSM_BH014_VMP_01[1]	Starling St, Lilyfield	330456.4	6250242	-0.17	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_PSM_BH014_VMP_02[1]	Starling St, Lilyfield	330456.4	6250242	-14.17	Hawkesbury Sandstone	VWP	Pore pressure/ GWL
RIC_PSM_BH055_VWP01[1]	Rozelle Rail Yard	330665.9	6250403	-2.7	Alluvium	VWP	Pore pressure/ GWL
RIC_PSM_BH055_VWP02[1]	Rozelle Rail Yard	330665.9	6250403	-4.3	Alluvium	VWP	Pore pressure/ GWL
RIC_PSM_BH055_VWP03[1]	Rozelle Rail Yard	330665.9	6250403	-5.3	Alluvium	VWP	Pore pressure/ GWL
RIC_PSM_BH055_VWP04[1]	Rozelle Rail Yard	330665.9	6250403	-9.7	Alluvium	VWP	Pore pressure/ GWL
RIC_PSM_BH055_VWP05[1]	Rozelle Rail Yard	330665.9	6250403	-11.9	Alluvium	VWP	Pore pressure/ GWL
IC_BH03 Log	Clubb St, Rozelle	330215.2	6251636.7	-10	Hawkesbury Sandstone	SP	GWL, GWQ (EC)
IC_BH04 Log	Onsite, between Toelle St and Clubb St	330273.0	6251661.6	-20	Hawkesbury Sandstone	SP	GWL, GWQ (EC)

HSS = Hawkesbury Sandstone; GWL = Groundwater level; GWQ = Groundwater quality; SP = Standpipe piezometer; VWP = Vibrating Wire Piezometer

[1] Bore to be relocated due to construction activities (excavations and installation of pavements). Relocated bore to be as local to the original position as site/construction constraints allow, as well as having an equivalent screened interval.
[2] Future VWPs to be installed prior to the commencement of adjacent tunnelling works (see).

Figure 2: Construction phase groundwater monitoring network – standpipe and vibrating wire piezometers



3.2.2. Groundwater level

Dataloggers will be installed (or maintained from the baseline monitoring phase) in each construction monitoring bore (Table 4) to provide continuous data collection. Dataloggers will be programmed to record at hourly intervals. The VWPs will be equipped with dataloggers set to record pore pressures at six-hourly intervals.

To supplement the above continuous monitoring, manual measurements will be collected every two months (bi-monthly), pending access, at each bore in the construction monitoring network in Table 4. Measurements will be recorded in metres below top of casing (mbTOC) and converted to metres below ground level (mBGL) and metres Australian Height Datum (mAHD).

Two monitoring wells are installed in the north Rozelle/Lilyfield area to the west of the ventilation tunnel at Iron Cove to monitor groundwater levels as per CoA C12 (h).

Recorded data will be compensated for barometric pressure and converted to a groundwater level measurement. Manual monitoring data will be used to verify continuous data.

Groundwater level data will be compared to local rainfall records to assess trends.

Table 5: Groundwater level monitoring

Monitoring target (hydrogeological unit/number of bores)	Processed data outputs	Frequency
Alluvium (4)	mBGL; mBTOC; mAHD	hourly (via datalogger) Bi-monthly (manual dips)
Hawkesbury Sandstone (8)	mBGL; mBTOC; mAHD	hourly (via datalogger) Bi-monthly (manual dips)

3.2.2.1. Performance criteria

Seasonal fluctuation considered within the EIS groundwater model (AECOM 2017) will facilitate the assessment and comparison between groundwater level decrease and the predicted drawdown from the Project. The assessment will determine whether the observed decrease is attributable to the Project and, if so, whether it aligns with approved predictions. Data analysis is described in Section 5.1.2 and water monitoring reports will be produced every six months to assess this which will include data summary reports presenting tabulated groundwater monitoring data collected during the reporting period in accordance with Table 9.

If drawdown is identified outside of model predictions, management actions outlined in the GMP will be initiated including (but not limited to) a review of baseline groundwater level and quality data in the relevant and surrounding monitoring bores as well as an assessment of groundwater inflow rates into the tunnel.

3.2.3. Groundwater salinity

Dedicated dataloggers with specification allowing the measurement of electrical conductivity (EC) and groundwater level will be installed at the key monitoring bores between the tunnel alignment and saline water bodies (Table 4). The dataloggers will be programmed to record data on an hourly basis.

Dataloggers will be downloaded bi-monthly (every two months). Electrical conductivity (EC) results will be assessed to detect changes in water quality that may indicate the intrusion of saline water towards the tunnel in accordance with CoA C12 (d). Data analysis is described in Section 5.1.2 and water monitoring reports produced every six months in accordance with Table 9. A review after the first 12 months of construction of the monitoring program will be completed to determine the efficiency of the monitoring program and any required changes.

3.2.3.1. Performance criteria

Baseline monitoring shows that some groundwater quality parameters exceed the default ANZECC (2000) water quality trigger values for slightly to moderately disturbed ecosystems. This is not unexpected given the highly disturbed and urbanised Project area.

Site-specific trigger values (SSTV) (Table 6) for EC have been developed for each water quality monitoring bore using the baseline data used to inform the EIS (AECOM 2017). The SSTV's were derived by calculating the 80th percentile values of the baseline EC data (using ANZECC 2000 and 2018 methodology). A percentile is the value below which a given percentage of observations fall. The 80th percentile is therefore the value below which 80% of observations are found. Using these percentiles removes anomalous data that is outside of the normal range (defined here as 0 – 80 % of values).

The SSTV's provide an easily identifiable indication of a potential change in salinity. A management response would be initiated if any of the following occurs:

- The EC data continuously exceeds the SSTV over a period of three months and depicts a rising trend
- The EC data exceeds the SSTV at any time by more than 100%

In the event that one or both of the above EC triggers are observed a review will be initiated to determine the significance of the exceedance(s) and possible causes. The review will assess the historical and surrounding monitoring bore data, and modelling predictions.

If the exceedance is determined to be attributable to Project works and outside of approved model predictions for saline intrusion the groundwater model will be reviewed and updated. The updated model will be used to assess potential impacts and inform potential mitigation measures.

Table 6: Salinity (EC) trigger values

Region	Monitoring bore[1]	Lithology	Sample count	EC min (µS/cm)	EC max (µS/cm)	SSTV[2] (µS/cm)	Relocation bore
Rozelle	RZ_BH01s	Alluvium	22	397	2,174	600	RZ_GW24
	RZ_BH01d[3]	Hawkesbury Sandstone	23	307	3,650	2,000	N/A
	RZ_BH015[3]		22	368	1,470	1,100	RZ_GW22
	RZ_BH44d[3]		22	161	1,925	1,400	SB_BH01
	RZ_BH51[3]		19	239	4,100	1,800	RZ_GW01
	RZ_BH52[3]		21	526	1,317	1,000	RZ_GW05b
	RZ_BH60		13	172	4,910	3,900	N/A
	RZ_BH67[3]		9	507	773	600	GC01_GW01b
The Crescent	TC_BH01s	Alluvium	22	6,899	74,800	30,100	N/A
	TC_BH06s		23	1,175	4,723	2,400	N/A
	TC_BH08s		22	3,170	42,730	13,500	N/A
	TC_BH01d	Hawkesbury Sandstone	22	1,126	9,910	3,900	N/A
Iron Cove	IC_BH01	Hawkesbury Sandstone	14	516	7,980	2,100	N/A

EC = electrical conductivity; µS/cm = micro-Siemens per centimetre
[1] Key monitoring locations.
[2] SSTV = site specific trigger value (80th percentile of baseline data, rounded to nearest 100).
[3] Bore to be relocated due to construction activities (excavations and installation of pavements). Relocated bore to be as local to the original position as site/construction constraints allow, as well as having an equivalent screened interval. This is to allow future EC values to be compared against those in this table.

All relocated bores are identified by the Environment and Sustainability Manager in consultation with a suitably qualified hydrogeologist.

Locations of all salinity loggers are in Figure 3 and Figure 4.

Two monitoring wells are installed in the north Rozelle/Lilyfield area to the west of the ventilation tunnel at Iron Cove to monitor salinity as per CoA12 (h) in consultation with The Water Group (DPIE Water)These are identified as IC_BH03 and IC_BH04 and locations shown in Figure 4 below. In the absence of background monitoring data for these bores and based on the groundwater model and HIR, no significant fluctuations in the levels recorded is expected and any changes that occur from the initial time of installation will be monitored.

At the time of installation, the value will be recorded and is used as the salinity quality trigger value

Figure 3 Construction phase groundwater monitoring network – salinity logger locations (Rozelle)

Figure 4 Construction phase groundwater monitoring network – salinity logger locations (Iron Cove)

3.2.4. Tunnel inflow

During construction, groundwater will be intersected and managed by either capturing the water that enters the tunnels, caverns, and portals or by restricting inflow through targeted grouting where required in cut-and- cover sections.

Groundwater inflow into the tunnels will be monitored during construction and compared to model predictions. Data analysis is addressed in Section 5.1.2, and will be documented in the water monitoring reports produced every six months in accordance with Table 9. The groundwater model will be updated as required based on the results of monitoring, and proposed management measures to minimise potential groundwater impacts adjusted accordingly.

A simple water balance approach will be used to estimate groundwater inflows to the tunnel during construction:

Groundwater inflow = WTP discharge – Project water inputs

This simplistic approach doesn't consider the water that will be extracted in the spoil. This water is accounted for in groundwater modelling for the Project and is predicted to not contribute to ongoing drawdown and associated impacts.

In areas where tunnels are to be constructed within the alluvium and paleochannels, including at the Rozelle Rail Yards, additional mitigation measures including targeted grouting in hydraulic conductive ground and engineered structures such as soldier pile walls and diaphragm walls will be implemented to restrict groundwater ingress from the alluvium entering the tunnels where required.

High groundwater inflow during excavation is possible in faulted or fractured zones such as beneath the Rozelle Rail Yard (Whites Creek paleochannel) and in the alluvium (AECOM 2017). Grouting will be undertaken as required through the construction program reducing tunnel inflow.

3.3. Water treatment plant monitoring

Groundwater captured during construction of the Project will be treated at three water treatment plants at the Rozelle civil and tunnel site (C5). The water from the treatment plants will be tested and either reused or discharged in accordance with this document or the Project EPL or JHCPB's trade waste licence requirements (if requested by JHCPB and granted by Sydney Water). This data will be reviewed and assessed in the water monitoring reports produced every six months in accordance with Table 9.

3.3.1. Tunnel discharge volume

Discharge volumes will be continuously monitored at the WTPs via calibrated flow meters, which will enable the daily measurement of the amount of water discharged from the WTPs.

3.3.2. Discharge water quality

3.3.2.1. Water treatment plant commissioning

During commissioning of each of the WTPs, a minimum of two rounds of commissioning sampling will be undertaken to confirm their efficacy. All of the parameters listed in Table 7 and Table 8 will be tested during this commissioning phase. The main objectives of the commissioning testing will be to determine:

- If the WTPs perform to meet the proposed discharge criteria in
- Table 7: WTP construction discharge criteria
- and the design performance in Table 8 and what (if any) design or operational modifications may be required to the WTP in order for it to meet the required specifications, and
- The relationship between TSS and turbidity to allow turbidity to be measured as a proxy for TSS — this will require more samples than for the other parameters and may continue into the post-commissioning phase.

The WTPs will not be deemed commissioned until two rounds of testing confirm compliance with the criteria. If monitoring results in an exceedance, the commissioning process will be continued, and adjustments made if necessary, until two subsequent rounds of testing are compliant.

3.3.2.2. Water treatment plant post-commissioning

In addition to the commissioning sampling, the WTPs discharge will be sampled for water quality analysis, via grab samples, for the parameters listed in Table 7 and Table 8. Sampling will be undertaken in accordance with the EPL requirements. The results will be reviewed by trained personnel to ensure that the discharged water meets discharge criteria.

