

Annual Water Monitoring Report

Pacific Highway Upgrade: Woolgoolga to Ballina Sections 3 to 11: July 2016 to June 2017



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Executive Summary

This is the first annual water monitoring report for the construction phase of Sections 3 to 11 of the Woolgoolga to Ballina (W2B) Pacific Highway upgrade. The reporting period for this annual report is 1 July 2016 to 30 June 2017.

The water quality monitoring program is described in the *Pacific Highway Upgrade – Woolgoolga to Ballina Sections 3 to 11: Water Quality Monitoring Program (WQMP)* (dated 21 August 2015, GeoLINK ref: 2476-1021). The purpose of the WQMP is to monitor the construction and operation impacts of the highway upgrade on surface water bodies and groundwater resources, and provide input to the environmental management of the project

There was no change to the monitoring methodology or the monitoring locations during the reporting period.

In this report, a ‘result of interest’ is a result that has potentially been influenced by project activities and has been investigated.

The WQMP proposes that water quality monitoring results be assessed by comparing sampling results to the corresponding 80th percentile (P80) figure and/or 20th percentile (P20) figure (as relevant) from the baseline data. The P80 is applicable to parameters where high values are potentially an issue (e.g. turbidity), while the P20 is applicable to parameters where low values are potentially an issue (e.g. dissolved oxygen), and both figures are relevant for parameters where either a high value or a low value are potentially an issue (e.g. pH).


For surface water monitoring, where a downstream result is greater than the P80 baseline value (or is less than the P20 baseline value, where relevant) comparison with the upstream result collected at the same time is undertaken to determine whether it is a result of interest. During the reporting period, results of interest were identified at most sites.

For groundwater quality monitoring, bores have been classified as either ‘up gradient’ or ‘down gradient’. For a pair of bores, the down gradient bore is the one that typically has the lower groundwater level, indicating that the direction of groundwater flow is from the up gradient bore to the down gradient bore. Where the down gradient result is greater than the P80 value (or is less than the P20 value, where relevant), it is considered to be a result of interest. During the reporting period, results of interest were identified at most sites.

For groundwater level monitoring, the construction phase groundwater level data has been assessed by comparing the difference in groundwater level between a pair of bores to the P80 of the difference in groundwater level between the same pair of bores during the pre-construction monitoring period. During the reporting period, results of interest were identified at most sites.

Updated monitoring data is provided to Pacific Complete on a regular basis. The aim is to provide the data in a timely manner so that it can be used to inform environmental management of the project. The project responds to the water monitoring results as follows:

1. The water monitoring data is reviewed, with particular focus on the results of interest that have been identified.
2. The results assist with setting the focus for the project’s environmental management inspections.

- 
3. During these inspections, environmental controls are checked and reviewed against the relevant environmental plans (e.g. Progressive Erosion and Sediment Control Plans) for adequacy and any required actions (e.g. maintenance, replacement or upgrade) are identified.
 4. The aforementioned actions are tracked and implemented.

The monitoring program was reviewed during the reporting period. Some changes to monitoring locations have been recommended, along with minor changes to the frequency of groundwater level recording and the naming of a water quality parameter. Also, an alternative approach to the analysis of groundwater quality results has been recommended due to the lack of baseline data.



1. Introduction

1.1 Background

This is the first annual water monitoring report for the construction phase of Sections 3 to 11 of the Woolgoolga to Ballina (W2B) Pacific Highway upgrade. The reporting period for this annual report is 1 July 2016 to 30 June 2017.

1.2 Overview of Monitoring Program

The water quality monitoring program is described in the *Pacific Highway Upgrade – Woolgoolga to Ballina Sections 3 to 11: Water Quality Monitoring Program (WQMP)* (dated 21 August 2015, GeoLINK ref: 2476-1021).

1.2.1 Objectives

The purpose of the WQMP is to monitor the construction and operation impacts of the highway upgrade on surface water bodies and groundwater resources and provide input to the environmental management of the project.

The key surface water quality objective of the W2B project is to protect downstream environments from the potential impacts of surface runoff during the construction and operational phases of the project (RMS, Aurecon, SKM, 2012a). Similarly, the key groundwater objective of the W2B project is to protect environmental receivers of groundwater flows and groundwater users from the potential impacts on groundwater levels and quality during the construction and operational phases of the project (RMS, Aurecon, SKM, 2012b).

The outcomes of the WQMP will assist with achieving water quality and hydrology related management objectives for the W2B project including:

- Mitigating impacts to surface water quality in order to protect aquatic ecology and ecosystem characteristics in adjacent catchments.
- Mitigating impacts to groundwater hydrology in order to protect licensed bores and dams, water bodies and groundwater dependant ecosystems.

2. Monitoring Methodology

2.1 Surface Water Quality

2.1.1 Monitoring Locations

The surface water monitoring locations are described in Section 2.1 of the WQMP. Maps of the surface water monitoring locations are presented in **Appendix A**. There was no change to the monitoring locations during the reporting period.

2.1.2 Sampling Regime and Parameters


As per Section 4.2.1 of the WQMP, the required frequency of sampling and the sampling parameters are as follows:

- One wet event sampling round per month except for 'high risk areas' where two wet event sampling rounds will be undertaken (refer to Table 2.1 of the WQMP for high risk areas):
 - Type A parameters (refer to **Table 2.1**); plus
 - Type B parameters (refer to **Table 2.1**) every second month (every second round for 'high risk areas').
- One dry event sampling round per month for all sites:
 - Type A parameters every month; plus
 - Type B parameters every second month.

Table 2.1 Surface Water Sampling Parameters

<i>Parameter</i>		<i>Type A Parameters</i>	<i>Type B Parameters</i>
pH	(measured in the field)	X	
Temperature	(measured in the field)	X	
Electrical Conductivity (EC)	(measured in the field)	X	
Dissolved Oxygen (DO)	(measured in the field)	X	
Turbidity	(measured in the field)	X	
Total Suspended Solids (TSS)			X
Total Oils and Grease (include as Type A parameter if oil/ grease is visible)		*	X
Total Phosphorous (TP), Total Nitrogen (TN)			X
Total Recoverable Hydrocarbons (TRH) (include as Type A parameter if oil/ grease is visible)		*	X

* Note: Oils and grease and TRH to be analysed as Type A parameters if oil/ grease is visible



The WQMP listed Total Petroleum Hydrocarbons as the last parameter in the corresponding table. This parameter has been updated to Total Recoverable Hydrocarbons in line with industry best practice.

Wet events are defined as 15 mm or more of rain within 24 hours. Wet event sampling is to be undertaken within 48 hours of the rain event.

The monitoring undertaken during the reporting period complied with the above requirements. In some months, the wet event trigger of 15 mm or more of rain within 24 hours was not exceeded and therefore wet event monitoring was not undertaken. Some sites were not monitored during some monitoring rounds because they either could not be accessed or had insufficient water.

2.1.3 Sample and Data Collection

The collection of in-situ water quality data and the collection of water samples for laboratory analysis were undertaken in accordance with the methodology described in Sections 5.1 and 5.2 of the WQMP.

2.2 Groundwater Quality

2.2.1 Monitoring Locations

The groundwater quality monitoring locations are described in Section 2.2 of the WQMP. Maps of the groundwater monitoring locations are presented in **Appendix A**. There was no change to the monitoring locations during the reporting period.

2.2.2 Sampling Regime and Parameters

Sampling parameters are as per **Table 2.2** below. As per Section 4.3.2.1 of the WQMP, the required frequency of sampling is:

- quarterly sampling of Type A parameters (field analysis parameters); plus
- six-monthly sampling of Type B parameters (laboratory analysis parameters).

As with the surface water quality parameters, the WQMP listed Total Petroleum Hydrocarbons in the corresponding table. This parameter has been updated to Total Recoverable Hydrocarbons in line with industry best practice.

The monitoring undertaken during the reporting period complied with the above requirements. Some bores were not monitored during some monitoring rounds because they either could not be accessed or had insufficient water. These instances are noted in the results spreadsheet presented in **Appendix E**.

Table 2.2 Groundwater Quality Sampling Parameters

<i>Parameter Group</i>	<i>Parameter</i>	<i>Type A Parameters (Field Analysis)</i>	<i>Type B Parameters (Laboratory Analysis)</i>
Physical and Chemical Properties	pH	X	
	Temperature	X	
	Electrical Conductivity (EC)	X	
Hydrocarbons	Total Recoverable Hydrocarbons (TRH)		X
Nutrients	Total Phosphorous, Total Nitrogen		X
Major Cations	Sodium (Na ⁺), Potassium (K ⁺), Calcium (Ca ²⁺), Magnesium (Mg ²⁺)		X
Major Anions	Chloride (Cl ⁻), Sulfate (SO ₄ ²⁻), Bicarbonate (HCO ₃ ³⁻)		X
Heavy Metals (Dissolved)	Aluminium, Cadmium, Copper, Lead, Zinc		X

2.2.3 Sample and Data Collection

The collection of in-situ water quality data was undertaken in accordance with the methodology described in Sections 5.1 and 5.3 of the WQMP. A passive sampling approach was used to collect groundwater samples.

2.3 Groundwater Levels

2.3.1 Monitoring Locations

The groundwater level monitoring locations are described in Section 2.2 of the WQMP. Maps of the groundwater monitoring locations are presented in **Appendix A**. There was no change to the monitoring locations during the reporting period.

2.3.2 Sampling Regime

As per Section 4.3.1.1 of the WQMP, the automatic water level recorders are required to be downloaded on a quarterly basis with the recorders set to take readings at a maximum of one hour intervals. Physical measurement of the depth to standing water level is to be taken at the same time as the quarterly download.

The monitoring undertaken during the reporting period complied with the above, except that the automatic water level recorders (loggers) were set to take readings at six hour intervals. This was done to increase the battery life of the loggers. Some bores were not monitored during some monitoring rounds due to various reasons, including insufficient water, access constraints and issues with the loggers. Also, some bores could not be accessed during the first round of monitoring in August 2016, so the first round of monitoring for these bores was delayed. These instances are noted in the results spreadsheet presented in **Appendix E**.



2.3.3 Sample and Data Collection

The collection of groundwater level data was undertaken in accordance with the methodology described in Sections 5.1 and 5.3 of the WQMP.

3. Results

3.1 Climatic Conditions

During the second half of 2016, rainfall recorded across Sections 3 to 11 of the W2B project was significantly below the average monthly totals, with the exception of slightly above average rainfall during August. Rainfall in the first three months of 2017 was significantly higher than the long-term averages. A large rainfall event associated with ex-tropical cyclone Debbie resulted in very high totals for March 2017. Rainfall totals in April and May 2017 were close to average, while there was significantly higher than average monthly rainfall in June 2017. **Figure 3.1** to **Figure 3.4** present monthly totals for the reporting period compared to long-term averages (data sourced from BoM website). Total rainfall for the 12 months of the reporting period were typically higher than the long-term average annual rainfalls, except at Ballina (**Table 3.1**).