Monthly sampling of the design performance criteria listed in Table 8 will be undertaken to ensure that each of the WTPs continues to meet design specifications. Where in-line sensors (typically pH and turbidity) or monitoring identify WTPs performance drift outside of the required criteria measures will be implemented to return the WTPs performance back into the required range. In these instances, water will be discharged to trade waste (where permitted), re-used on site or disposed offsite at an appropriate licenced liquid waste facility. Water quality will be monitored via in-line sensors calibrated pH and turbidity sensors with appropriate alerts set to inform management of any drift in WTP performance.

Water quality results will be analysed monthly, and along with an overview of corrective actions will be reported in the six-monthly water monitoring report.

3.3.2.3. Performance criteria

In accordance with CoA E186 water to be discharged from the water treatment plant must comply with project's EPL and ~~the ANZECC (2000) 90 per cent species~~ the protection level listed in Table 8 ~~unless the EPL is in force in which the guidelines in Table 8 can~~ will be adhered to when discharging water into the environment. If required, when discharging into existing sewer drains, Sydney Water trade waste agreement criteria will be adhered to.

The WTPs will undergo commissioning and testing to determine the treatment efficacy in accordance with Section 3.3.2.1 and Section 3.3.2.2.

Table 7: WTP construction discharge criteria

Parameter	Discharge criteria	Reference
pH	6.5 - 8.5	EPL
Oil and grease	None visible	EPL
Turbidity	An NTU value calibrated to achieve <50 mg/L equivalent Total Suspended Solids	EPL

~~Note: EPL is yet to be finalised and approved by the EPA~~

Table 8: Water treatment plant monthly design performance criteria

Parameter	Unit	WTP performance criteria
Cadmium	mg/L	0.014
Chromium (hexavalent)	mg/L	~~0.0486~~ 0.07
Chromium (trivalent)	mg/L	~~0.02~~ 0.15
Copper	mg/L	~~0.003~~ 0.04
Iron[4]	mg/L	~~0.3~~ 1.5
Lead	mg/L	~~0.0066~~ 0.03
Mercury	mg/L	0.0007
Nickel	mg/L	0.2
Zinc	mg/L	~~0.023~~ 0.15
Arsenic	mg/L	0.05

Source: Project EPL ~~ANZECC (2000a) – Trigger values for 90% species protection level except where:~~

[4] ~~Guideline for recreational water quality~~

WTPs will be of a modular design so that they can be modified if required to ensure discharge can be conducted in accordance with the discharge criteria.

4. Monitoring methodology

4.1. Overview

The methodology for monitoring groundwater for the Project includes:

- Assessment of groundwater level (measurement and datalogger download (including VWPs))
- Assessment of groundwater salinity as EC (datalogger download)
- Assessment of WTP discharge water quality (grab samples and analysis)
- Implementation of quality control plan including appropriate chain-of-custody for laboratory analysis and provision of appropriate documentation.

Groundwater monitoring is to be undertaken by suitably qualified personnel at all times.

4.2. Manual groundwater level measurements

Groundwater monitoring will be overseen by personnel with appropriate qualifications and experience. Trained field personnel will complete monitoring rounds using appropriate personal protective equipment (PPE) and monitoring equipment.

The static groundwater level will be measured and recorded at each standpipe groundwater monitoring bore using an electronic groundwater level dip meter (dipper) to verify the continuous data recorded by dataloggers (Section 4.3). The level (to the nearest millimetre) will be referenced to a known (and consistent) surveyed point at the top of the bore casing (mTOC). This measurement will be corrected to mAHD using survey data. Recorded groundwater level will be tabulated in both metres below top of bore casing (mBTOC) and mAHD. This monitoring will occur bi-monthly.

4.3. Continuous groundwater level and quality (EC) measurements

Groundwater level (as pressure) and EC will be measured automatically by calibrated dataloggers at key monitoring locations and VWPs (pore pressure only). Continuous data (recorded every hour) will be periodically validated by manual measurements.

Groundwater level/pressure measurement will be converted to mAHD using calibration coefficients, installation data, and survey data. Spreadsheets will be maintained detailing the conversion and converted groundwater level measurement.

The dataloggers will be downloaded bi-monthly. Dataloggers will be checked and maintained as necessary before being re-calibrated and then returned to the monitoring bore at a known depth below the top of casing.

4.4. Water Treatment Plant discharge samples

4.4.1. Sample collection

Grab samples will be collected manually from the WTP locations and sent to a NATA accredited laboratory for analysis. Further information about WTP monitoring is detailed in Section 3.3 of this GWMP.

4.4.2. Field measurements

Field physico-chemical parameters including temperature, EC, pH, DO, TDS, ORP, and turbidity will be measured at each WTP location before water is discharged using a fully calibrated inline water quality meters. Other observations including odour and colour will also be recorded.

The water quality meters will be calibrated against known standards, as supplied by the manufacturer, at the start and completion of each day of water quality sampling. Calibration records will be maintained in accordance with the appropriate standard.

4.4.3. Decontamination

Equipment will need to be cleaned periodically to prevent a build-up of dirt. The following method will be followed:

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

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

4.4.4. Quality Assurance and documentation

Quality assurance and control protocols during sampling and recording of physico-chemical (field) parameters will be undertaken in accordance with ANZECC/ARMCANZ (2000b) to ensure the integrity of the dataset.

As part of sampling, quality assurance and control samples during sampling will be undertaken to ensure the integrity of the dataset. These are to include:

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

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

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

4.4.5. Recording and documentation of results

All monitoring and sampling will be documented and transferred to a central electronic database under the responsibility of the Environment and Sustainability Manager. This data will be reviewed and assessed as detailed in Section 5.1.2

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

The field sheet will detail:

- Prevailing weather conditions
- Prevailing tidal movement (where applicable)
- Name of sampler
- Time and date of sampling.

5. Compliance management

5.1. Roles, responsibility and training

The JHCPB Project Team's organisational structure, and overall roles and responsibilities, are outlined in Section 3.3 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in the GMP.

All employees, contractors and utility staff working on site will undergo site induction and targeted training relating to groundwater management issues detailed in the GMP.

Further details regarding staff induction and training are outlined in Section 3.5 of the CEMP.

5.1.1. Monitoring and inspection

Section 4.2 and Section 5 of this GWMP provide detailed inspection criteria including:

- Groundwater monitoring locations
- Parameters/analytes to be monitored
- Type of monitoring
- Frequency of monitoring
- Monitoring methodology.

Additional requirements and responsibilities in relation to inspections are documented in Section 3.3.1 of the CEMP.

5.1.2. Data analysis

Results from the construction monitoring program will be compared with the SSTVs and groundwater modelling predictions following each bi-monthly sampling event for ground water salinity, monthly for water quality, and in-line continuous monitoring.

Monitoring results of groundwater level will involve recorded data being compensated for barometric pressure and converted to a groundwater level measurement. Manual monitoring data will be used to verify continuous groundwater level data. Groundwater level data will be compared to local rainfall records to assess trends.

Water quality results from the WTPs will be analysed monthly, and along with an overview of corrective actions will be reported in the six-monthly water monitoring report. The monitoring results will be compared against the requirements for discharge (Table 7) and Project EPL ~~ANZECC (2000) 90 per cent species protection level~~ (see Table 8).

Monitoring results for EC will be compared against SSTVs (see Table 6) bi-monthly and reported in the water monitoring reports (Table 9). If results trigger a response (see Section 3.2.2.1), management actions will be implemented, as required, should an initial review determine a potential impact outside of approved predictions.

The monitoring results for groundwater level will be used to inform the groundwater model updates increasing the confidence level in model predictions with respect to groundwater inflow and drawdown. Where required (see Section 4.2) the groundwater model will be calibrated to monitoring results and predictions updated.

5.1.3. Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this Program, CoA, and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in Section 3.9.3 of the CEMP.

5.1.4. Reporting

During construction, groundwater level and EC will be collected, tabulated and assessed against baseline conditions and performance criteria. Monitoring reports will be submitted to DPIE, DPIE Water, Sydney Water and Port Authority of NSW within 60 days of the reporting period unless otherwise agreed with DPIE.

Data provision and reporting requirements associated with the Program for the construction phase of the Project are presented in Table 9.

Table 9: Reporting requirements

Schedule (during construction)	Requirements	Recipient (relevant authority)
Reporting		
Water monitoring reports (every six months)	Data summary reports presenting tabulated groundwater monitoring data collected during the reporting period. Groundwater level hydrographs (including rainfall) and water quality (EC) results will be presented and SSTV exceedances will be highlighted. Metres of ground excavated and flow rates during construction will be presented. Applicable management responses will be documented. Compliance against discharge criteria will also be presented. Report will present validation of groundwater modelling and determine the need for any necessary adjustments to the GWMP (this document).	DPIE, DPIE Water Water, Sydney Water, Port Authority of NSW
EPL Monitoring Reports and Annual Returns	EPL monitoring reports will be prepared in accordance with the requirements of the EPL. An EPL Annual Return will be prepared in respect of each EPL reporting period (typically 12 months).	EPA
Construction Compliance Reports (every six months)	A results summary an analysis of environmental monitoring	DPIE, TfNSW, ER
Monthly Environmental Report (every month)	Commentary on monitoring program performance will be documented in the Monthly Environmental Report. Any incidents and key environmental issues will be documented.	TfNSW
Data provision		
Quarterly (every 3 months)	WTP discharge water quality and flow data (raw data collated and tabulated in Excel) To demonstrate compliance with the CoA (C12(f)), Project discharge criteria (defined in Section 3.3 of this GWMP, EPL, and if applicable JHCPB's trade waste licence.	Sydney Water
Quarterly (every 3 months)	Groundwater level and groundwater quality (EC) monitoring data (raw data collated and tabulated in Excel) To demonstrate compliance with the CoA (C12(g)).	DPIE Water

6. Review and improvement

6.1. Continuous improvement

Monitoring data will be reviewed throughout the construction period to provide validation of the groundwater model and potential requirements to increase, or decrease, the number of sampling locations and/or the analytical suites. SSTV will be reviewed for appropriateness following 12 months of construction monitoring. Alterations to monitoring locations, analytical suites, or frequencies will be reported in the construction compliance monitoring reports.

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

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Make comparisons with objectives and targets.

6.2. GWMP update and amendment

The processes described in Section 3.1.3 of the CEMP may result in the need to update or revise this Program. This will occur as needed.

Only the Environment and Sustainability Manager, or delegate, has the authority to change any of the environmental management documentation. All amendments to environmental management documentation require endorsement from the Environmental Representative.

A copy of the updated Program and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure, refer to Section 3.11.2 of the CEMP.

7. References

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Annexure A Baseline Groundwater Quality Sampling Program Summary

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
RZ_BH01D	27/07/2016	19.4	1.17	1373	7.04	-117.3
	30/08/2016	20.4	1.79	1491	6.63	-116.1
	29/09/2016	18.6	1.43	1261	9.88	-167.6
	24/10/2016	20.7	1.21	1979	6.01	-6.1
	25/10/2016	21.1	0.38	2146	6.0	-14.5
	28/11/2016	22.4	1.25	1987	6.78	-81.9
	12/12/2016	22.7	2.75	1408	6.65	-72.0
	12/01/2017	23.1	2.85	1817	6.74	-22.0
	14/02/2017	20.4	0.60	1869	6.43	-68.0
	13/03/2017	22.1	1.24	1646	6.92	-114.6
	26/04/2017	22.7	2.54	1876	6.79	-69.2
	24/05/2017	20.3	3.35	1489	6.37	19.3
	15/06/2017	19.4	0.93	1246	6.92	19.4
	18/07/2017	18.9	3.65	892	7.12	-126.0
	11/08/2017	20.7	1.56	1339	8.52	-123.4
	19/10/2017	25.4	2.95	1932	7.75	-73.3
	21/11/2017	21.8	4.13	452	8.65	119.7
	11/01/2018	22.5	2.93	742	7.3	-129.5
	15/02/2008	24.0	2.66	1644	7.25	-125.0
	15/03/2018	24.3	6.25	307	11.3	-95.0
	16/04/2018	22.7	2.03	3650	9.74	162.0
	16/05/2018	17.6	9.05	2186	10.8	-93.0
	13/06/2018	20.5	7.58	930	7.6	-38.1
RZ_BH01S	27/07/2016	20.0	1.72	456	6.96	-95.5
	30/08/2016	19.9	1.61	397	6.95	-109.0
	27/09/2016	19.8	0.09	528	7.02	-163.6
	25/10/2016	25.0	1.44	627	6.69	-65.0
	28/11/2016	22.6	2.75	426	7.29	-53.9
	12/12/2016	21.3	3.37	540	7.12	-66.0
	12/01/2017	22.8	3.82	517	7.07	-25.0
	14/02/2017	21.3	1.78	560	6.66	-90.0
	13/03/2017	21.9	0.87	527	6.77	-88.9
	26/04/2017	21.7	3.78	523	6.85	-109.4
	24/05/2017	21.0	3.25	448	6.75	-4.6
	15/06/2017	20.0	0.69	419	7.06	-76.9
	18/07/2017	20.1	6.02	399	7.18	-120.0
	11/08/2017	23.0	2.11	417	9.69	-149.5
	19/10/2017	22.6	4.67	507	8.08	506.6
	21/11/2017	20.5	3.44	445	8.79	-47.5
	12/01/2018	23.8	3.34	450	7.46	-85.5
	16/02/2018	23.9	2.89	584	7.1	-112.8
	16/03/2018	21.0	1.71	493	7.13	-118.0
	17/04/2018	21.6	1.92	1250	7.18	-117.0
	17/05/2018	17.9	6.16	787	7.15	-55.7

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
	14/06/2018	20.2	7.12	2174	10.34	-93.6
RZ_BH15	27/07/2016	18.7	1.56	611	9.35	-132.3
	30/08/2016	20.7	1.47	368	7.7	-76.0
	29/09/2016	19.1	0.58	1248	7.14	-141.0
	25/10/2016	20.8	0.09	1048	6.55	-58.1
	28/11/2016	22.7	1.94	698	7.48	-93.2
	12/12/2016	22.7	1.87	995	6.65	18.0
	12/01/2017	23.8	0.66	694	6.86	-55.0
	14/02/2017	21.2	1.76	984	6.65	-90.1
	13/03/2017	21.9	1.23	880	6.99	-93.4
	26/04/2017	21.6	1.99	1067	7.04	-82.8
	24/05/2017	22.4	2.19	890	6.2	17.9
	15/06/2017	19.7	0.90	921	6.8	-40.3
	18/07/2017	19.7	2.87	877	6.95	-140.0
	11/08/2017	20.3	1.55	977	11.39	-238.8
	19/10/2017	21.7	4.61	1010	7.63	-41.5
	21/11/2017	20.8	3.85	955	7.79	-14.3
	11/01/2018	23.8	4.65	954	7.72	-118.0
	15/02/2008	24.4	3.51	1080	7.03	-107.1
	15/03/2018	21.0	0.81	499	6.85	-73.0
	16/04/2018	20.7	2.20	754	7.13	-99.0
	16/05/2018	15.6	6.67	1086	6.86	-10.5
	13/06/2018	22.5	6.54	1470	7.37	-66.0
RZ_BH16	14/07/2016	20.5	1.17	1310	7.24	27.1
	27/07/2016	19.0	1.24	690	10.3	-158.8
	30/08/2016	19.4	1.87	672	10.02	-54.1
	29/09/2016	18.9	0.11	782	8.93	-170.4
	24/10/2016	20.2	1.69	1225	6.09	-17.2
	25/10/2016	23.8	1.75	768	7.32	-41.2
	28/11/2016	22.3	1.46	969	7.51	-75.3
	12/12/2016	20.2	1.53	993	8.96	9.0
	12/01/2017	22.2	2.06	925	8.38	-9.0
	14/02/2017	19.9	2.26	969	7.35	-45.3
	13/03/2017	21.9	0.31	1065	7.51	-134.3
	26/04/2017	21.3	4.34	945	7.11	-118.9
	24/05/2017	19.7	0.55	830	9.22	10.5
	15/06/2017	18.4	4.75	202	7.48	22.0
	18/07/2017	19.1	2.14	466	8.62	-125.0
	11/08/2017	20.6	2.01	563	9.72	-129.4
	15/09/2017	20.6	4.16	339	7.7	23.9
	19/10/2017	24.9	1.03	946	7.99	-6.2
	21/11/2017	23.9	2.35	551	8.52	-43.5
	12/01/2018	23.6	6.72	839	7.64	-43.3
	16/02/2018	24.9	3.85	639	7.17	-114.4
	16/03/2018	23.6	3.42	496	7.31	-93.0
	17/04/2018	22.0	1.00	344	7.74	-174.0
	17/05/2018	17.3	6.45	1460	9.22	-182.0
	14/06/2018	21.9	4.74	1874	8.44	-141.3

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
RZ_BH19	10/08/2016	20.0	0.36	1112	7.34	155.9
	29/09/2016	18.6	0.10	1199	8.11	-132.1
	24/10/2016	21.0	1.44	1245	6.07	-20.4
	27/10/2016	19.8	0.06	1270	7.04	-135.8
	28/11/2016	21.1	1.50	1227	8.34	-158.7
	12/12/2016	21.8	1.15	1245	9.82	-154.0
	13/01/2017	21.4	0.66	1190	6.7	124.0
	14/02/2017	20.4	0.10	1240	8.5	-203.0
	13/03/2017	23.0	0.14	1340	6.69	-230.0
	26/04/2017	21.4	4.50	918	7.68	-152.9
	24/05/2017	20.1	2.57	1052	7.83	13.5
	15/06/2017	21.4	3.14	963	7.5	-112.9
	18/07/2017	19.1	3.38	919	8.47	-123.0
	11/08/2017	19.9	0.53	957	8.11	-117.4
	15/09/2017	20.8	3.38	1190	8.03	-88.0
	19/10/2017	25.5	1.85	1242	7.86	-89.7
	21/11/2017	20.5	0.20	955	8.11	-141.8
	12/01/2018	26.8	2.46	1149	8.18	-78.5
	16/02/2018	22.1	2.43	1090	7.19	-64.7
	16/03/2018	22.9	2.90	1175	7.52	-124.0
	17/04/2018	22.1	2.32	431	7.71	-173.0
	17/05/2018	17.8	6.65	2269	7.44	-74.3
	14/06/2018	20.0	4.97	2386	7.45	-72.2
RZ_BH26	14/07/2016	18.7	1.24	445	6.65	60.0
	27/07/2016	17.4	1.82	449	10.29	-107.2
	30/08/2016	19.8	1.60	4547	9.16	54.3
	29/09/2016	18.9	0.30	560	7.35	-149.5
	24/10/2016	20.6	0.64	547	5.73	-7.0
	25/10/2016	20.3	3.98	488	9.29	-112.6
	28/11/2016	21.2	0.80	611	7.02	-115.0
	12/12/2016	21.3	1.56	469	6.97	-133.0
	13/01/2017	23.7	1.44	604	6.83	-29.0
	14/02/2017	19.8	2.51	617	6.79	-126.9
	13/03/2017	21.3	0.55	712	6.4	-113.2
	26/04/2017	22.6	4.03	601	7.09	-66.7
	24/05/2017	18.7	0.24	549	6.68	-39.7
	15/06/2017	19.2	0.51	577	6.73	-86.1
	18/07/2017	18.8	2.88	459	6.81	-114.0
	11/08/2017	20.5	3.02	472	7.65	-20.6
	15/09/2017	19.3	2.99	501	6.97	-47.9
	19/10/2017	23.4	3.11	545	7.43	-16.9
	21/11/2017	22.7	8.57	123	10.45	-30.6
	12/01/2018	25.2	2.24	587	8.66	-110.8
	16/02/2018	26.1	1.95	672	6.95	-97.8
	16/03/2018	23.7	3.52	644	6.77	-88.0
	17/04/2018	22.8	2.43	223	6.71	-111.0
	17/05/2018	19.5	4.34	1226	6.72	-36.4
	14/06/2018	18.8	7.06	1508	6.54	-7.6

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
RZ_BH28	10/08/2016	18.9	1.08	833	6.09	-7.9
	29/09/2016	18.8	0.95	835	6.79	-88.8
	25/10/2016	20.7	0.17	849	5.96	-97.2
	28/11/2016	21.4	1.57	887	6.64	-35.4
	12/12/2016	21.2	2.85	935	6.8	-72.0
	13/01/2017	23.3	2.27	868	6.42	-17.0
	14/02/2017	19.7	2.43	862	6.4	-61.3
	13/03/2017	21.1	0.85	963	6.19	-51.0
	26/04/2017	23.6	3.10	814	6.89	-43.2
	24/05/2017	19.6	3.03	725	6.34	52.9
	15/06/2017	20.0	1.98	753	6.15	21.5
	18/07/2017	18.4	3.62	612	6.52	-83.0
	11/08/2017	21.0	3.60	695	7.34	110.3
	12/01/2018	24.6	3.03	778	7.61	-42.9
	16/02/2018	22.3	3.10	885	6.69	-31.8
	16/03/2018	21.6	2.84	441	6.11	-6.0
	17/04/2018	25.5	4.46	3041	6.88	-60.0
	17/05/2018	19.7	7.31	1489	6.32	33.6
	14/06/2018	18.1	7.52	363	6.88	39.6
RZ_BH30	27/07/2016	20.0	0.60	1452	6.75	-67.5
	31/08/2016	20.3	2.54	1347	6.7	-87.7
	28/09/2016	21.7	1.20	1598	6.84	-109.8
	16/01/2017	21.1	5.26	951	6.13	95.0
	26/04/2017	20.1	3.69	1422	6.75	-39.2
	24/05/2017	19.6	2.91	1094	6.74	52.8
	15/06/2017	20.2	3.59	415	7.06	-31.0
	18/07/2017	18.2	2.50	#	6.69	-76.0
	11/08/2017	19.9	1.68	1098	7.23	-11.9
	15/09/2017	21.1	3.68	1248	7.33	237.7
	19/10/2017	24.5	1.29	1535	7.46	-49.8
	12/01/2018	25.7	2.18	1424	7.28	-35.2
	16/02/2018	25.1	1.78	1680	6.82	-42.1
	16/03/2018	21.2	3.59	206	3.9	142.0
	17/04/2018	22.1	2.58	259	7.18	-70.0
	17/05/2018	19.4	6.84	1957	6.78	15.1
	14/06/2018	17.6	6.87	2758	7.6	-55.6
RZ_BH38	10/08/2016	20.1	1.18	1136	9.72	-281.1
	29/09/2016	18.4	0.64	1350	8.57	-178.3
	26/10/2016	20.4	0.81	1682	7.86	-94.9
	27/10/2016	21.1	0.89	1276	10.45	-139.2
	28/11/2016	22.1	1.29	1946	8.24	-148.2
	12/12/2016	-	3.02	1971	7.99	-96.0
	12/01/2017	24.2	2.50	1933	8.0	-56.0
	14/02/2017	20.6	1.29	2056	7.3	-164.0
	13/03/2017	22.1	0.28	2193	7.51	22.1
	26/04/2017	20.6	6.22	1467	7.35	-94.6
	24/05/2017	20.0	1.54	1543	7.43	28.3
	15/06/2017	19.4	2.11	1484	7.22	-57.9