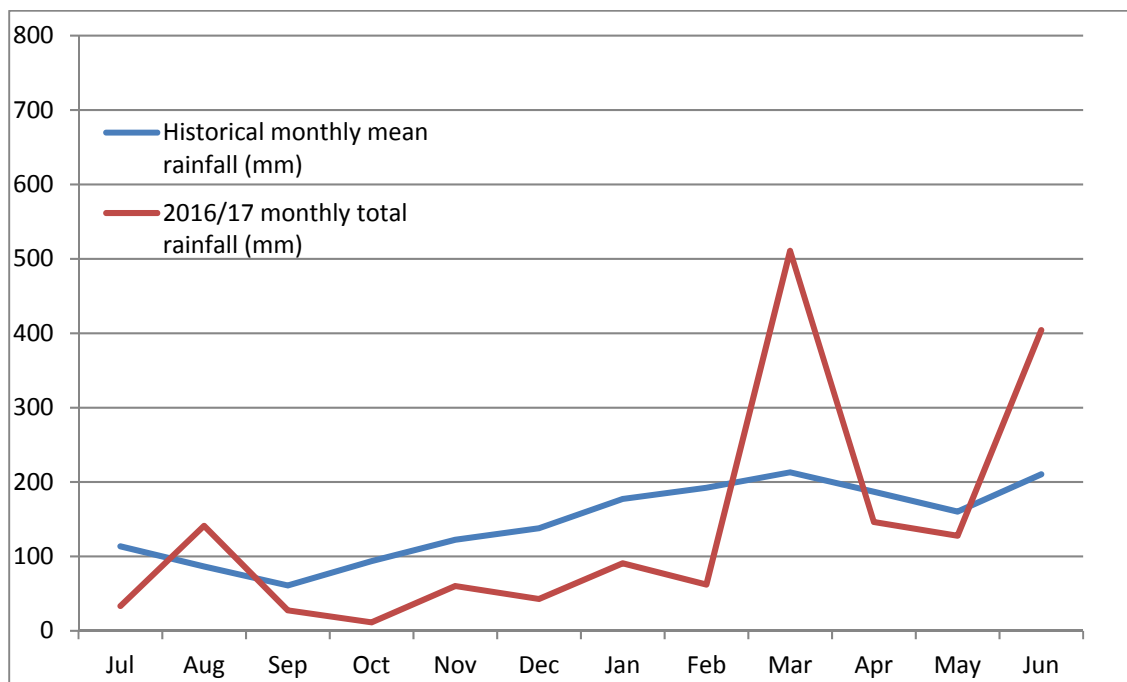


Figure 3.1 Ballina monthly rainfall over the reporting period versus long-term average

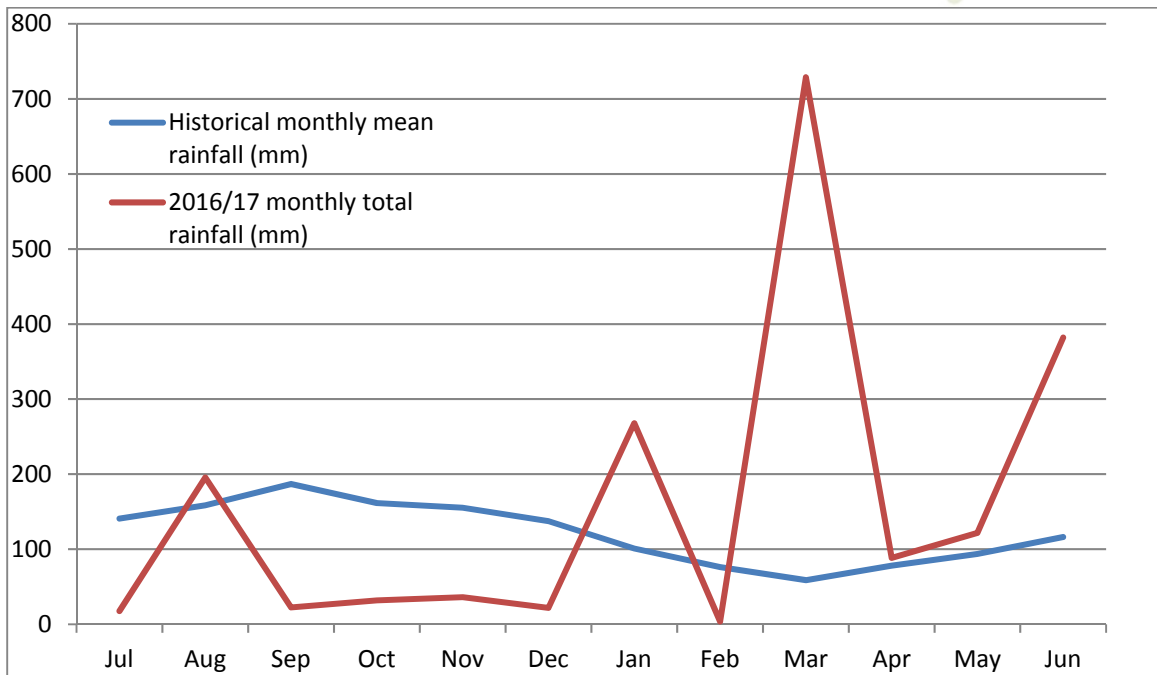


Figure 3.2 Yamba monthly rainfall over the reporting period versus long-term average

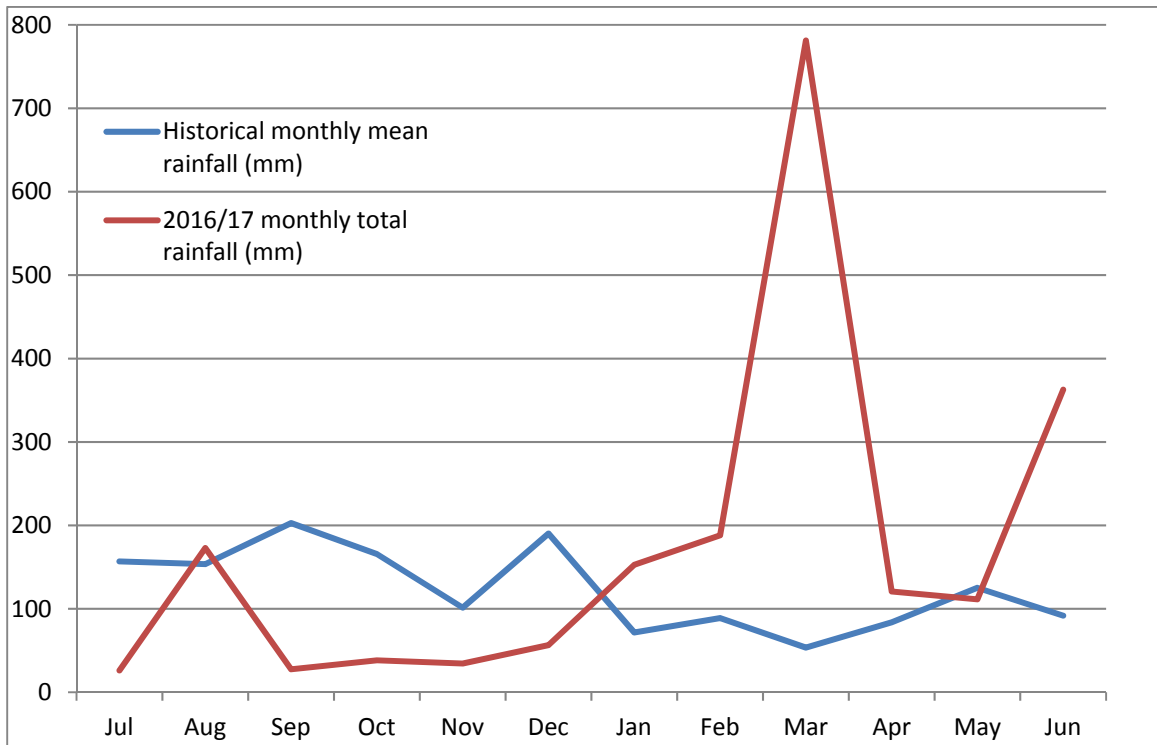


Figure 3.3 Evans Head monthly rainfall over the reporting period versus long-term average

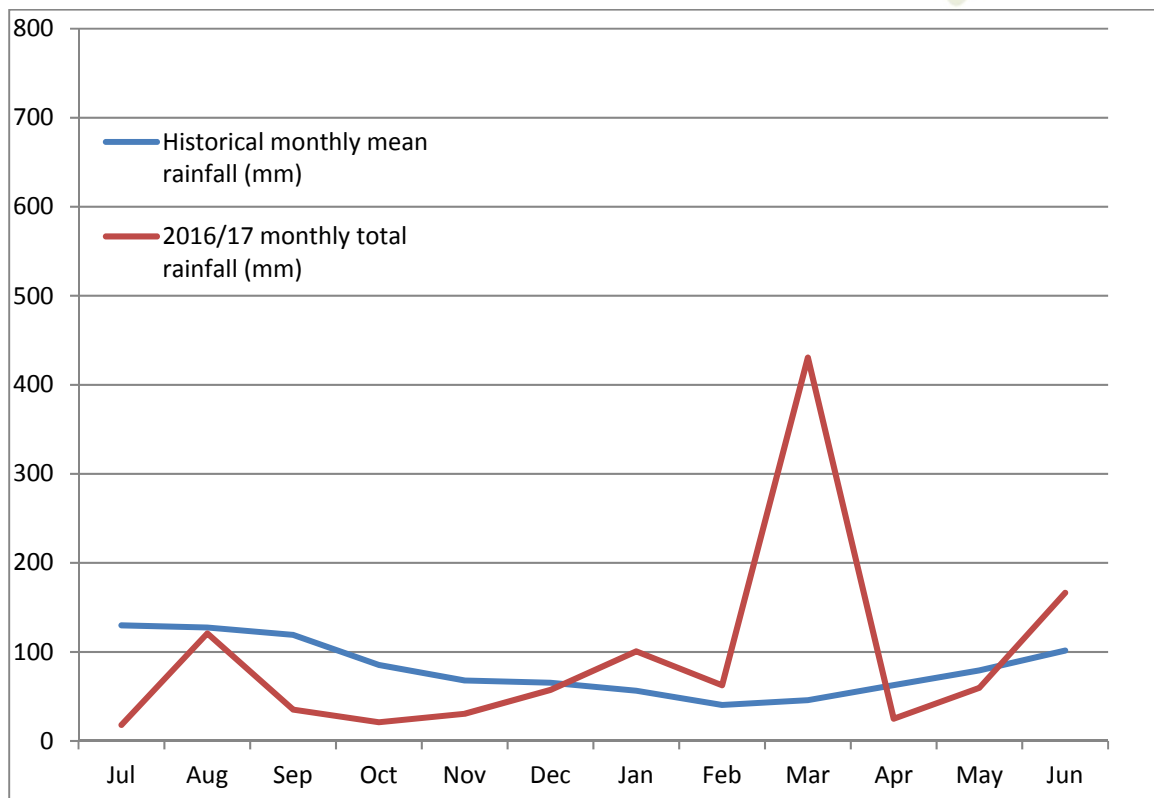


Figure 3.4 Grafton monthly rainfall over the reporting period versus long-term average

Table 3.1 Reporting Period Total Rainfall and Average Annual Rainfall

Station	Long-term average annual rainfall (mm)	Rainfall for 2016-17 reporting period (mm)
Ballina	1843	1659
Yamba	1464	1918
Evans Head	1466	2073
Grafton (Airport)	986	1128

3.2 Data Analysis Approach

3.2.1 Surface Water Quality

The WQMP proposes that surface water quality monitoring results be assessed by comparing sampling results to the corresponding 80th percentile (P80) figure and/or 20th percentile (P20) figure (as relevant) from the baseline data.