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
	18/07/2017	18.8	2.88	1400	8.28	-117.0
	11/08/2017	19.5	2.71	1211	9.14	-97.9
	15/09/2017	21.3	2.85	1300	7.95	-24.5
	19/10/2017	25.8	4.45	1565	7.54	-29.5
	21/11/2017	21.9	1.39	1344	8.04	-97.6
	12/01/2018	23.4	1.97	1476	8.06	-75.4
	16/02/2018	27.7	0.52	1509	7.26	-78.2
	16/03/2018	18.2	3.48	1175	6.87	-51.0
	17/04/2018	21.7	2.60	534	8.09	-190.0
	17/05/2018	18.1	7.34	1934	7.97	-79.2
	14/06/2018	19.9	6.23	2315	7.52	-11.3
RZ_BH44S	10/08/2016	21.8	0.99	6681	6.49	-62.5
	29/09/2016	18.3	0.26	3713	5.79	-28.9
	27/10/2016	19.1	0.21	2706	6.28	-70.8
	28/11/2016	22.3	1.06	2844	6.67	-18.8
	12/12/2016	21.3	3.57	2610	5.84	-6.0
	13/01/2017	21.5	4.20	2390	6.78	-38.0
	14/02/2017	20.4	2.38	2685	6.17	-19.8
	13/03/2017	21.4	1.66	2934	6.7	-91.0
	26/04/2017	22.5	3.68	2430	7.2	-44.9
	24/05/2017	21.0	3.22	2248	6.3	50.2
	15/06/2017	21.3	4.84	1880	6.22	37.0
	18/07/2017	19.5	3.65	1425	6.77	-123.0
	11/08/2017	21.0	2.56	2000	7.59	-96.8
	15/09/2017	19.6	4.93	702	7.46	59.2
	19/10/2017	23.1	-	2264	7.3	10.9
	21/11/2017	23.0	2.15	2095	8.1	-77.1
	12/01/2018	23.6	0.58	1559	6.91	-20.9
	16/02/2018	22.8	2.26	1918	6.22	48.7
	16/03/2018	26.2	5.38	242	6.9	-22.0
	17/04/2018	22.5	3.24	566	6.69	-87.0
	17/05/2018	18.3	5.62	4540	6.67	39.9
	14/06/2018	20.0	8.82	3071	6.91	44.3
RZ_BH44D	10/08/2016	20.9	0.53	715	6.95	-84.5
	29/09/2016	18.7	0.94	1168	7.04	-124.3
	27/10/2016	20.6	2.65	1304	7.04	-106.1
	28/11/2016	22.0	2.56	1401	7.89	-117.0
	12/12/2016	22.6	0.93	1199	6.77	-117.0
	13/01/2017	22.3	3.08	1344	7.42	11.0
	14/02/2017	20.9	0.43	1470	7.01	-133.8
	13/03/2017	21.4	1.82	1332	6.89	-123.0
	26/04/2017	24.0	2.85	1403	7.62	-128.1
	24/05/2017	20.6	2.32	1071	7.02	2.4
	15/06/2017	21.4	3.07	481	7.0	-1.9
	18/07/2017	19.1	4.66	347	7.81	-108.0
	11/08/2017	20.0	1.11	590	7.79	-83.1
	15/09/2017	20.3	3.65	571	8.07	-71.1
	19/10/2017	21.4	3.32	820	7.4	-45.6

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
	21/11/2017	21.4	2.93	1007	8.2	-75.8
	12/01/2018	22.7	1.22	795	7.07	-59.0
	16/02/2018	24.1	1.61	565	7.2	-77.8
	16/03/2018	23.6	3.91	161	7.41	-133.0
	17/04/2018	22.1	2.32	1925	7.06	-126.0
	17/05/2018	19.1	8.76	910	6.94	-14.4
	14/06/2018	19.4	8.29	1201	7.16	-12.1
RZ_BH47S	31/08/2016	23.0	1.75	1216	6.27	-57.2
	29/09/2016	18.7	0.22	1393	5.56	10.8
	25/10/2016	19.9	5.22	328	9.64	-129.4
	28/11/2016	23.1	0.69	1271	6.65	4.2
	12/12/2016	23.4	4.22	932	6.39	-14.0
	13/01/2017	24.8	2.36	1203	6.41	-24.0
	14/02/2017	21.1	0.88	1120	6.25	-22.5
	13/03/2017	22.3	0.99	1202	6.14	-27.0
	26/04/2017	22.6	3.16	1193	7.26	-21.8
	24/05/2017	20.5	3.03	1003	6.06	64.3
	15/06/2017	20.5	1.77	1085	5.95	41.5
	18/07/2017	19.9	1.83	857	6.53	-101.0
	11/08/2017	23.3	1.67	993	7.46	-56.5
	15/09/2017	19.7	5.30	904	7.22	142.1
	19/10/2017	24.4	1.74	1271	8.18	-8.5
	21/11/2017	22.4	4.51	845	9.08	-59.0
	12/01/2018	23.1	0.12	1255	7.83	-40.5
	16/02/2018	26.3	1.05	1307	6.23	-29.2
	16/03/2018	27.3	3.38	1234	5.91	39.0
	17/04/2018	19.3	1.68	6780	7.13	-124.0
	17/05/2018	20.1	6.26	2319	6.16	56.7
	14/06/2018	21.1	6.23	3508	6.41	34.8
RZ_BH47D	31/08/2016	22.5	2.26	829	6.51	-62.3
	29/09/2016	19.1	0.13	1031	6.34	-63.0
	25/10/2016	21.7	4.30	338	8.72	-132.9
	28/11/2016	21.9	1.20	900	6.7	-60.5
	12/12/2016	23.3	2.08	921	6.58	-73.0
	13/01/2017	25.4	3.35	931	6.49	-16.0
	14/02/2017	20.8	1.00	946	6.58	-104.3
	13/03/2017	21.9	0.60	1007	6.65	-104.0
	26/04/2017	21.4	4.82	926	6.98	-70.8
	24/05/2017	19.9	1.20	845	6.4	29.7
	15/06/2017	20.3	2.75	894	6.5	6.6
	18/07/2017	19.6	1.39	753	6.72	-87.0
	11/08/2017	21.3	3.14	858	7.27	-35.0
	15/09/2017	20.1	2.35	881	7	-6.0
	19/10/2017	23.2	2.03	1068	7.52	-51.7
	21/11/2017	21.9	4.43	957	8.75	-83.4
	12/01/2018	23.1	3.01	881	7.65	-33.8
	16/02/2018	25.1	3.36	1001	6.71	-60.2
	16/03/2018	29.0	2.78	967	6.55	-41.0

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
	17/04/2018	25.1	2.30	5280	7.04	-85.0
	17/05/2018	19.2	5.97	2585	6.06	56.8
	14/06/2018	18.0	7.56	2546	6.51	66.6
RZ_BH49	14/07/2016	19.1	0.67	9258	7.57	33.7
	27/07/2016	18.0	3.46	3017	9.95	-168.8
	30/08/2016	20.0	1.96	7900	6.69	-55.6
	29/09/2016	18.1	0.41	10778	6.49	-64.2
	26/10/2016	20.8	2.28	5419	7.56	-87.1
	28/11/2016	22.2	2.82	4416	8.46	-49.7
	12/12/2016	20.0	4.25	3580	7.82	-3.0
	12/01/2017	22.6	4.16	646	7.35	38.0
	14/02/2017	19.9	0.80	9348	6.45	-53.2
	13/03/2017	21.4	1.05	9869	6.82	-75.7
	26/04/2017	21.1	5.36	1995	7	-19.4
	24/05/2017	19.7	3.69	6453	7.31	53.5
	15/06/2017	18.9	5.03	4483	6.89	13.2
	18/07/2017	18.7	4.07	3840	7.34	-42.0
	11/08/2017	19.5	7.29	655	9.62	6.8
	15/09/2017	20.0	7.73	1174	7.73	207.9
	19/10/2017	26.3	2.26	9693	6.84	1.5
	12/01/2018	24.9	2.61	9329	7.23	-75.5
	16/02/2018	24.1	1.32	8263	6.75	-62.7
	16/03/2018	24.3	2.04	3040	7.31	-65.0
	17/04/2018	25.9	2.20	1427	7.06	-48.0
	17/05/2018	19.5	7.39	9784	6.61	29.9
	14/06/2018	20.7	6.81	21550	6.89	19.3
RZ_BH50	31/08/2016	20.9	1.44	338	7.47	-120.3
	28/09/2016	22.0	0.82	678	6.05	-37.9
	25/10/2016	22.4	0.20	594	5.76	-111.6
	28/11/2016	21.4	0.79	598	6.79	-37.2
	12/12/2016	23.0	2.41	422	6.2	-33.0
	16/01/2017	20.9	5.78	423	6.5	-10.0
	14/02/2017	20.5	6.10	6600	6.74	-54.7
	15/03/2017	22.8	2.58	531	6.56	-20.6
	26/04/2017	23.1	4.07	550	7.26	-1.4
	24/05/2017	20.1	2.75	550	6.22	34.9
	15/06/2017	20.3	1.27	541	6.17	-26.3
	18/07/2017	19.6	4.06	505	6.55	-87.0
	11/08/2017	19.8	3.27	520	7.47	-46.2
	15/09/2017	21.5	3.42	499	7.07	44.1
	19/10/2017	23.1	1.96	686	7.64	-34.6
	16/02/2018	23.0	2.44	646	6.35	-49.8
	16/03/2018	21.1	3.00	224	4.12	-4.0
	17/04/2018	21.3	2.81	211	6.65	-76.0
	17/05/2018	20.3	3.86	1064	6.35	26.7
	14/06/2018	15.8	8.13	1692	7.16	-35.1
RZ_BH51	10/08/2016	24.9	1.52	4100	11.92	-190.6
	28/09/2016	20.0	0.23	1770	6.62	-84.8

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
	25/10/2016	26.5	2.26	1801	6.37	-107.1
	28/11/2016	21.8	0.90	1580	7.16	-123.5
	12/12/2016	22.0	3.04	1645	6.71	-30.0
	16/01/2017	21.5	1.30	1440	6.57	63.0
	14/02/2017	21.0	1.46	1533	6.74	-77.0
	26/04/2017	20.9	5.40	1161	6.88	-18.4
	24/05/2017	20.6	3.55	1467	6.48	43.9
	15/06/2017	21.0	2.53	824	6.98	-48.3
	18/07/2017	19.8	5.51	1101	6.67	-69.0
	11/08/2017	21.1	3.25	1265	6.81	-11.7
	15/09/2017	22.5	5.30	996	6.98	68.3
	12/01/2018	26.1	2.36	1375	8.42	-130.4
	16/02/2018	26.5	1.63	1155	7.93	-148.1
	16/03/2018	24.8	1.87	1422	6.91	-91.0
	17/04/2018	21.3	2.65	239	7.03	-137.0
	17/05/2018	20.1	6.33	1081	6.81	-16.1
	14/06/2018	17.3	3.41	1766	7.82	-102.6
RZ_BH52	10/08/2016	22.0	1.23	526	10.15	154.3
	28/09/2016	21.0	1.08	1256	6.59	-74.1
	25/10/2016	21.3	0.17	1004	5.6	-106.2
	28/11/2016	22.2	2.50	1033	7.44	-48.5
	12/12/2016	22.2	2.42	775	6.44	-77.0
	14/02/2017	21.2	0.27	1087	6.66	-72.8
	15/03/2017	25.3	0.32	920	6.68	16.0
	26/04/2017	20.5	3.78	818	7.05	-64.6
	24/05/2017	20.7	1.38	873	6.45	20.6
	15/06/2017	20.7	2.13	980	6.41	-37.4
	18/07/2017	18.9	6.32	724	6.73	-85.0
	11/08/2017	20.5	0.87	853	7.03	-8.2
	15/09/2017	22.2	2.73	831	6.67	44.9
	19/10/2017	25.7	2.62	986	6.82	9.4
	21/11/2017	23.4	4.64	659	9.63	23.4
	12/01/2018	24.6	2.15	873	9.05	-89.4
	16/02/2018	26.1	4.01	937	7.02	-92.9
	16/03/2018	21.2	3.01	854	11.56	-22.0
	17/04/2018	23.8	4.72	923	6.82	-78.0
	15/05/2018	21.4	5.60	1317	6.63	34.5
	14/06/2018	16.9	6.89	926	7.62	33.8
RZ_BH60	16/01/2017	22.5	9.63	4910	11.76	-95.0
	17/02/2017	20.9	0.79	4291	11.43	-294.1
	15/03/2017	21.2	0.93	3393	12.37	-93.2
	27/04/2017	18.5	2.76	3764	11.86	-184.9
	26/05/2017	19.0	2.88	3303	12.19	64.4
	16/06/2017	17.6	1.12	3081	12.45	-144.6
	17/07/2017	19.0	9.29	172	11.81	-248.0
	10/08/2017	22.0	2.46	3262	12.95	-89.7
	14/09/2017	17.9	2.94	3542	11.22	-51.8
	20/10/2017	17.9	3.03	3284	11.83	-66.9

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
	20/11/2017	24.1	2.00	2615	10.63	-76.4
	15/02/2018	21.4	2.92	3422	12.11	-46.6
	15/03/2018	25.9	2.74	2570	11.86	25.0
RZ_BH64	26/05/2017	19.3	1.59	572	9.16	562.0
	15/06/2017	17.8	2.10	605	8.56	-122.3
	18/07/2017	18.6	1.54	545	8.63	-149.0
	10/08/2017	19.8	1.34	602	7.6	-135.6
	14/09/2017	17.3	3.03	675	7.52	-44.8
	20/10/2017	17.8	3.54	672	10.52	-160.5
	20/11/2017	22.8	2.76	581	8.29	-65.9
	12/01/2018	24.5	2.46	745	7.83	-112.6
	16/02/2018	24.0	2.46	762	7.62	-96.1
	15/03/2018	27.4	2.46	259	7.03	-92.0
	16/04/2018	20.9	2.21	256	6.63	-193.0
	16/05/2018	17.3	2.43	1358	7.73	-124.6
	13/06/2018	16.0	8.76	1806	7.45	-141.6
RZ_BH67	17/02/2017	21.4	0.03	773	8.96	-316.8
	15/03/2017	22.2	0.78	602	7.06	-61.7
	27/04/2017	17.5	5.20	507	6.73	-20.9
	26/05/2017	20.2	3.11	523	6.42	19.2
	16/06/2017	18.3	1.01	518	6.88	-90.6
	14/09/2017	17.9	4.83	573	8.3	-104.7
	20/10/2017	19.9	1.23	588	7.43	-32.6
	20/11/2017	21.7	1.94	532	8.86	-98.9
	16/03/2018	20.3	3.71	642	11.65	-4.0
RZ_BH69	16/02/2017	20.4	1.13	424	5.79	-168.1
	15/03/2017	20.1	2.98	2469	12.28	-80.8
	18/07/2017	17.6	2.11	974	11.82	-19.5
	14/09/2017	19.0	1.54	453	8.35	103.9
	20/10/2017	19.9	1.72	1349	9.37	-157.8
	16/04/2018	21.3	2.91	138	7.12	173.0
TC_BH01D	8/07/2016	18.2	1.85	1126	8.66	30.7
	27/07/2016	17.4	2.20	3883	12.06	-183.4
	30/08/2016	18.5	0.84	3267	11.86	-293.2
	27/09/2016	21.9	1.34	3817	11.53	-242.5
	26/10/2016	20.7	0.48	3855	10.3	-118.5
	29/11/2016	21.6	2.61	1696	7.61	-99.6
	13/12/2016	25.0	2.06	3230	11.59	-289.0
	16/01/2017	23.6	4.94	2450	10.88	-117.0
	16/02/2017	23.1	0.04	4004	10.52	-297.1
	14/03/2017	22.0	1.95	2962	9.42	-112.7
	27/04/2017	19.7	4.06	3077	9.26	-184.7
	25/05/2017	18.9	2.07	2724	7.35	20.5
	15/06/2017	20.2	0.37	2789	11.28	-115.0
	17/07/2017	17.6	3.10	#	11.05	-123.0
	10/08/2017	17.7	9.29	2857	11.7	-127.9
	20/10/2017	19.0	4.41	3054	8.94	-82.8
	20/11/2017	21.3	1.82	2912	7.39	82.0

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
	12/01/2018	21.7	1.79	2763	8.17	78.1
	15/02/2018	22.0	2.08	3515	10.66	-127.0
	15/03/2018	24.8	2.01	3910	9.97	-136.0
	16/04/2018	29.6	2.02	1127	9.21	-222.0
	16/05/2018	19.8	6.97	8040	7.52	26.8
	13/06/2018	16.8	6.61	9910	7.57	122.0
TC_BH01S	8/07/2016	19.5	3.59	11084	6.97	-219.8
	21/07/2016	17.1	3.70	17511	6.87	-64.7
	30/08/2016	17.4	4.25	6899	7.05	-52.0
	27/09/2016	19.3	0.16	34922	6.63	-81.4
	26/10/2016	21.6	1.77	24313	6.68	-110.6
	29/11/2016	21.7	2.67	9665	7.03	-14.6
	13/12/2016	21.9	3.93	19850	7.37	-109.0
	16/01/2017	23.2	5.50	14240	8.25	-71.0
	16/02/2017	23.8	0.89	29747	6.82	-168.0
	14/03/2017	23.2	2.04	27564	7.03	130.6
	27/04/2017	20.6	2.85	29460	8.3	-100.4
	25/05/2017	19.2	6.36	11554	6.87	46.7
	15/06/2017	20.2	3.11	18544	6.96	-48.7
	17/07/2017	17.6	1.01	#	6.84	-44.0
	10/08/2017	17.8	1.36	25188	7.93	-83.1
	20/10/2017	18.7	6.02	24371	7.83	-75.6
	20/11/2017	20.8	4.52	22954	6.7	-55.2
	12/01/2018	21.7	3.98	22885	7.1	-92.2
	15/02/2018	22.7	2.81	30912	6.81	-37.5
	15/03/2018	23.9	3.54	30600	6.77	-67.0
	16/04/2018	29.1	1.51	8860	6.9	-69.0
	16/05/2018	20.4	7.10	17430	6.82	31.5
	13/06/2018	19.8	5.99	74800	6.83	15.3
TC_BH06	8/07/2016	17.4	3.55	1966	6.54	-40.7
	27/07/2016	18.9	1.02	1993	7.14	-113.0
	30/08/2016	17.3	3.06	1424	6.84	-83.0
	27/09/2016	18.9	0.22	1677	6.33	-55.7
	26/10/2016	19.9	1.01	1672	7.5	-112.7
	29/11/2016	20.2	2.39	3530	7.88	-45.4
	13/12/2016	22.5	7.65	1628	6.84	-65.0
	16/01/2017	22.8	5.47	1935	7.76	-135.0
	17/02/2017	21.9	1.98	2236	7.31	-216.1
	14/03/2017	21.9	2.03	1464	6.71	3.9
	27/04/2017	20.5	3.41	1504	10.25	-188.8
	25/05/2017	19.7	3.15	1500	6.57	18.4
	15/06/2017	19.5	1.57	1959	6.64	-65.8
	17/07/2017	16.0	1.04	#	6.88	-69.0
	10/08/2017	16.0	4.45	1492	8.36	-73.2
	15/09/2017	20.3	3.17	1175	6.51	-2.6
	20/10/2017	18.1	4.23	1485	8.89	-69.3
	20/11/2017	20.8	3.81	1839	7.73	-56.5
	12/01/2018	21.9	3.21	1861	8.42	-117.2

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
	15/02/2018	22.9	3.90	2241	6.66	-73.0
	15/03/2018	24.9	7.53	2480	6.73	-86.0
	16/04/2018	27.2	2.69	2321	6.8	-98.0
	16/05/2018	19.5	3.47	3473	6.57	21.5
	13/06/2018	15.7	6.74	4723	6.68	13.9
TC_BH07D	8/07/2016	18.7	5.41	4202	11.84	-132.7
	27/07/2016	17.3	1.56	1762	7.63	-91.2
	31/08/2016	19.5	1.07	1713	8.55	-18.9
	26/10/2016	24.2	0.66	2640	6.84	-101.7
	16/01/2017	22.8	9.48	1547	7.4	-79.0
	16/02/2017	23.4	1.90	3123	6.49	-183.0
	14/03/2017	23.9	3.72	2416	7.18	-40.2
	27/04/2017	19.7	3.91	2045	9.01	-96.7
	16/06/2017	17.8	2.77	1846	6.8	-67.0
	17/07/2017	15.6	1.06	940	6.71	-57.0
	10/08/2017	18.2	0.91	1862	7.56	-70.4
	21/11/2017	20.2	6.20	1606	8.6	-61.6
	15/03/2018	26.3	2.54	845	6.78	-69.0
	17/04/2018	20.3	2.49	774	7.76	-151.0
	13/06/2018	16.9	5.51	4316	6.53	61.6
TC_BH07S	8/07/2016	18.1	3.33	30018	7.78	-117.9
	27/07/2016	17.6	1.24	23684	6.98	-160.2
	30/08/2016	18.2	1.68	24493	6.81	-71.2
	27/09/2016	18.6	0.06	31947	6.82	-260.0
	26/10/2016	21.9	1.70	28266	6.71	-107.4
	13/12/2016	22.7	3.51	373	6.93	-62.0
	16/01/2017	22.6	8.20	16700	6.9	-44.0
	16/02/2017	23.7	2.04	26816	6.2	-179.0
	14/03/2017	24.3	2.52	30388	6.89	-66.2
	28/04/2017	17.2	4.63	29619	6.91	-113.6
	25/05/2017	20.1	2.35	28938	6.72	27.5
	15/06/2017	19.8	3.49	27338	6.86	-46.2
	17/07/2017	15.9	1.08	#	6.87	-170.0
	10/08/2017	17.9	6.37	26990	6.73	-56.3
	15/09/2017	20.1	3.04	27541	6.12	22.6
	20/10/2017	18.8	2.08	29311	7.58	-38.5
	20/11/2017	23.5	4.29	16383	6.47	-35.8
	12/01/2018	22.0	1.39	29029	6.74	-130.9
	15/02/2018	23.6	3.41	26914	6.94	-93.3
	15/03/2018	29.0	1.45	3180	6.95	-81.0
	17/04/2018	20.2	3.25	6770	7.14	-148.0
	16/05/2018	18.8	4.73	128000	6.71	-2.1
	13/06/2018	17.5	8.49	40480	7.03	-113.4
TC_BH08	27/07/2016	19.0	1.23	7575	9.71	14.8
	30/08/2016	17.6	5.45	7104	8.1	20.7
	27/09/2016	19.2	0.06	13379	6.85	-121.0
	26/10/2016	21.0	2.36	10250	6.97	-88.6
	29/11/2016	20.2	2.01	12491	7.25	-95.0