The P80 is applicable to parameters where high values are potentially an issue (e.g. turbidity), while the P20 is applicable to parameters where low values are potentially an issue (e.g. dissolved oxygen), and both figures are relevant for parameters where either a high value or a low value are potentially an issue (e.g. pH).

Where a downstream result is greater than the P80 value (or is less than the P20 value, where relevant) then further comparison with the upstream result collected at the same time is undertaken. Where the downstream result is also greater than (or less than, where relevant) the corresponding upstream result by more than the tolerance listed in **Table 3.2**, it is considered to be a 'result of interest'. That is, the result has potentially been influenced by project activities and further investigation is required.

Where the downstream result exceeds the upstream result by less than the tolerance listed in **Table 3.2**, it is considered unlikely to have been influenced by project activities. The tolerances listed in **Table 3.2** take into consideration spatial and temporal variation that is observed when taking water quality measurements in waterways that typically exhibit significant variance within short distances and timeframes. The tolerances also account for instrument error ranges.

Table 3.2 Tolerances for Comparing Upstream and Downstream Results

Parameter	<i>Downstream result is considered to be a 'result of interest' if it exceeds the upstream result by more than:</i>
Electrical Conductivity	The standard deviation from the baseline data
pH	The standard deviation from the baseline data
Dissolved Oxygen	0.5 mg/L
Turbidity	10 NTU
Total Suspended Solids	10 mg/L
Oil and grease	2 mg/L
Total Phosphorous	0.02 mg/L
Total Nitrogen	0.2 mg/L

The original baseline data set is the pre-construction data collected between February and December 2013. As per Section 7.1.2 of the WQMP, the baseline data is supplemented with the data collected from upstream monitoring sites during the construction and operational phases of the project. The upstream monitoring sites represent sites not impacted by the highway upgrade and therefore represent control sites. This process provides a more robust set of baseline data over the course of the project.


3.2.2 Groundwater Quality

The WQMP proposes that groundwater quality monitoring results be assessed using comparisons to the P80 and P20 values from the baseline data, similar to the surface water quality approach described above.

The baseline data set is the pre-construction data collected between February and December 2013.

During baseline monitoring in Sections 3 to 6, the bores were monitored for the in-situ parameters of pH, EC and temperature. In Sections 7 to 11, the bores were monitored for pH only, with the exception of three bores in Section 8 (GWB8-15, GWB8-16 and GWB8-17), which were monitored for pH, EC, TDS, hydrocarbons, nutrients, major cations and anions, and heavy metals.

Because there is no baseline data for some parameters and only limited baseline data for the remainder, an alternative approach has been adopted. Each bore has been classified as either 'up gradient' or 'down gradient'. For a pair of bores, the 'down gradient' bore is the one that typically has



the lower groundwater level, indicating that the direction of groundwater flow is from the 'up gradient' bore to the 'down gradient' bore. P80 values (and P20 values, where relevant) have been calculated using any available pre-construction data, as well as the construction phase data for the 'up gradient' bore. These P80 and P20 values are then used to assess the groundwater quality results for the corresponding 'down gradient' bore.

Where the down gradient result is greater than the P80 value (or is less than the P20 value, where relevant), it is considered to be a 'result of interest'. That is, the result has potentially been influenced by project activities and further investigation is required.

3.2.3 Groundwater Levels

The WQMP proposes that the construction phase groundwater level data be assessed by comparing the difference in groundwater level between a pair of bores to the P80 of the difference in groundwater level between the same pair of bores during the pre-construction monitoring period. This has been implemented in the following manner:

- The difference in the groundwater level between a pair of bores is calculated at each time interval for the pre-construction monitoring period.
- The P80 of these groundwater level differences is calculated to determine the baseline P80.
- During the construction phase, the difference in the groundwater level between a pair of bores is calculated at each time interval.
- If the difference in the groundwater level exceeds the baseline P80, it is considered to be a 'result of interest'. That is, the result has potentially been influenced by project activities and further investigation is required.


It is noted that the groundwater levels could be impacted by other 'natural' factors, such as climatic conditions that are different to those experienced during the baseline period.

3.3 Surface Water Quality

The results from the surface water quality monitoring are progressively provided to RMS during the monitoring program (typically one to four times per month). Results of interest are highlighted in bold red font in the spreadsheet and a tabulated summary of these results is also provided at the same time. These results trigger a review of site activities and potentially further investigation, as outlined in the WQMP.

A compilation of the results of interest for the reporting period is provided in **Appendix B** and a snapshot of the surface water quality monitoring results spreadsheet (as at 30 June 2017) is provided in **Appendix C**.

The results of interest listed in **Appendix B** will not necessarily match the results that are highlighted in bold red font in the spreadsheet in **Appendix C**. This is because the P80 and P20 values are progressively updated as additional upstream data is collected and added to the baseline data set (refer to **Section 3.2.1** for discussion). The results of interest listed in **Appendix B** were determined based on the P80 and P20 values that were current at the time that the result was obtained, whereas the spreadsheet in **Appendix C** contains the P80 and P20 values as at 30 June 2017.



Appendix H presents a table of environmental incidents that occurred during the reporting period and have the potential to impact water quality. The last four columns of the table assess potential correlation between incidents and surface water quality results of interest. It is considered that there is a potential correlation between an incident and a surface water quality result if the incident occurred within 50 m of a waterway or drain (or more than 50 m if the incident involved a spill greater than five litres) and a result of interest for a relevant parameter was recorded within a month following the incident.

3.3.1 Discussion


Almost all sites had results of interest for at least one parameter during one or more monitoring round. All sites (except for some sites within Section 7, 9 and 10) were in close proximity to construction works for at least some of the monitoring events during the reporting period. Monitoring results and the proximity and nature of construction works at some sites suggest that some results of interest may have been attributable to construction activities. The following observations can be made:

- **Rainfall:** As described in **Section 3.1**, rainfall was typically below average during the first half of the reporting period; however, some very large rainfall events in the second half of the reporting period resulted in significantly higher than average monthly rainfalls. During the drier periods, there were a number of cases where water quality was tested and sampled at a downstream site that was not visibly connected by continuous water to the upstream site. This regularly occurred during dry monitoring events when some waterways were a series of isolated pools, and monitoring was undertaken within a pool of water that did not appear to be connected with the upstream site. As per **Section 4**, any assessment of the adequacy of environmental management controls should consider the lack of connectivity at the time of the monitoring event.
- **Electrical Conductivity (EC):** Aside from the influence of tidal water, EC in a waterway may be influenced by inputs such as fertiliser (i.e. TP and TN concentrations) and soils with high salt content. Fertiliser runoff and erosion associated with the project may cause increases in EC levels at monitoring sites.

EC results of interest were recorded at some sites (e.g. SW3-23, SW5-04, SW5-11, SW7-06) on one or more occasions, including during both wet and dry sampling events. While the impacts from the recorded EC levels are considered likely to be negligible, management responses can include a review of the existing measures that relate to the management of erosion and sediment control and the use of fertilisers.

- **Dissolved Oxygen (DO):** Low DO concentrations in a waterway may be a result of:
 - inputs of tannin leachates (which increases biological oxygen demand);
 - inputs of nutrients (which cause elevated algal growth that in turn depletes DO); or
 - a change in flow regime which can lead to stagnation and in turn depleted DO concentrations.

Another potential cause of low DO concentrations, which is unrelated to construction activities, is long periods of floodplain inundation due to flood events.



DO results of interest were recorded at most sites on one or more occasions, including during both wet and dry sampling events. Low DO concentrations, especially over a long-term, can stress aquatic fauna. Management responses to low DO concentrations can include a review of:

- management of cleared vegetation and mulch stockpiles (with respect to tannin leachates); and
- maintaining the flow regime of waterways during construction works.

- **Turbidity and Total Suspended Solids:** Elevated turbidity and/or suspended solids can result from the direct disturbance and subsequent mobilisation of sediments within waterways as well as inputs of sediment laden run-off during rain. Construction activities including clearing, grubbing and earthworks typically increase the area of exposed soil and, without appropriate management, can lead to erosion and transport of fine material into waterways. Direct disturbance of river and creek beds during activities such as temporary rock platform construction, creek crossings and piling associated with bridge works can also mobilise sediments and lead to increased turbidity/ suspended soils.


Turbidity and suspended solids results of interest were recorded at most sites on one or more occasions, including during both wet and dry sampling events. There were more results of interest during the months that had relatively high rainfall (e.g. March and June 2017). Elevated turbidity can attenuate light and subsequently stress photosynthetic aquatic flora. Suspended solids can stress fish via interfering with the function of fish gills and, when suspended solids fall out of suspension, they can smother sessile aquatic biota. Potential management responses to address elevated turbidity/ suspended solid concentrations can include:

- review of existing erosion and sediment controls at relevant sites to ensure they are installed in accordance with the Progressive Erosion and Sediment Control Plan and are functioning well, particularly during rainfall; and
- measuring turbidity levels downstream of activities that disturb or have the potential to disturb sediments in a waterway to confirm that existing controls (e.g. silt curtains) are working effectively.

- **Hydrocarbons (including Oil and Grease):** Hydrocarbons are widely used in construction plant and equipment in the form of fuels and oils. Spills and leaks from plant, equipment and storage vessels and during transport and refuelling can lead to contamination of waterways. Run-off from contaminated soil and asphalt works is also a potential pathway for hydrocarbons to enter aquatic systems.

Results of interest for the >C16 - C34 hydrocarbon fraction were detected at nine sites (one occasion per site), typically at concentrations between 100 µg/L and 300 µg/L. Relevant examples of hydrocarbons in this fraction include diesel and engine oils. No results of interest were reported for other hydrocarbon fractions at any site. Results of interest for oil and grease were reported at most sites. However, it should be noted that oil and grease were analysed using a hexane extractable analysis which measures for organic hydrocarbons (vegetable or animal origin) in addition to petroleum hydrocarbons. Potential management responses to elevated hydrocarbon (including oil and grease) results can include:

- review of the project incident register (to determine whether a spill has been reported in the area);
- review and audit of spill response procedures; and

- 
- inspections of nearby areas that may be used for the storage or use of hydrocarbons (e.g. site compounds).