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
	13/12/2016	24.0	3.24	10940	7.08	-102.0
	16/01/2017	22.3	6.06	10250	7.23	-46.0
	16/02/2017	22.5	5.39	11702	7.19	-182.3
	14/03/2017	22.6	2.28	13552	7.21	40.3
	27/04/2017	20.5	3.76	7203	8.46	-128.6
	25/05/2017	20.4	1.49	9735	6.95	10.5
	15/06/2017	20.0	3.62	3170	7.52	-67.6
	17/07/2017	15.6	1.07	#	7.06	-119.0
	10/08/2017	18.5	6.51	4050	6.93	-14.2
	15/09/2017	19.6	6.43	5599	7.76	32.8
	20/10/2017	19.0	3.65	10212	8.11	-71.4
	20/11/2017	21.4	3.37	11368	6.66	-61.9
	12/01/2018	21.7	4.61	13051	6.84	-82.3
	15/02/2018	24.8	3.42	14898	7.32	-96.8
	15/03/2018	29.6	3.78	12810	7.18	-9.7
	17/04/2018	20.0	2.35	16520	7.01	-97.0
	16/05/2018	18.9	3.33	8467	6.92	-20.1
	13/06/2018	17.7	7.23	42730	7.05	-15.9
TC_BH09D	27/07/2016	18.8	1.00	1761	6.25	2.3
	30/08/2016	17.3	1.32	1385	6.62	-41.5
	28/09/2016	17.5	4.94	1917	6.5	-67.5
	26/10/2016	22.5	1.44	2012	6.95	-86.3
	29/11/2016	-	2.84	1794	8.13	84.7
	13/12/2016	24.4	1.01	2020	7.96	-129.0
	16/01/2017	23.6	8.01	2050	7.92	-110.0
	16/02/2017	23.6	1.57	1995	7.51	-232.0
	14/03/2017	23.1	0.37	1870	7.46	-56.2
	27/04/2017	20.2	4.40	1910	9.59	-102.2
	25/05/2017	19.7	1.52	1907	7.53	-9.0
	15/06/2017	19.9	2.19	2336	7.02	-65.4
	17/07/2017	15.5	7.10	#	7.07	-71.0
	10/08/2017	18.6	3.85	1836	7.99	-41.5
	20/10/2017	19.3	0.77	1752	9.27	-101.5
	20/11/2017	22.8	1.14	1555	8.13	-77.1
	12/01/2018	22.7	2.52	1724	8.02	-84.2
	15/02/2018	24.0	2.94	2153	6.78	-57.2
	15/03/2018	28.5	2.22	2311	6.73	-67.0
	17/04/2018	20.7	2.37	1205	6.91	-99.0
	16/05/2018	19.8	3.53	4898	7.11	-6.9
	13/06/2018	18.1	7.14	6103	6.54	61.9
TC_BH09S	27/07/2016	18.4	0.35	2601	6.73	17.4
	30/08/2016	16.1	2.05	1255	6.59	143.7
	26/10/2016	21.4	1.95	4699	6.48	-73.8
	29/11/2016	20.4	2.04	5114	7.54	-43.6
	13/12/2016	23.0	3.83	2830	7.16	-111.0
	17/01/2017	23.0	2.38	2780	6.25	21.0
	17/02/2017	23.4	1.55	3955	6.93	-204.5
	28/04/2017	18.2	3.57	2997	8.63	-107.4

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
	26/05/2017	18.4	0.78	3195	7.1	24.8
	16/06/2017	18.1	4.37	1673	6.86	-18.7
	21/11/2017	20.6	4.30	2974	8.76	-87.9
EP_BH07	27/10/2016	20.4	7.29	429	7.97	-81.2
	30/11/2016	19.8	2.96	416	7.28	160.3
	13/12/2016	20.9	8.10	245	5.25	169.0
	12/01/2017	21.5	3.22	261	5.89	136.0
	16/02/2017	20.5	1.92	330	6.54	-137.1
	14/03/2017	21.2	3.51	336	4.48	127.5
	27/04/2017	16.8	4.99	314	7.64	130.7
	26/05/2017	19.8	5.63	287	8.68	77.6
	16/06/2017	20.0	2.57	326	5.19	176.2
	18/07/2017	15.6	3.70	390	6.92	-59.0
	11/08/2017	19.8	1.26	299	8.35	-14.1
	15/09/2017	18.5	2.22	333	7.05	199.5
	20/10/2017	20.3	4.66	616	8.35	61.3
	21/11/2017	19.9	6.33	302	8.98	61.5
	12/01/2018	21.3	2.70	300	9.74	-26.8
	16/02/2018	20.6	7.37	334	6.74	112.3
	16/03/2018	21.1	2.41	257	10.81	172.0
	17/04/2018	21.1	1.57	149	6.96	-98.0
	17/05/2018	15.3	7.81	403	7.25	72.6
	14/06/2018	14.7	6.34	490	6.45	127.8
EP_BH06	27/10/2016	21.5	5.08	547	7.59	-102.6
	30/11/2016	20.7	2.41	1274	8.08	-10.4
	13/12/2016	22.2	1.88	851	5.53	129.0
	12/01/2017	21.2	1.29	659	5.63	72.0
	16/02/2017	21.1	0.95	509	5.91	-165.0
	14/03/2017	21.8	1.48	469	5.7	85.9
	27/04/2017	18.1	2.72	421	6.99	42.3
	26/05/2017	20.9	2.73	398	7.21	68.3
	16/06/2017	19.3	3.64	425	5.59	109.7
	18/07/2017	16.2	3.41	358	6.15	-74.0
	11/08/2017	18.9	2.42	355	7.75	-21.3
	15/09/2017	18.3	3.54	431	6.81	174.3
	20/10/2017	20.1	3.01	401	7.7	117.0
	21/11/2017	19.3	5.53	382	8.51	43.6
	12/01/2018	21.6	4.59	394	9.16	-59.4
	16/02/2018	22.4	5.76	487	6.61	110.0
	16/03/2018	20.5	5.01	541	11.79	184.0
	17/04/2018	20.7	2.41	174	6.09	-17.0
	17/05/2018	14.6	8.79	713	7.22	91.0
	14/06/2018	17.5	6.73	1302	5.73	155.1
IC_BH01	27/10/2016	20.8	0.42	2852	11.65	-98.4
	30/11/2016	21.0	0.19	1300	8.65	-95.6
	13/12/2016	23.2	4.33	873	6.54	63.0
	17/01/2017	22.7	1.05	723	6.02	32.0
	14/03/2017	22.0	0.75	7980	6.11	81.5

Monitoring Well	Date	Temperature (° C)	Dissolved Oxygen (ppm)	Electrical Conductivity (µS/cm)	pH	Redox Potential (mV)
	28/08/2017	20.8	1.12	784	11.2	-244.0
	15/06/2017	20.0	0.11	766	6.51	-64.4
	17/07/2017	18.8	1.07	#	6.36	-135.0
	11/08/2017	19.9	1.31	545	7.82	-40.8
	20/10/2017	20.4	1.20	622	6.79	32.2
	20/11/2017	22.3	1.76	516	9.45	-179.0
	11/01/2018	22.7	3.09	553	10.69	16.3
	16/04/2018	25.9	1.24	689	5.94	25.0
	16/05/2018	17.9	6.18	1518	8.41	162.8
	13/06/2018	14.6	7.82	2122	5.96	180.2
IC_BH02	14/03/2017	22.1	2.72	160	5.31	84.3
	28/04/2017	16.7	3.75	191	9.26	34.5
	26/05/2017	18.5	6.06	259	7.44	51.2
	15/06/2017	19.8	4.20	255	8.58	5.5
	17/07/2017	18.8	4.10	#	7.91	-18.0
	20/10/2017	20.4	3.88	158	7.16	122.5
	15/02/2018	21.5	1.89	644	5.74	71.5
MT_BH07	17/02/2017	20.4	1.13	2880	10.8	-295.1
	14/03/2017	22.0	1.93	2362	12.13	42.3
	27/04/2017	17.0	6.12	2140	11.73	-40.7
	26/05/2017	20.2	3.48	1738	11.22	51.3
	15/06/2017	19.1	2.68	1633	11.49	-72.4
	17/07/2017	19.9	7.37	#	10.82	-77.0
	11/08/2017	18.5	6.45	1423	11.02	-87.0
	14/09/2017	17.6	9.36	1690	11.09	70.1
	20/10/2017	18.2	4.33	1718	11.38	-38.2
	20/11/2017	21.7	2.71	1467	9.28	-164.7
	15/02/2018	23.3	4.51	1702	11.13	119.5
	16/03/2018	25.0	3.93	1409	10.92	64.0
	16/04/2018	29.3	2.13	451	10.91	-78.0
	16/05/2018	16.6	8.33	2825	9.86	-49.5
	13/06/2018	19.7	7.16	4598	11.58	-138.1
	13/06/2018	19.2	5.98	10920	11.48	-115.4
MT_BH21	17/02/2017	20.6	1.76	2797	11.18	-246.3
	14/03/2017	22.3	3.69	1985	8.22	194.9
	15/06/2017	21.3	2.90	2065	6.69	2.8
	11/08/2017	18.4	0.80	1828	9.17	-177.5
	14/09/2017	18.2	3.43	2073	9.31	-109.0
	21/11/2017	20.5	5.06	1762	7.77	10.9
	16/04/2018	23.8	3.19	730	10.64	-31.0
BH60	29/09/2016	18.1	0.05	3912	7.35	-200.2

Annexure B Baseline Groundwater Level Monitoring Program Summary

Monitoring Well	Lithology Screened	screen interval (m)	RL toc mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD
				Jun-16		Jul-16		Aug-16		Sep-16		Oct-16	
RZ_BH01d	Hawkesbury Sandstone	22-25	6.30	3.91	2.39	4.31	1.99	4.74	1.56	4.71	1.59	5.11	1.20
RZ_BH01s	alluvium	7-10	6.39	4.39	2.00	4.36	2.03	4.35	2.04	4.422	1.97	4.56	1.83
RZ_BH15	Hawkesbury Sandstone	18-21	6.02	3.55	2.47	4	2.02	4.45	1.57	4.38	1.64	4.57	1.45
RZ_BH16d	Hawkesbury Sandstone	17-20	5.82			4.11	1.71	4.26	1.56	4.257	1.56	4.37	1.45
RZ_BH19	Hawkesbury Sandstone	19-22	2.46					1.00	1.46	0.956	1.50	1.02	1.44
RZ_BH26	Hawkesbury Sandstone	20 - 23	2.84			1.1	1.74	1.32	1.52	1.335	1.51	1.60	1.24
RZ_BH28d	Hawkesbury Sandstone	27-30	2.83					0.93	1.90	1.06	1.77	1.64	1.19
RZ_BH30	Hawkesbury Sandstone	16 - 19	2.04			0.02	2.02	0.54	1.50	0.473	1.57		
RZ_BH38	Hawkesbury Sandstone	28 - 31	2.27					0.55	1.72	0.69	1.58	0.71	1.57
RZ_BH44d	Hawkesbury Sandstone	25 - 28	2.29					0.42	1.87	0.67	1.62	0.76	1.53
RZ_BH44s	Alluvium	12-15	2.25					1.14	1.11	1.298	0.95	1.36	0.89
RZ_BH47d	Hawkesbury Sandstone	27 - 30	2.30					0.75	1.55	0.783	1.52	1.67	0.63
RZ_BH47s	Alluvium	15 - 18	2.50					1.34	1.16	1.393	1.11	1.38	1.12
RZ_BH49s	alluvium	13-16	5.99			4.64	1.35	4.65	1.34	4.694	1.30	4.81	1.19
RZ_BH50	Hawkesbury Sandstone	22-25	1.92					0.05	1.87	0.455	1.47	0.60	1.32
RZ_BH51	Hawkesbury Sandstone	19-22	2.15					0.01	2.14	0.704	1.45	0.60	1.55
RZ_BH52	Hawkesbury Sandstone	32 - 35	2.53					1.01	1.52	1.304	1.23	1.12	1.41
RZ_BH60	Hawkesbury Sandstone	56-59	24.96										
RZ_BH64	Hawkesbury Sandstone	46-49	10.38										
RZ_BH67	Hawkesbury Sandstone	46-49	12.84										
RZ_BH69	Hawkesbury Sandstone	38-41	30.29										
TC_BH01d	Hawkesbury Sandstone	25-28	2.54			0.77	1.77	0.89	1.65	0.994	1.55	1.06	1.48
TC_BH01s	alluvium	3-6	2.55			1.53	1.02	1.55	1.00	1.637	0.91	1.78	0.77
TC_BH06s	alluvium	4.5-7.5	2.65					1.29	1.36	1.57	1.08	1.50	1.15
TC_BH07d	Hawkesbury Sandstone	19-22	2.03			1.06	0.97	0.40	1.63				
TC_BH07s	Alluvium	3-6	2.06			1.06	1.00	1.59	0.47	1.655	0.41	1.72	0.34
TC_BH08s	Alluvium	5-8	2.24			1.58	0.66	1.59	0.65	1.655	0.59	1.76	0.48