■ **Nutrients (Total N and Total P):** Nutrients can enter waterways via:

- soil erosion and off-site movement of eroded soils, particularly soils that have had fertiliser added; or
- changes to flow regimes, which can change the volumes and flow rates of water, leading to stagnation and subsequent increases in nutrients.

Elevated nutrient concentrations can result in algal blooms that in turn stress the aquatic system via light attenuation and depressed DO concentrations.

Nutrient results of interest were recorded at most sites on one or more occasions, including during both wet and dry sampling events. Potential management responses to elevated nutrients can include:

- investigating the potential sources of nutrients (e.g. fertiliser);
- review of existing erosion and sediment controls; and
- confirming that the flow regime of the relevant waterway is being maintained appropriately.

■ **pH:** The pH of a waterway can be affected by acidification due to exposure of acid sulphate soils, the leaching of tannins and from spills/ run-off during concreting and lime stabilisation works.


pH results of interest (both high and low) were recorded at most sites on one or more occasions, including during both wet and dry sampling events. Aquatic biota can become stressed when pH levels fall outside optimal ranges. Potential management responses to significant pH results can include:

- for low pH levels, review acid sulphate soil management and cleared vegetation/ mulch stockpile management (with respect to tannin leachates); and
- for high pH levels, review management of spills/ leaching/ runoff associated with concreting and/or lime stabilisation.

Based on the information presented in **Appendix H**, only one incident appeared to correlate with a result of interest. The incident occurred at an unnamed cane drain between CH 131100 and CH 131140 on 2 February 2017. During works to realign and install culverts, a number of deceased fish were identified in the adjacent cane drain. Advice from the Aquatic Ecologist suggested that mobilisation of monosulfidic black ooze (MBO) and subsequent deoxygenation of the water was the root cause of the incident. A result of interest for DO was recorded at site SW8-02 on 1 February 2017. Due to the proximity and connection of the cane drain and Tuckombil Canal at site SW8-02, it is possible that any mobilisation of MBO prior to 1 February 2017 may have contributed to depressed DO levels recorded at SW8-02 during the 1 February 2017 monitoring event.

3.4 Groundwater Quality

A spreadsheet containing the groundwater quality monitoring results is progressively updated and provided to Pacific Complete on a regular basis. Results of interest are highlighted in bold red font in the spreadsheet.



A compilation of the results of interest for the reporting period is provided in **Appendix D** and a snapshot of the groundwater quality monitoring results spreadsheet (as at 30 June 2017) is provided in **Appendix E**.

3.4.1 Discussion

The discussion provided in **Section 3.3.1** regarding potential impacts of construction activities on specific surface water quality parameters and potential management responses is also applicable to groundwater quality.

During the reporting period, results of interest were identified at most sites.

EC results of interest were recorded at most sites. In some locations and instances, it is considered likely that elevated electrical conductivity was caused by saltwater intrusion into the groundwater from nearby tidal waterways.

pH results of interest were also recorded at most sites. It is noted that the baseline pH range for some bores is quite narrow; for example, GWB3-06 has a P20 of 6.68 and a P80 of 6.99. It is considered that pH levels slightly outside such a narrow range are not a cause for concern. In general, when the down gradient pH value was substantially outside of the P20-P80 range, the up gradient pH value was similar to the down gradient pH value.

Results of interest for nutrients, salts, metals and hydrocarbons were recorded at some sites. However, the P80 values for these parameters at most sites are based on only two rounds of construction phase monitoring at the up gradient bore and it is considered unlikely that this data captures the full range of natural variability of each parameter at each site. As the project progresses and more data are collected for the up gradient bores, the data set will become more representative of control sites.

3.5 Groundwater Levels

A compilation of the results of interest for the reporting period is provided in **Appendix F** and charts of the groundwater levels are presented in **Appendix G**.

3.5.1 Discussion

Results of interest were recorded at most sites. Investigations to determine the likelihood of project activities being a contributing factor to these results consider:

- The timing of the cutting and/or excavation works at the specific site.
- Site observations that indicate interception of groundwater levels.

Potential management responses can include measures to collect and transfer groundwater seepage from the up gradient side of the cut to the down gradient side of the cut.



4. Project Response to Results

As discussed in **Section 3**, the updated monitoring data is provided to RMS on a regular basis. The aim is to provide the data in a timely manner so that it can be used to inform environmental management of the project. The project responds to the water monitoring results as follows:

1. The water monitoring data is reviewed, with particular focus on the results of interest that have been identified.
2. The results assist with setting the focus for the project's environmental management inspections.
3. During these inspections, environmental controls are checked and reviewed against the relevant environmental plans (e.g. Progressive Erosion and Sediment Control Plans) for adequacy and any required actions (e.g. maintenance, replacement or upgrade) are identified.
4. The aforementioned actions are tracked and implemented.

The project's environmental management inspections include the following:

- Daily pre-work inspection by the contractor's staff, including a check of relevant environmental controls and resources required to ensure effective operation and maintenance.
- Weekly and post rainfall inspections of the work sites by Pacific Complete and contractor environmental personnel to evaluate the effectiveness of environmental controls.
- Weekly or fortnightly joint inspections by Pacific Complete Environment Manager, the Environmental Representative and RMS Environmental Services Manager, Pacific Highway (or delegated staff).
- Fortnightly inspection by the Soil Conservationist focusing on erosion and sediment controls.
- Regular inspections of the work sites by the Environmental Representative, Pacific Complete Environment Manager (or delegate), RMS staff, and members of the Environmental Review Group.

When reviewing a result of interest, the first step is to determine whether construction activities with the potential to influence the result were underway at the time of (or prior to) the monitoring event. For example, if the result of interest is an elevated turbidity value, the first step is to check whether construction activities with the potential to mobilise sediment were occurring at the time of (or prior to) the monitoring event.

Where construction activities are considered the likely source of the result of interest, existing management measures are reviewed and, where appropriate, additional management measures are considered. If it is determined that additional management measures are warranted, they are implemented and monitored for efficacy.

With regard to surface water monitoring, sometimes the downstream monitoring site is not connected by continuous water to the upstream monitoring site. In such instances, the waterway may be a series of isolated pools. The review of a result of interest and consideration of the adequacy of the management measures takes into account the lack of connectivity at the time of the monitoring event.



5. Recommendations

5.1 Monitoring Program

The monitoring program was reviewed during the reporting period. Proposed changes to the monitoring program have been presented to RMS in several documents, including interim (quarterly) reports, emails and a memorandum. The proposed changes have been discussed, reviewed and refined in collaboration with RMS. The recommended changes were then presented to the relevant agencies at the September 2017 W2B Environmental Review Group meeting. The recommended changes are outlined below.

5.1.1 Surface Water Monitoring Locations


The following minor amendments to surface water monitoring locations are proposed to allow for access constraints associated with construction works/ exclusion areas:

- SW5-05 and SW5-06: Access to site SW5-06 (on the southern bank of the Clarence River) is constrained by construction activities at times and sampling outside of the hydrocarbon boom/ silt curtain can also be problematic due to access constraints (depending on location of the boom/ curtain). Moving the site upstream or downstream on the southern bank is not practical given the dense mangroves. It is recommended that this site (and the corresponding upstream site SW5-05) be relocated to the northern bank, at a similar distance from the bridge as the current sites. Construction activities and associated risks to water quality on the northern bank are considered to be equivalent to those on the southern bank.
- SW11-01 (upstream site): Access to this site is significantly constrained due to bridge construction activities within a restricted site. It is recommended that this site be moved 200 m upstream where access is less constrained.

5.1.2 Groundwater Monitoring Locations

A number groundwater monitoring bores are proposed to be removed from the WQMP as follows:

- Removal of bores that are in close proximity to other bores:
 - Rationalisation of the number of bore pairs between GWB3-11 and GWB3-18 that are in close proximity to one another. It is recommended that GWB3-13, GWB3-14, GWB3-17 and GWB3-18 (which are monitored for level and water quality in accordance with the WQMP) remain in the WQMP, while GWB3-11, GWB3-12, GWB3-15 and GWB3-16 (which are only monitored for level) are removed from the WQMP.
 - Removal of GWB3-44, which is within 40 m of GWB3-45 on the same side of alignment.
 - Removal of GWB4-15 and GWB4-16 due to close proximity (approximately 200 m) to GWB4-13 and GWB4-14. It is noted that GWB4-16 was recorded as dry throughout the reporting period.
 - Removal of GWB4-19 and GWB4-20, which are unable to be located. It is noted that GWB4-20 is within the future road alignment and is assumed to have been destroyed by the construction works. It is recommended that these bores be removed from the WQMP and that



a new bore (GWB4-22) be installed to the east of the Maclean interchange (i.e. near CH80500). This bore would then be paired with GWB4-21, which currently does not have a pair.

- Removal of GWB8-05 and GWB8-06 due to close proximity to GWB8-07 and GWB8-08.
 - Removal of GWB8-11 and GWB8-12 due to the presence of two other bore pairs between Tuckombil Canal and Woodburn Evans Head Road (approximately 1.4 km distance).
 - Removal of GWB8-13 due to close proximity to a number of other bores in the area. Also, this bore does not have a pair. This bore is near the Rous Water bore field, but it is not a water quality bore (i.e. it is water level only) and it is not indicated in the WQMP as a 'Rous Water bore'.
- Removal of bores that do not have a matching 'pair' and therefore cannot be assessed using the data analysis approach described in **Sections 3.2.2** and **3.2.3**:
- GWB3-34 (level and water quality bore)
 - GWB7-01 (level bore)
 - GWB7-04 (level bore)
 - GWB7-05 (level bore)
 - GWB8-04 (level and water quality bore)
 - GWB8-26 (level and water quality bore)
 - GWB9-04B (level and water quality bore)
 - GWB10-09 (level and water quality bore)
 - GWB10-11 (level and water quality bore).
- Potential future removal of a number of bores that have been observed to be continually dry. It is proposed that the following bore pairs (within which one bore has been recorded as 'dry' on every monitoring event for the reporting period) are monitored for an additional year (i.e. the 2017-18 reporting period) before the status of these bores is reviewed:
- GWB3-01 / GWB3-02
 - GWB3-03 / GWB3-04
 - GWB4-15 / GWB4-16.

5.1.3 Monitoring Frequency

As discussed in **Section 2.3.2**, the WQMP states that the automatic groundwater level recorders (loggers) should be set to take readings at a maximum of one hour intervals. However, this frequency of readings has resulted in the logger batteries running out of charge relatively quickly. Therefore, it is recommended that the loggers be set to take readings at six hour intervals to increase the battery life of the loggers.

5.1.4 Monitoring Parameters

As discussed in **Sections 2.1.2** and **2.2.2**, the WQMP listed Total Petroleum Hydrocarbons as one of the water quality parameters to be monitored. It is recommended that this parameter be updated to Total Recoverable Hydrocarbons in line with industry best practice.



5.1.5 Groundwater Quality Data Analysis Approach

As discussed in **Section 3.2.2**, the WQMP proposes that groundwater quality monitoring results be assessed using comparisons to the P80 and P20 values from the baseline data. However, there is no baseline data for some parameters and only limited baseline data for the remainder. Therefore, an alternative approach is recommended. Each bore has been classified as either 'up gradient' or 'down gradient'. For a pair of bores, the 'down gradient' bore is the one that typically has the lower groundwater level, indicating that the direction of groundwater flow is from the 'up gradient' bore to the 'down gradient' bore. P80 values (and P20 values, where relevant) have been calculated using any available baseline data, as well as the construction phase data for the 'up gradient' bore. These P80 and P20 values are then used to assess the groundwater quality results for the corresponding 'down gradient' bore.



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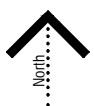
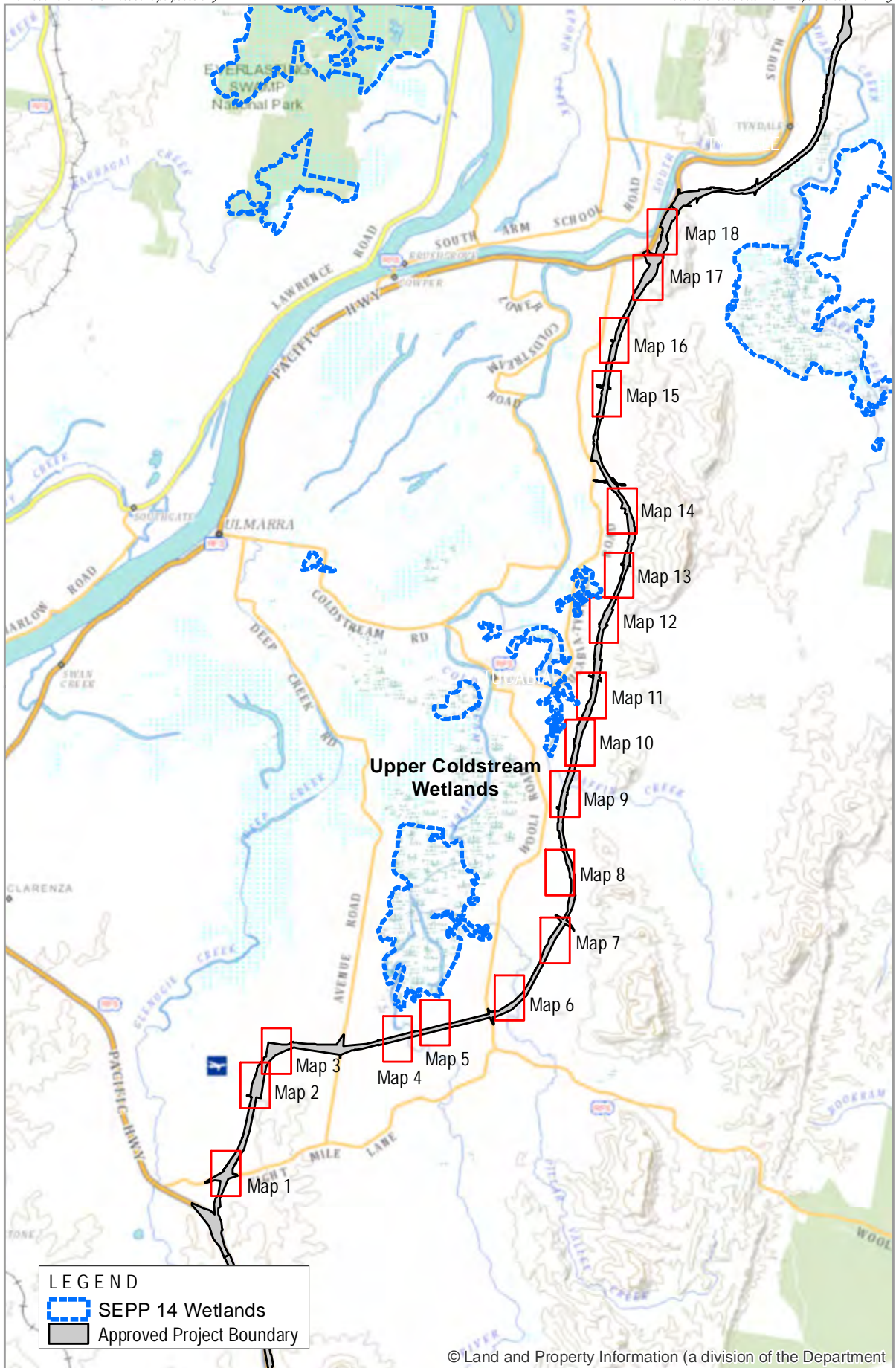
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Appendix A