Monitoring Well	Lithology Screened	screen interval (m)	RL toc mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD
				Jun-16		Jul-16		Aug-16		Sep-16		Oct-16	
TC_BH09d	Hawkesbury Sandstone	21-24	2.25			0.61	1.64	0.64	1.61	0.675	1.58	0.80	1.45
TC_BH09s	alluvium	2-5	2.29			1.61	0.68	1.60	0.69			1.75	0.54
IC_BH01	Hawkesbury Sandstone	23-26	26.77									7.51	19.26
IC_BH02	Hawkesbury Sandstone	8-11	20.77										
EP_BH06	Hawkesbury Sandstone	10-13	7.60									3.48	4.12
EP_BH07	Hawkesbury Sandstone	10-13	10.48									7.02	3.46
MT_BH07	Hawkesbury Sandstone	43-46	24.41										
MT_BH20	Hawkesbury Sandstone	41-44	12.27										
MT_BH21	Hawkesbury Sandstone	47-50	25.05										

Monitoring Well	Lithology Screened	screen interval (m)	RL toc mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD
				Nov-16		Dec-16		Jan-17		Feb-17		Mar-17	
RZ_BH01d	Hawkesbury Sandstone	22-25	6.30	4.745	1.56	4.91	1.39	4.86	1.44	4.71	1.59	4.573	1.73
RZ_BH01s	alluvium	7-10	6.39	4.669	1.72	4.72	1.67	4.76	1.64	4.50	1.89	4.421	1.97
RZ_BH15	Hawkesbury Sandstone	18-21	6.02	4.439	1.58	4.46	1.56	4.55	1.47	4.45	1.57	4.243	1.78
RZ_BH16d	Hawkesbury Sandstone	17-20	5.82	4.223	1.60	3.29	2.53	4.39	1.43	4.22	1.60	4.102	1.72
RZ_BH19	Hawkesbury Sandstone	19-22	2.46	1.083	1.38	1.01	1.45	0.84	1.62	0.81	1.65	0.853	1.61
RZ_BH26	Hawkesbury Sandstone	20 - 23	2.84	1.443	1.40	1.42	1.42	1.20	1.64	1.52	1.32	1.314	1.53
RZ_BH28d	Hawkesbury Sandstone	27-30	2.83	1.194	1.64	1.20	1.63	1.08	1.75	1.07	1.76	1.059	1.77
RZ_BH30	Hawkesbury Sandstone	16 - 19	2.04					0.57	1.47	#			
RZ_BH38	Hawkesbury Sandstone	28 - 31	2.27	1.49	0.78	0.79	1.48	0.92	1.35	0.65	1.62	0.638	1.63
RZ_BH44d	Hawkesbury Sandstone	25 - 28	2.29	0.78	1.51	0.90	1.39	0.56	1.73	0.56	1.73	0.602	1.69
RZ_BH44s	Alluvium	12-15	2.25	1.431	0.82	1.49	0.76	1.44	0.81	1.35	0.90	1.214	1.04
RZ_BH47d	Hawkesbury Sandstone	27 - 30	2.30	0.891	1.41	0.99	1.31	0.62	1.69	0.61	1.69	0.751	1.55
RZ_BH47s	Alluvium	15 - 18	2.50	1.434	1.07	1.49	1.01	1.36	1.14	1.32	1.19	1.294	1.21
RZ_BH49s	alluvium	13-16	5.99	4.73	1.26	4.95	1.04	4.91	1.08	4.79	1.20	4.534	1.46
RZ_BH50	Hawkesbury Sandstone	22-25	1.92	0.914	1.01	0.53	1.39	0.47	1.45	0.62	1.30	0.662	1.26
RZ_BH51	Hawkesbury Sandstone	19-22	2.15	0.766	1.38	0.80	1.35	0.69	1.46	0.49	1.66	0.504	1.65
RZ_BH52	Hawkesbury Sandstone	32 - 35	2.53	1.523	1.01	1.11	1.42			0.97	1.56	0.989	1.54
RZ_BH60	Hawkesbury Sandstone	56-59	24.96							12.50	12.46	12.391	12.57
RZ_BH64	Hawkesbury Sandstone	46-49	10.38							15.24	-4.86		
RZ_BH67	Hawkesbury Sandstone	46-49	12.84							4.03	8.81	5.049	7.79

Monitoring Well	Lithology Screened	screen interval (m)	RL toc mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD
				Nov-16		Dec-16		Jan-17		Feb-17		Mar-17	
RZ_BH69	Hawkesbury Sandstone	38-41	30.29							15.236	15.05	15.023	15.27
TC_BH01d	Hawkesbury Sandstone	25-28	2.54	0.73	1.81	1.02	1.52	1.05	1.49	0.97	1.57	1.821	0.72
TC_BH01s	alluvium	3-6	2.55	1.915	0.64	1.93	0.62	1.94	0.61	1.83	0.72	1.727	0.823
TC_BH06s	alluvium	4.5-7.5	2.65	1.62	1.03	1.63	1.02	1.69	0.96	1.50	1.15	1.421	1.229
TC_BH07d	Hawkesbury Sandstone	19-22	2.03					0.68	1.35	0.40	1.63	0.304	1.726
TC_BH07s	Alluvium	3-6	2.06	0.744	1.32	1.75	0.31	1.70	0.36	1.57	0.49	1.634	0.426
TC_BH08s	Alluvium	5-8	2.24	0.785	1.46	1.80	0.44	1.74	0.51	1.66	0.58	1.639	0.601
TC_BH09d	Hawkesbury Sandstone	21-24	2.25	0.69	1.56	0.84	1.41	0.74	1.51	0.67	1.58	0.559	1.691
TC_BH09s	alluvium	2-5	2.29	0.85	1.44	1.78	0.51	1.75	0.54	1.71	0.58		2.29
IC_BH01	Hawkesbury Sandstone	23-26	26.77	7.54	19.23	7.86	18.91	7.80	18.97			8.029	18.74
IC_BH02	Hawkesbury Sandstone	8-11	20.77			4.03	16.74					3.342	17.43
EP_BH06	Hawkesbury Sandstone	10-13	7.60	3.77	3.83	3.80	3.80	3.78	3.82	3.754	3.85	3.555	4.046
EP_BH07	Hawkesbury Sandstone	10-13	10.48	7.46	3.02	7.08	3.40	7.57	2.91	7.726	2.75	7.704	2.774
MT_BH07	Hawkesbury Sandstone	43-46	24.41							19.01	5.40	18.837	5.573
MT_BH20	Hawkesbury Sandstone	41-44	12.27									1.956	10.31
MT_BH21	Hawkesbury Sandstone	47-50	25.05							10.51	14.54	10.26	14.79

Monitoring Well	Lithology Screened	screen interval (m)	RL toc mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD
				Apr-17		May-17		Jun-17		Jul-17		Aug-17	
RZ_BH01d	Hawkesbury Sandstone	22-25	6.30	4.56	1.75	4.771	1.53	4.555	1.75	4.674	1.63	4.878	1.42
RZ_BH01s	alluvium	7-10	6.39	4.39	2.00	4.537	1.85	4.353	2.04	4.502	1.89	4.622	1.77
RZ_BH15	Hawkesbury Sandstone	18-21	6.02	4.27	1.75	4.483	1.54	4.264	1.76	4.392	1.63	4.384	1.64
RZ_BH16d	Hawkesbury Sandstone	17-20	5.82	4.05	1.77	4.335	1.49	4.506	1.31	4.175	1.65	4.191	1.63
RZ_BH19	Hawkesbury Sandstone	19-22	2.46	0.76	1.70	1.021	1.44	0.709	1.75	0.804	1.66	0.879	1.58
RZ_BH26	Hawkesbury Sandstone	20 - 23	2.84	0.22	2.62	1.328	1.51	0.989	1.85	1.123	1.72	1.285	1.56
RZ_BH28d	Hawkesbury Sandstone	27-30	2.83	0.95	1.88	1.15	1.68	1.069	1.76	1.038	1.79	1.114	1.72
RZ_BH30	Hawkesbury Sandstone	16 - 19	2.04	0.46	1.59	0.555	1.49	0.265	1.78	0.307	1.73	0.501	1.54
RZ_BH38	Hawkesbury Sandstone	28 - 31	2.27	0.54	1.73	0.793	1.48	0.581	1.69	0.827	1.44	0.665	1.61
RZ_BH44d	Hawkesbury Sandstone	25 - 28	2.29	0.53	1.76	1.267	1.02	0.444	1.85	0.545	1.75	0.651	1.64
RZ_BH44s	Alluvium	12-15	2.25	1.18	1.07	1.331	0.92	1.197	1.05	1.345	0.91	1.371	0.88
RZ_BH47d	Hawkesbury Sandstone	27 - 30	2.30	0.64	1.66	0.831	1.47	0.509	1.79	0.600	1.70	0.734	1.57
RZ_BH47s	Alluvium	15 - 18	2.50	1.23	1.27	1.382	1.12	1.271	1.23	1.354	1.15	1.365	1.14
RZ_BH49s	alluvium	13-16	5.99	4.57	1.42	4.763	1.23	4.585	1.41	4.751	1.24	4.814	1.18
RZ_BH50	Hawkesbury Sandstone	22-25	1.92	0.68	1.24	0.969	0.95	1.109	0.81	1.212	0.71	1.228	0.69
RZ_BH51	Hawkesbury Sandstone	19-22	2.15	0.59	1.57	0.671	1.48	0.409	1.74	0.429	1.72	0.775	1.38
RZ_BH52	Hawkesbury Sandstone	32 - 35	2.53	0.87	1.66	1.057	1.47	0.806	1.72	0.967	1.56	0.987	1.54
RZ_BH60	Hawkesbury Sandstone	56-59	24.96	12.22	12.74	12.395	12.57	12.424	12.54	12.430	12.53	12.466	12.49
RZ_BH64	Hawkesbury Sandstone	46-49	10.38			1.318	9.06	1.194	9.19	1.204	9.18	1.317	9.06
RZ_BH67	Hawkesbury Sandstone	46-49	12.84	4.20	8.64	4.392	8.45	4.486	8.35				
RZ_BH69	Hawkesbury Sandstone	38-41	30.29							14.311	15.98		
TC_BH01d	Hawkesbury Sandstone	25-28	2.54	0.55	1.99	1.026	1.51	0.765	1.78	0.992	1.55	0.955	1.59
TC_BH01s	alluvium	3-6	2.55	1.61	0.94	1.745	0.81	1.527	1.02	1.691	0.86	1.761	0.79
TC_BH06s	alluvium	4.5-7.5	2.65	1.46	1.19	1.476	1.17	1.298	1.35	1.820	0.83	1.805	0.85
TC_BH07d	Hawkesbury Sandstone	19-22	2.03	0.38	1.65	0.529	1.50	0.321	1.71	0.498	1.53	0.422	1.608
TC_BH07s	Alluvium	3-6	2.06	1.60	0.46	1.724	0.34	1.589	0.47	1.892	0.17	1.670	0.390
TC_BH08s	Alluvium	5-8	2.24	1.65	0.59	1.738	0.50	1.424	0.82	1.623	0.62	1.711	0.53
TC_BH09d	Hawkesbury Sandstone	21-24	2.25	0.65	1.60	0.836	1.41	0.571	1.68	0.756	1.49	0.697	1.553
TC_BH09s	alluvium	2-5	2.29	1.66	0.63	1.724	0.57	1.579	0.71			1.725	0.565