Monitoring Locations Maps

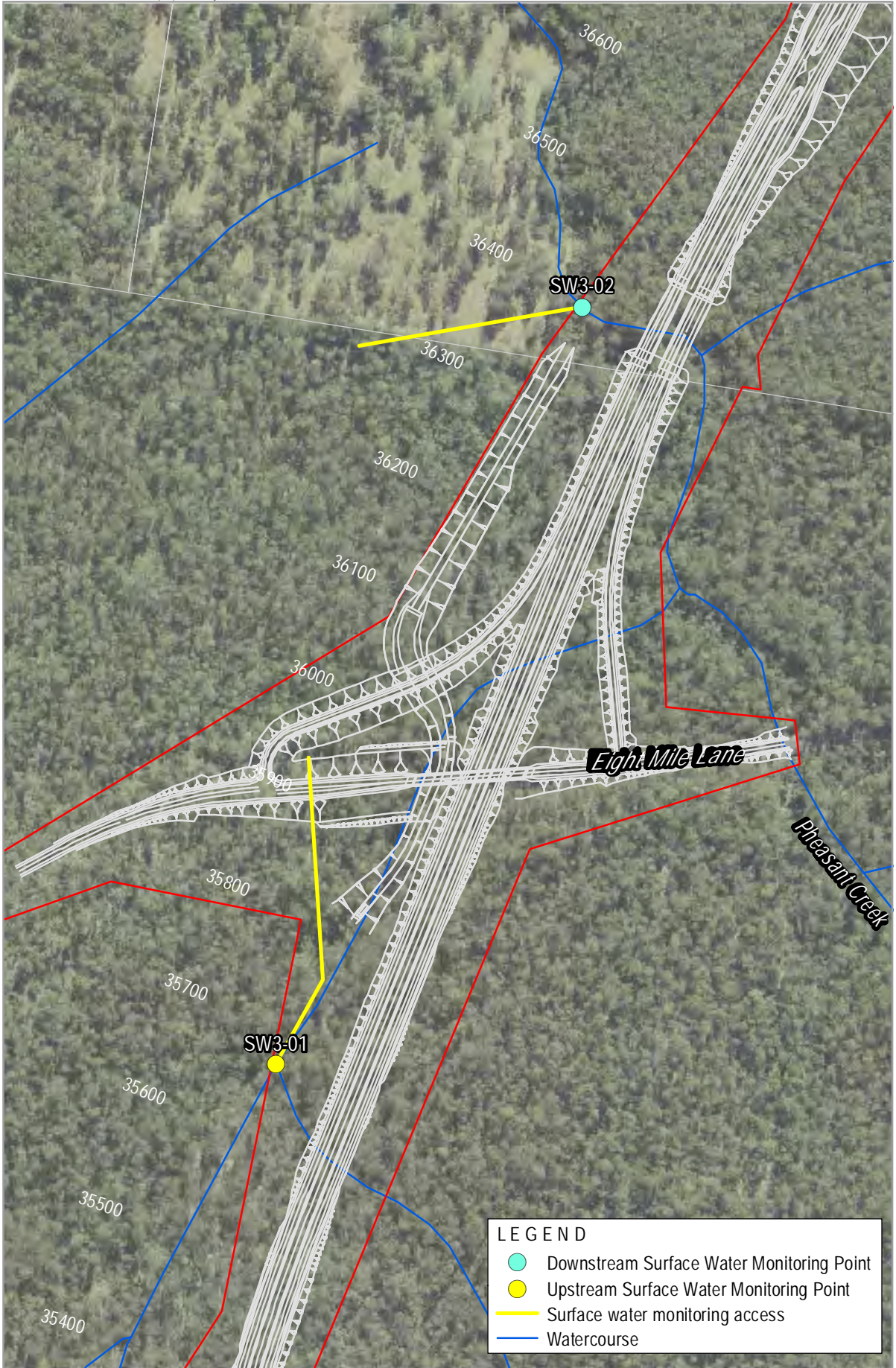


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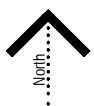
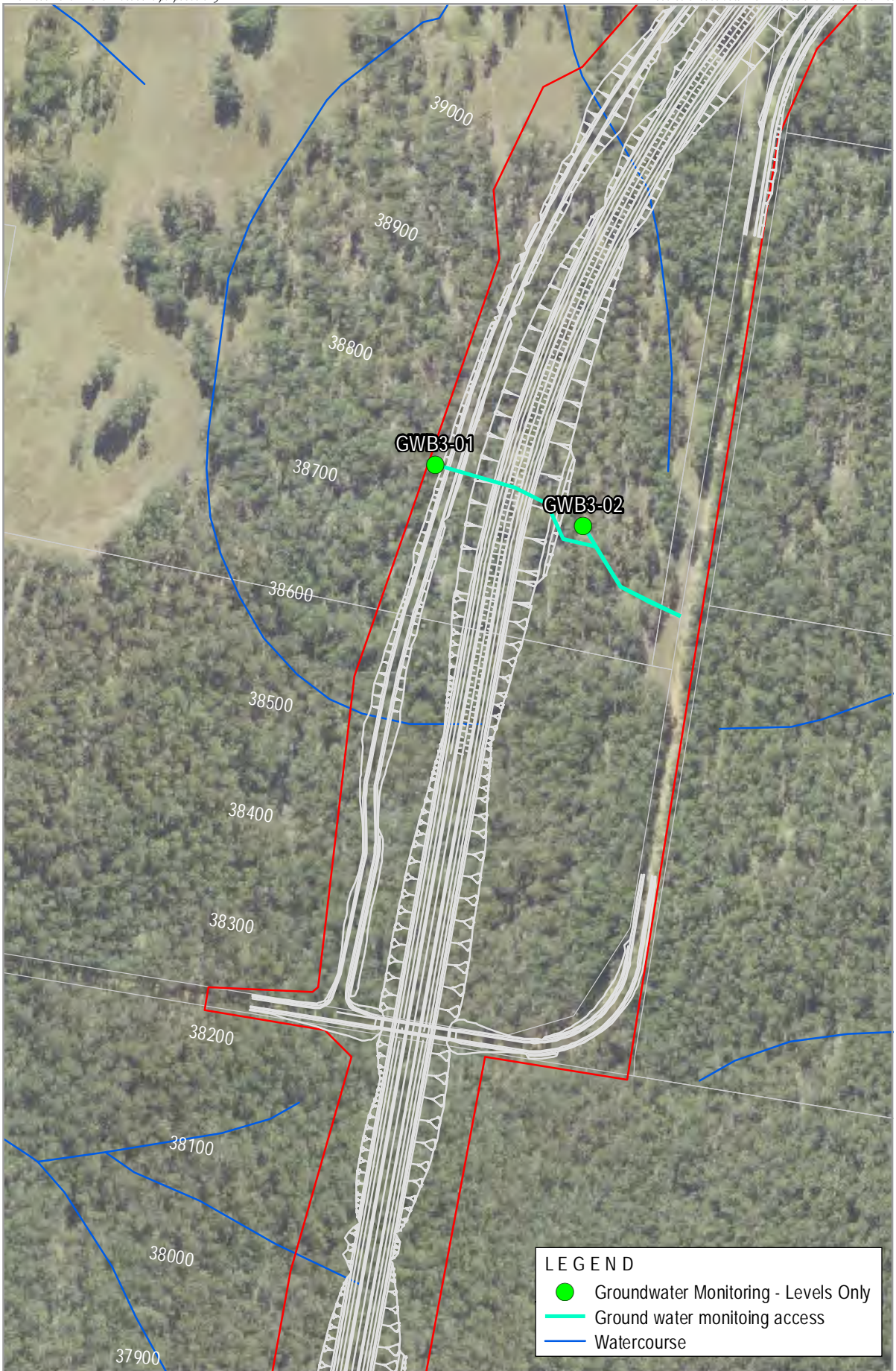
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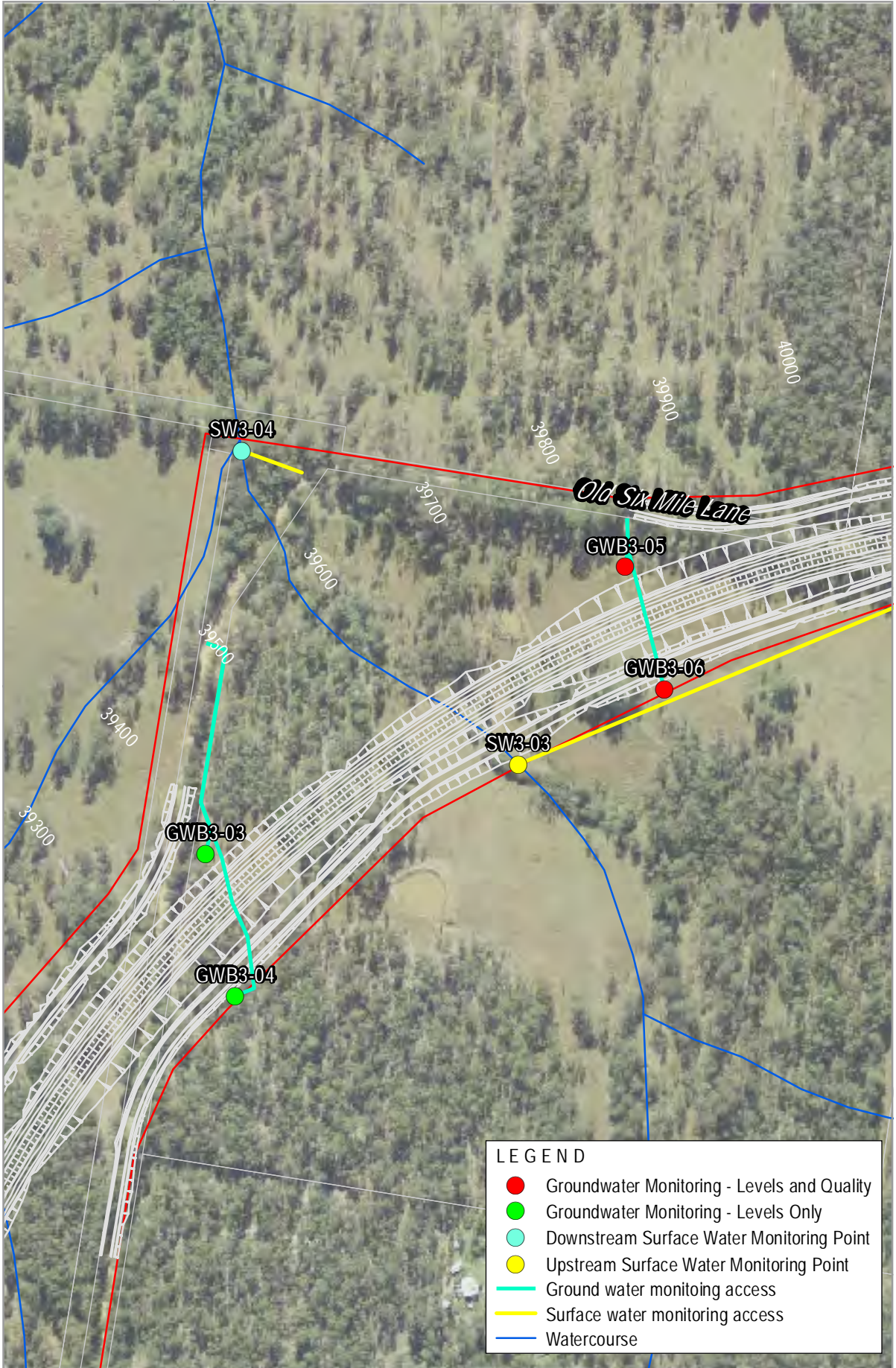


Woolgoolga to Ballina Section 3 - SW and GW Monitoring Locations



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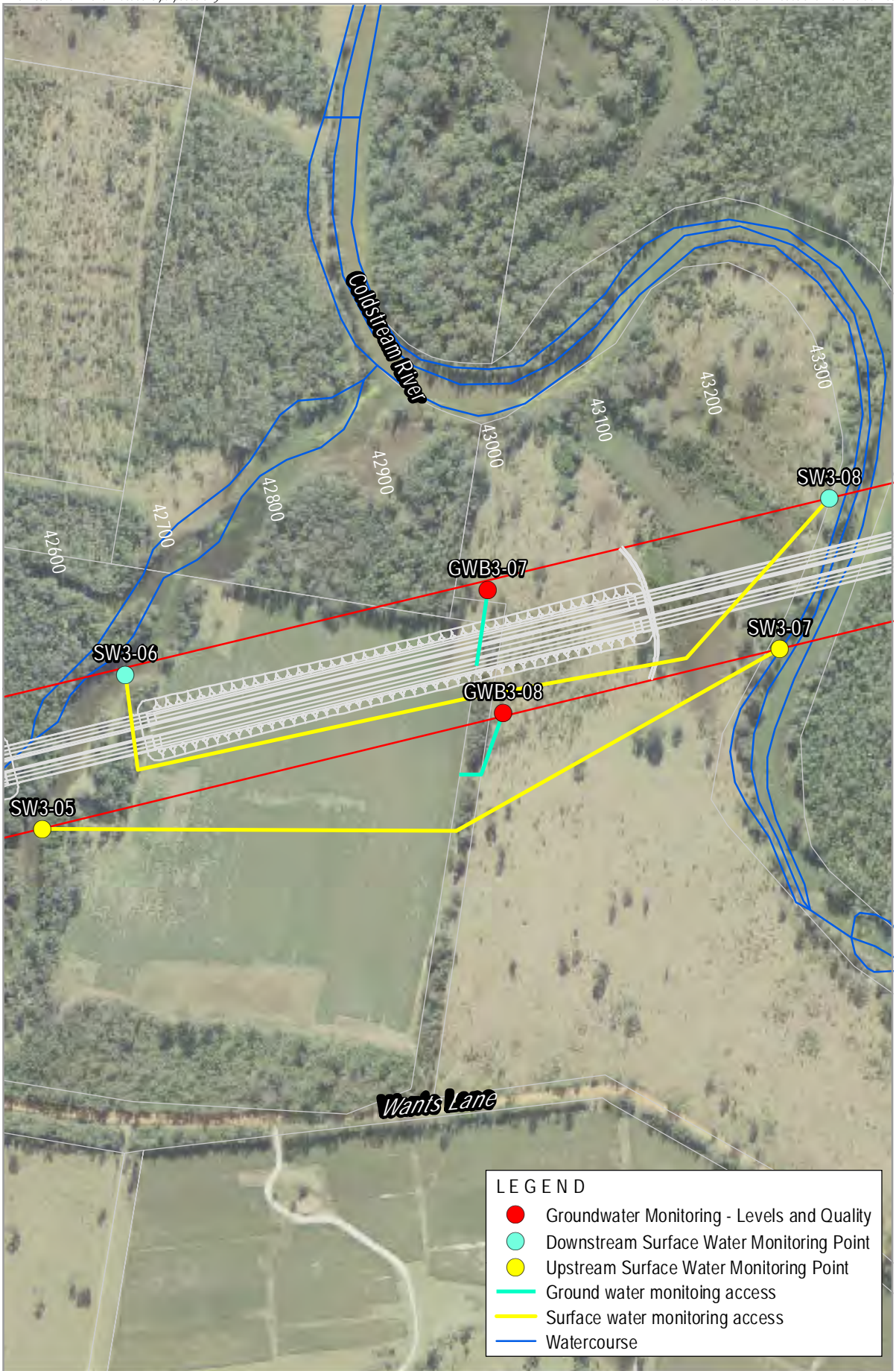


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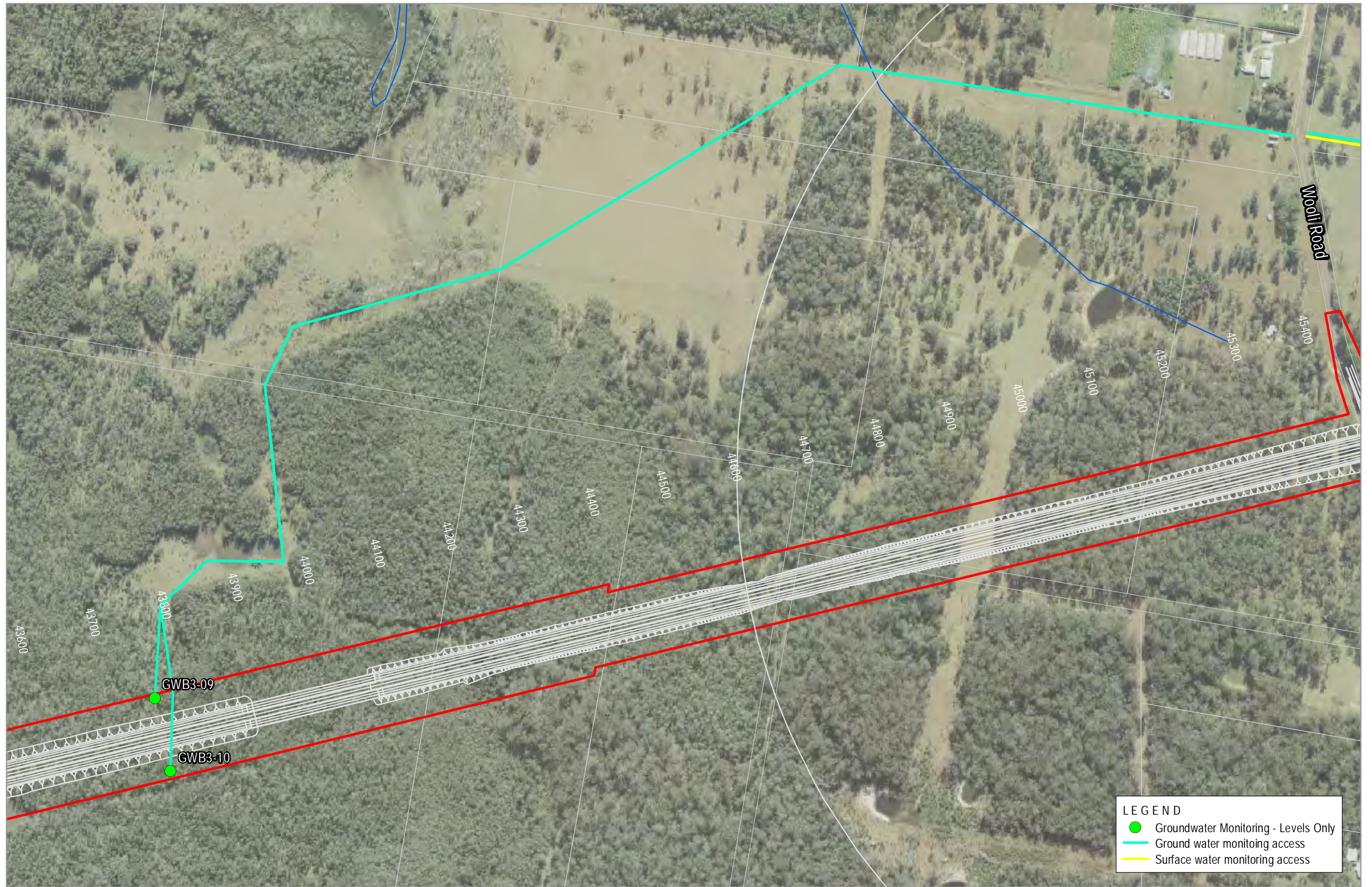
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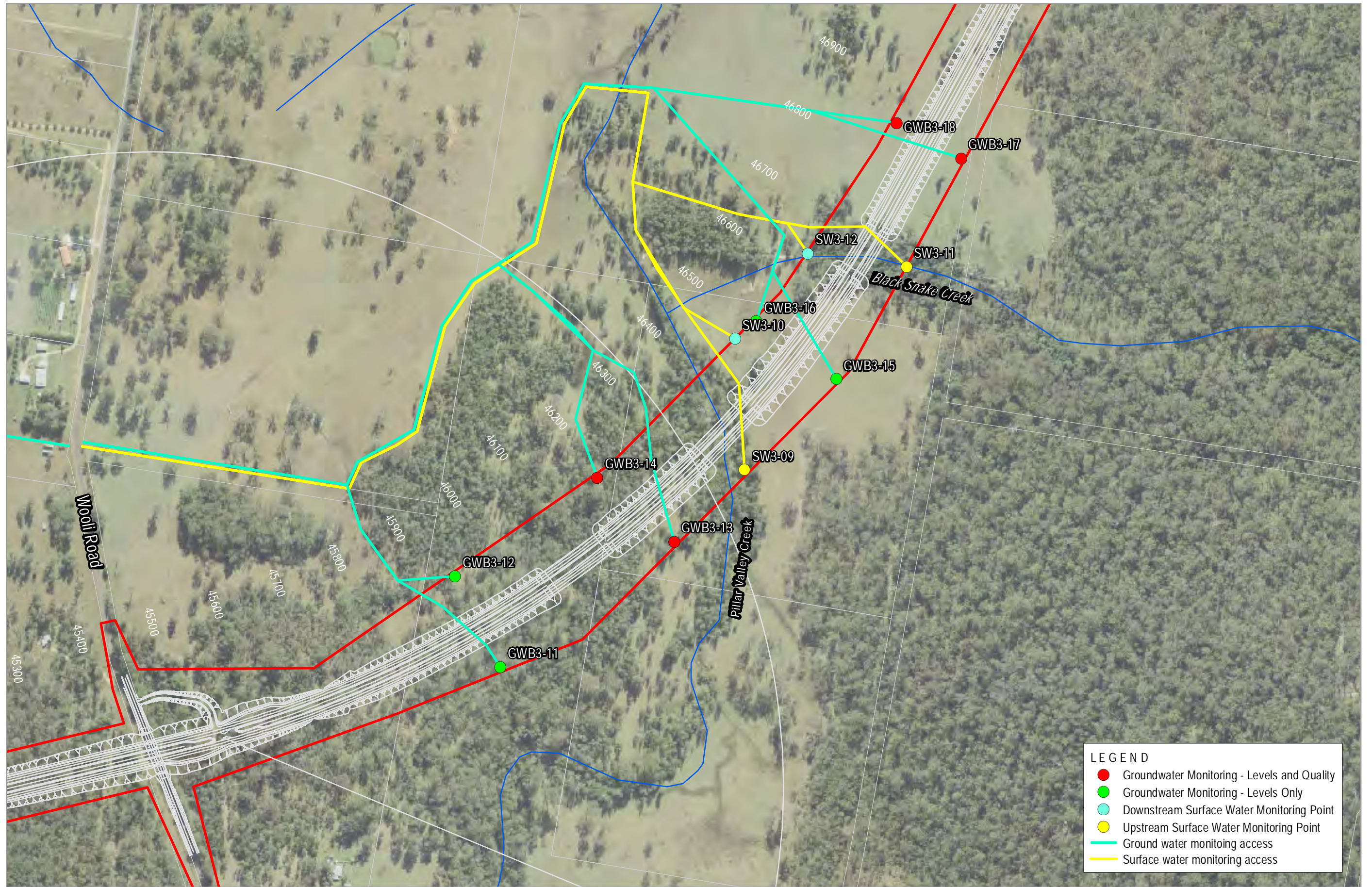


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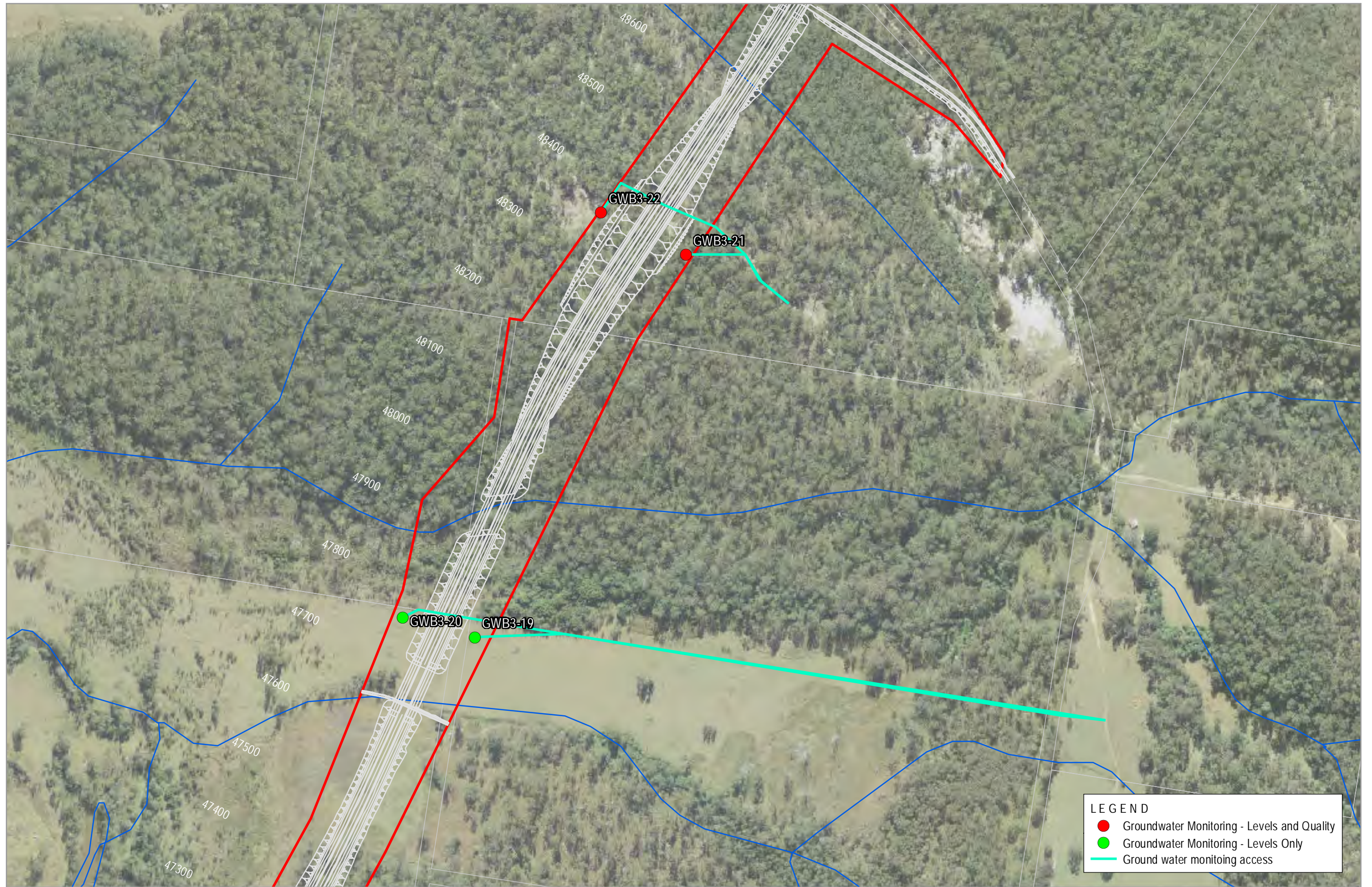
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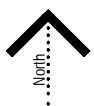


LEGEND

- Groundwater Monitoring - Levels and Quality
- Groundwater Monitoring - Levels Only
- Ground water monitoring access