Monitoring Well	Lithology Screened	screen interval (m)	RL toc mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD
				Apr-17		May-17		Jun-17		Jul-17		Aug-17	
IC_BH01	Hawkesbury Sandstone	23-26	26.77	7.91	18.86			7.934	18.83	8.002	18.77	7.845	18.92
IC_BH02	Hawkesbury Sandstone	8-11	20.77	2.91	17.86	3.32	17.45	3.791	16.98	3.504	17.27		
EP_BH06	Hawkesbury Sandstone	10-13	7.60	3.56	4.04	3.763	3.84	3.535	4.07	3.771	3.83	3.869	3.73
EP_BH07	Hawkesbury Sandstone	10-13	10.48	7.44	3.03	7.613	2.87	7.416	3.06	7.587	2.89	7.773	2.71
MT_BH07	Hawkesbury Sandstone	43-46	24.41	18.78	5.63	17.918	6.49	16.279	8.13	14.136	10.27	17.306	7.10
MT_BH20	Hawkesbury Sandstone	41-44	12.27										
MT_BH21	Hawkesbury Sandstone	47-50	25.05					8.556	16.494			11.788	13.26

Monitoring Well	Lithology Screened	screen interval (m)	RL toc mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD
				Sep-17		Oct-17		Nov-17		Dec-17		Jan-18	
RZ_BH01d	Hawkesbury Sandstone	22-25	6.30			4.858	1.442	4.832	1.468			4.803	1.497
RZ_BH01s	alluvium	7-10	6.39			4.558	1.832	4.581	1.809			5.704	0.686
RZ_BH15	Hawkesbury Sandstone	18-21	6.02			4.868	1.152	4.568	1.452			4.520	1.500
RZ_BH16d	Hawkesbury Sandstone	17-20	5.82	4.382	1.44	4.366	1.454	4.354	1.466			4.316	1.504
RZ_BH19	Hawkesbury Sandstone	19-22	2.46	1.059	1.40	1.112	1.348	1.012	1.448			1.072	1.388
RZ_BH26	Hawkesbury Sandstone	20 - 23	2.84	1.372	1.47	1.567	1.273	1.267	1.573			1.443	1.397
RZ_BH28d	Hawkesbury Sandstone	27-30	2.83									1.250	1.580
RZ_BH30	Hawkesbury Sandstone	16 - 19	2.04	0.601	1.44	0.741	1.299					0.574	1.466
RZ_BH38	Hawkesbury Sandstone	28 - 31	2.27	0.854	1.42	0.856	1.414	0.821	1.449			0.841	1.429
RZ_BH44d	Hawkesbury Sandstone	25 - 28	2.29	0.804	1.49	0.867	1.423	0.743	1.547			0.745	1.545
RZ_BH44s	Alluvium	12-15	2.25	1.432	0.82	1.565	0.685	1.474	0.776			1.454	0.796
RZ_BH47d	Hawkesbury Sandstone	27 - 30	2.30	0.869	1.43	0.917	1.383	0.809	1.491			0.851	1.449
RZ_BH47s	Alluvium	15 - 18	2.50	1.447	1.05	1.509	0.991	1.442	1.058			1.405	1.095
RZ_BH49s	alluvium	13-16	5.99	4.935	1.06	5.074	0.916					4.956	1.034
RZ_BH50	Hawkesbury Sandstone	22-25	1.92	1.216	0.70	1.316	0.604						
RZ_BH51	Hawkesbury Sandstone	19-22	2.15	0.693	1.46							0.761	1.389
RZ_BH52	Hawkesbury Sandstone	32 - 35	2.53	1.06	1.47	1.134	1.396	0.999	1.531			0.988	1.542
RZ_BH60	Hawkesbury Sandstone	56-59	24.96	12.54	12.42	12.461	12.499	13.78	11.178				
RZ_BH64	Hawkesbury Sandstone	46-49	10.38	1.853	8.53	1.604	8.776	1.7	8.680			3.746	6.634
RZ_BH67	Hawkesbury Sandstone	46-49	12.84	4.819	8.02	5.179	7.661	5.112	7.728				
RZ_BH69	Hawkesbury Sandstone	38-41	30.29	14.37	15.92	14.526	15.764						
TC_BH01d	Hawkesbury Sandstone	25-28	2.54			1.112	1.428	1.006	1.534			1.037	1.503
TC_BH01s	alluvium	3-6	2.55			1.998	0.552	2.929	-0.379			1.903	0.647
TC_BH06s	alluvium	4.5-7.5	2.65	1.653	1.00	1.741	0.909	1.587	1.063			1.614	1.036
TC_BH07d	Hawkesbury Sandstone	19-22	2.03					0.548	1.482				
TC_BH07s	Alluvium	3-6	2.06	1.751	0.31	1.801	0.259	1.724	0.336			1.683	0.377
TC_BH08s	Alluvium	5-8	2.24	1.799	0.44	1.789	0.451	1.817	0.423			1.724	0.516
TC_BH09d	Hawkesbury Sandstone	21-24	2.25			0.837	1.413	0.746	1.504			0.825	1.425
TC_BH09s	alluvium	2-5	2.29					1.819	0.471				

Monitoring Well	Lithology Screened	screen interval (m)	RL toc mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD
				Sep-17		Oct-17		Nov-17		Dec-17		Jan-18	
IC_BH01	Hawkesbury Sandstone	23-26	26.77			8.313	18.455	8.507	18.261			8.484	18.284
IC_BH02	Hawkesbury Sandstone	8-11	20.77			4.287	16.486						
EP_BH06	Hawkesbury Sandstone	10-13	7.60	4.041	3.56	4.072	3.529	3.854	3.747			3.943	3.658
EP_BH07	Hawkesbury Sandstone	10-13	10.48	7.988	2.49	8.109	2.369	7.983	2.495			8.078	2.400
MT_BH07	Hawkesbury Sandstone	43-46	24.41	18.07	6.34	19.152	5.258	19.19	5.218			19.17	5.241
MT_BH20	Hawkesbury Sandstone	41-44	12.27									2.331	9.94
MT_BH21	Hawkesbury Sandstone	47-50	25.05	11.29	13.756			12.07	12.978				

Monitoring Well	Lithology Screened	screen interval (m)	RL toc mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD
				Feb-18		Mar-18		Apr-18		May-18		Jun-18	
RZ_BH01d	Hawkesbury Sandstone	22-25	6.30	4.775	1.525	4.494	1.806	4.752	1.548	4.847	1.453	4.824	1.476
RZ_BH01s	alluvium	7-10	6.39	4.721	1.669	4.417	1.973	4.653	1.737	4.756	1.634	4.533	1.857
RZ_BH15	Hawkesbury Sandstone	18-21	6.02	4.475	1.545	4.19	1.830	4.463	1.557	4.56	1.460	4.545	1.475
RZ_BH16d	Hawkesbury Sandstone	17-20	5.82	4.283	1.537	4.066	1.754	4.272	1.548	4.366	1.454	4.352	1.468
RZ_BH19	Hawkesbury Sandstone	19-22	2.46	1.123	1.337	0.734	1.726	0.94	1.520	1.037	1.423	0.970	1.490
RZ_BH26	Hawkesbury Sandstone	20 - 23	2.84	1.351	1.489	1.19	1.650	1.352	1.488	1.431	1.409	1.327	1.513
RZ_BH28d	Hawkesbury Sandstone	27-30	2.83	1.262	1.568	0.925	1.905	1.219	1.611	1.316	1.514	1.154	1.676
RZ_BH30	Hawkesbury Sandstone	16 - 19	2.04	0.572	1.468	0.209	1.831	0.567	1.473	0.647	1.393	0.459	1.581
RZ_BH38	Hawkesbury Sandstone	28 - 31	2.27	0.746	1.524	0.52	1.750	0.728	1.542	0.824	1.446	0.773	1.497
RZ_BH44d	Hawkesbury Sandstone	25 - 28	2.29	0.837	1.453	0.521	1.769			0.797	1.493	0.698	1.592
RZ_BH44s	Alluvium	12-15	2.25	1.483	0.767	1.342	0.908	1.375	0.875	1.473	0.777	1.336	0.914
RZ_BH47d	Hawkesbury Sandstone	27 - 30	2.30	0.884	1.416	0.715	1.585	0.815	1.485	1.071	1.229	0.861	1.439
RZ_BH47s	Alluvium	15 - 18	2.50	1.430	1.070	1.232	1.268	1.445	1.055	1.464	1.036	1.337	1.163
RZ_BH49s	alluvium	13-16	5.99	5.044	0.946	4.709	1.281	4.887	1.103	4.901	1.089	4.779	1.211
RZ_BH50	Hawkesbury Sandstone	22-25	1.92	1.154	0.766	1.203	0.717	1.13	0.790	1.150	0.770	1.119	0.801
RZ_BH51	Hawkesbury Sandstone	19-22	2.15	0.705	1.445	0.525	1.625	0.715	1.435	0.777	1.373	0.600	1.550
RZ_BH52	Hawkesbury Sandstone	32 - 35	2.53	0.937	1.593	0.67	1.860	0.905	1.625	1.006	1.524	0.878	1.652
RZ_BH60	Hawkesbury Sandstone	56-59	24.96	12.74	12.224	12.77	12.193	12.81	12.153			12.94	12.017
RZ_BH64	Hawkesbury Sandstone	46-49	10.38		1.816	8.564	1.782	8.598	1.883	8.497	1.893	8.487	
RZ_BH67	Hawkesbury Sandstone	46-49	12.84		5.145	7.695			5.162	7.678			
RZ_BH69	Hawkesbury Sandstone	38-41	30.29				14.43	15.864					
TC_BH01d	Hawkesbury Sandstone	25-28	2.54	1.032	1.508	0.501	2.039	1.033	1.507	1.162	1.378	0.954	1.586
TC_BH01s	alluvium	3-6	2.55	1.971	0.579	1.821	0.729	1.973	0.577	1.957	0.593	1.830	0.720
TC_BH06s	alluvium	4.5-7.5	2.65	1.442	1.208	1.37	1.280	1.62	1.030	1.819	0.831	1.531	1.119
TC_BH07d	Hawkesbury Sandstone	19-22	2.03		0.08	1.950	0.642	1.388			0.456	1.574	
TC_BH07s	Alluvium	3-6	2.06	1.636	0.424	1.816	0.244	1.749	0.311	1.772	0.288	1.669	0.391
TC_BH08s	Alluvium	5-8	2.24	1.734	0.506	1.709	0.531	1.802	0.438	1.793	0.447	1.721	0.519
TC_BH09d	Hawkesbury Sandstone	21-24	2.25	0.808	1.442	0.348	1.902	0.934	1.316	0.963	1.287	0.765	1.485
TC_BH09s	alluvium	2-5	2.29										

Monitoring Well	Lithology Screened	screen interval (m)	RL toc mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD	SWL mbtoc	SWL mAHD
				Feb-18		Mar-18		Apr-18		May-18		Jun-18	
IC_BH01	Hawkesbury Sandstone	23-26	26.77				8.513	18.255	8.537	18.231	8.463	18.305	
IC_BH02	Hawkesbury Sandstone	8-11	20.77	8.287	12.486								
EP_BH06	Hawkesbury Sandstone	10-13	7.60	4.01	3.591	4.022	3.579	4.014	3.587	4.136	3.465	4.001	3.600
EP_BH07	Hawkesbury Sandstone	10-13	10.48	8.204	2.274	8.094	2.384	8.326	2.152	8.390	2.088	8.373	2.105
MT_BH07	Hawkesbury Sandstone	43-46	24.41	19.27	5.139	19.24	5.170	19.31	5.102	19.35	5.057	#####	4.982
MT_BH20	Hawkesbury Sandstone	41-44	12.27	2.369	9.90	2.403	9.87	2.404	9.87			2.477	9.79
MT_BH21	Hawkesbury Sandstone	47-50	25.05				12.89	12.159					

Annexure C Cross-Section Drawings