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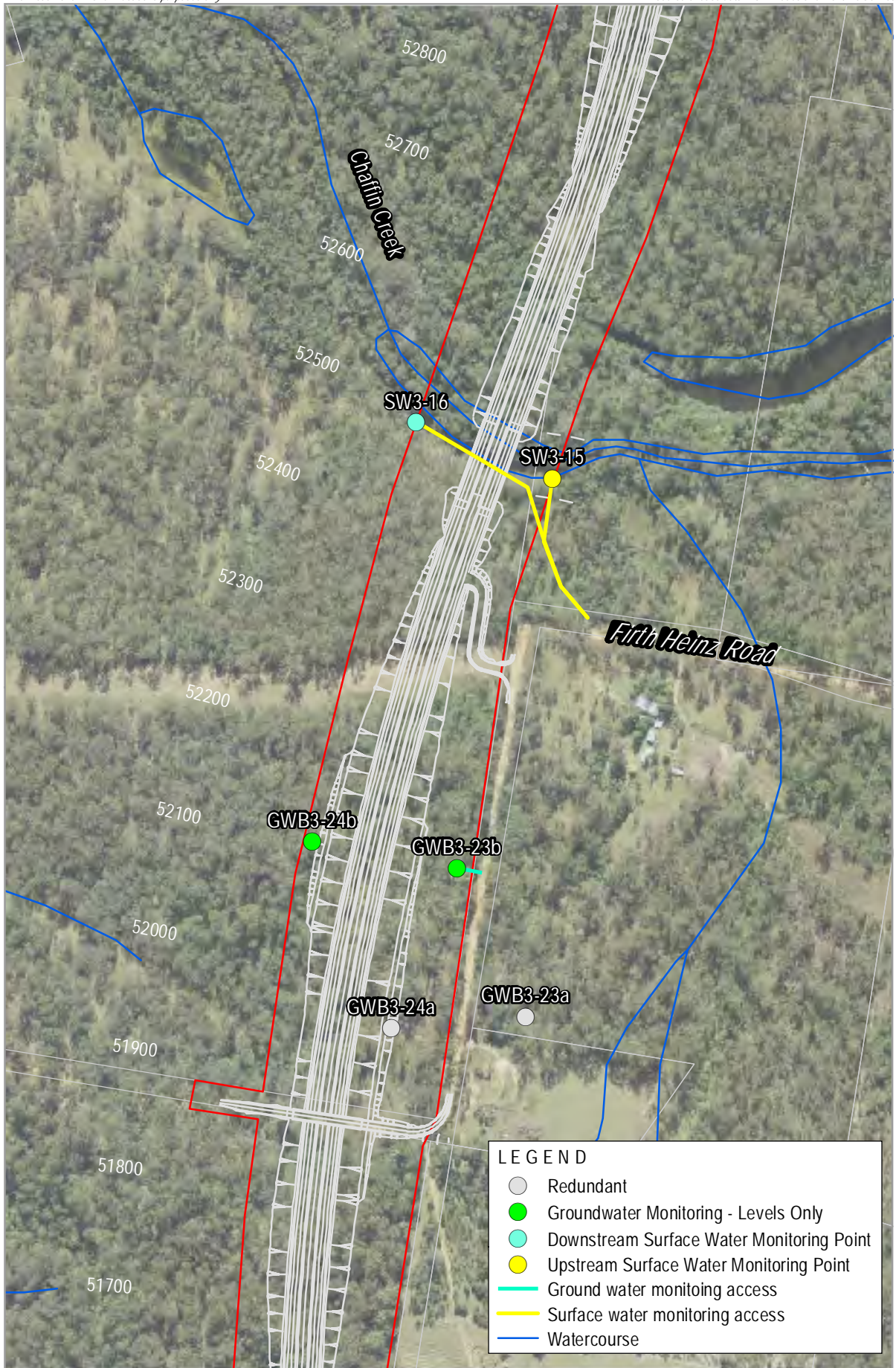


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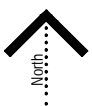
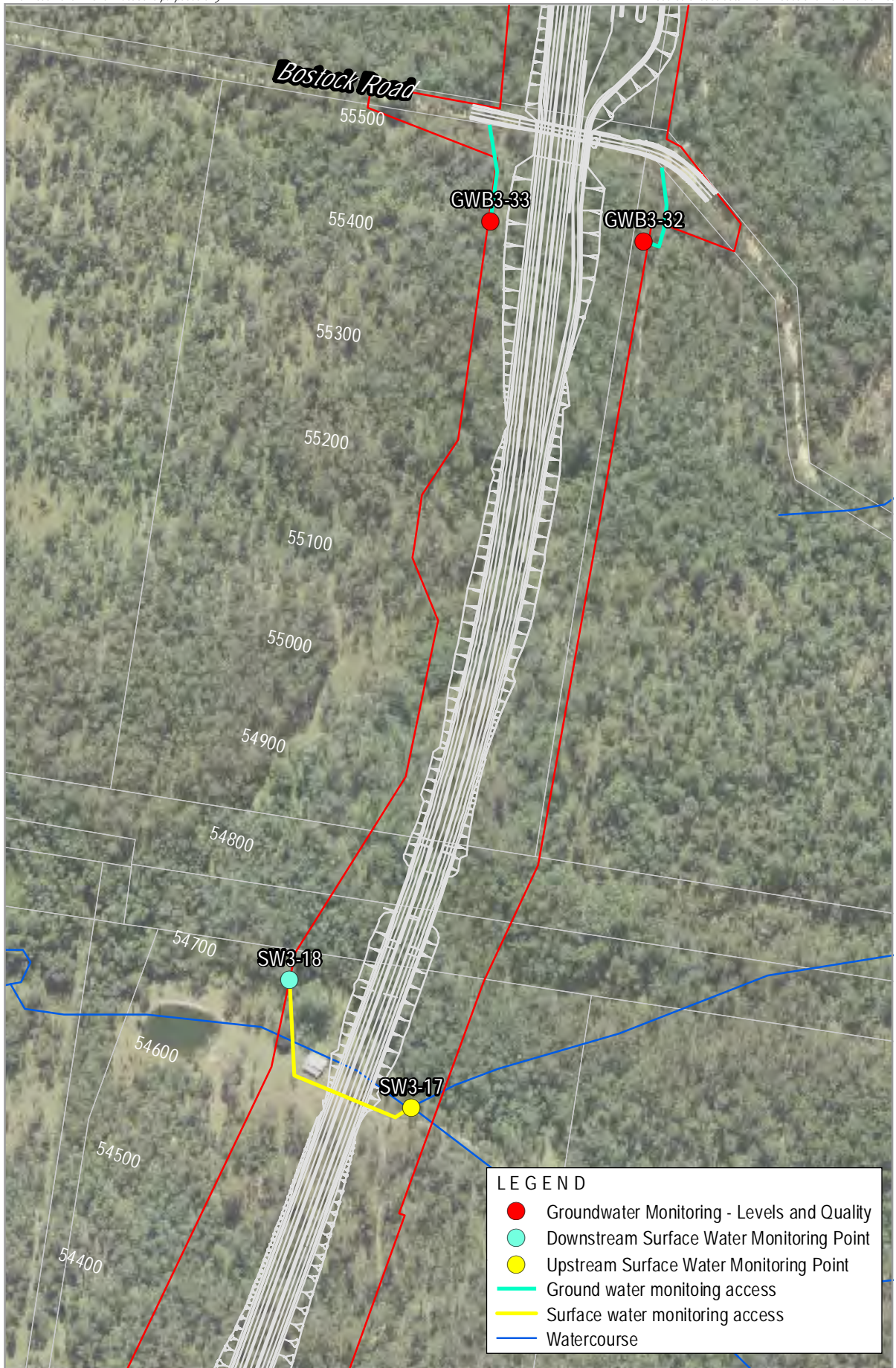
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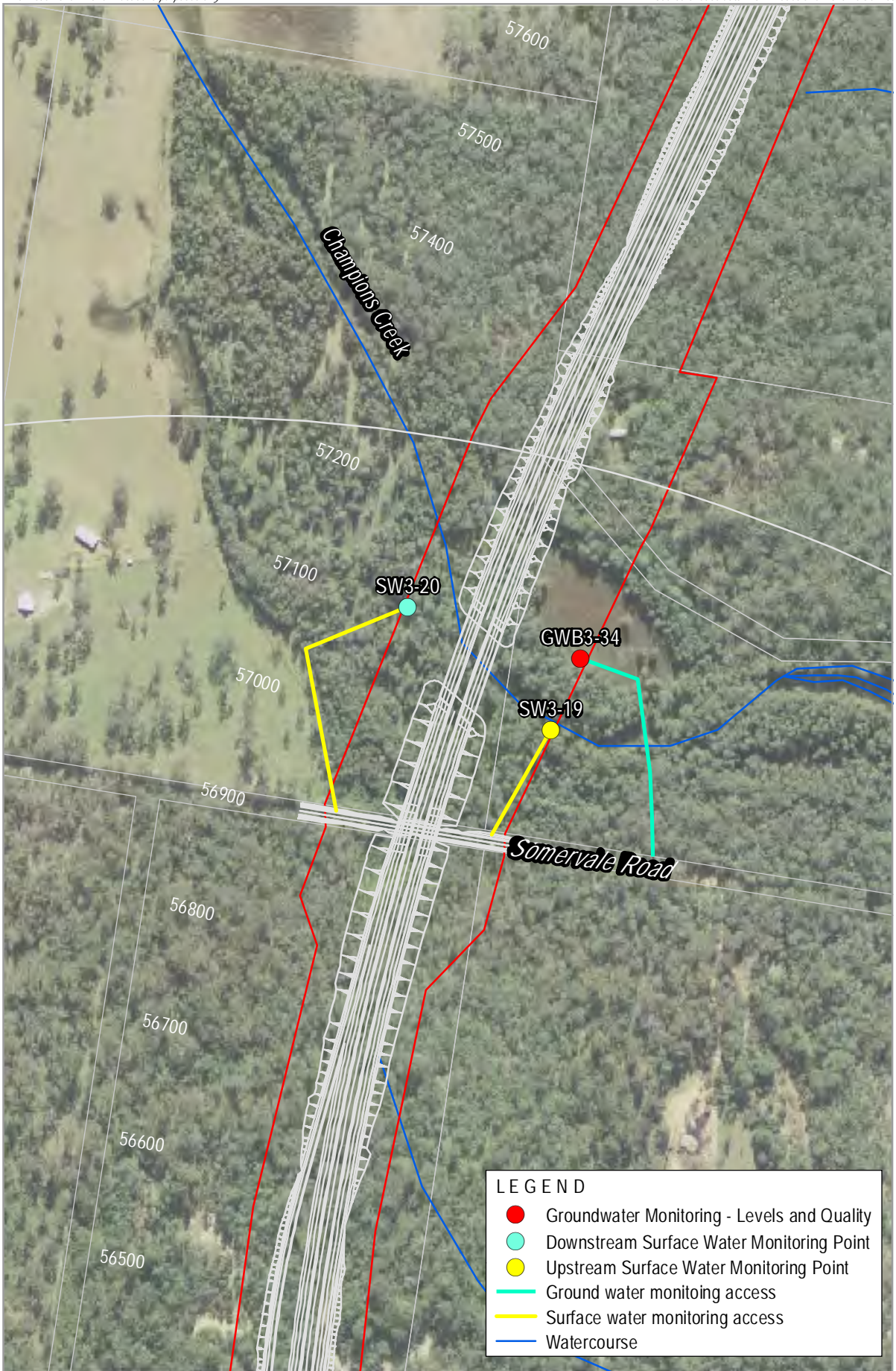
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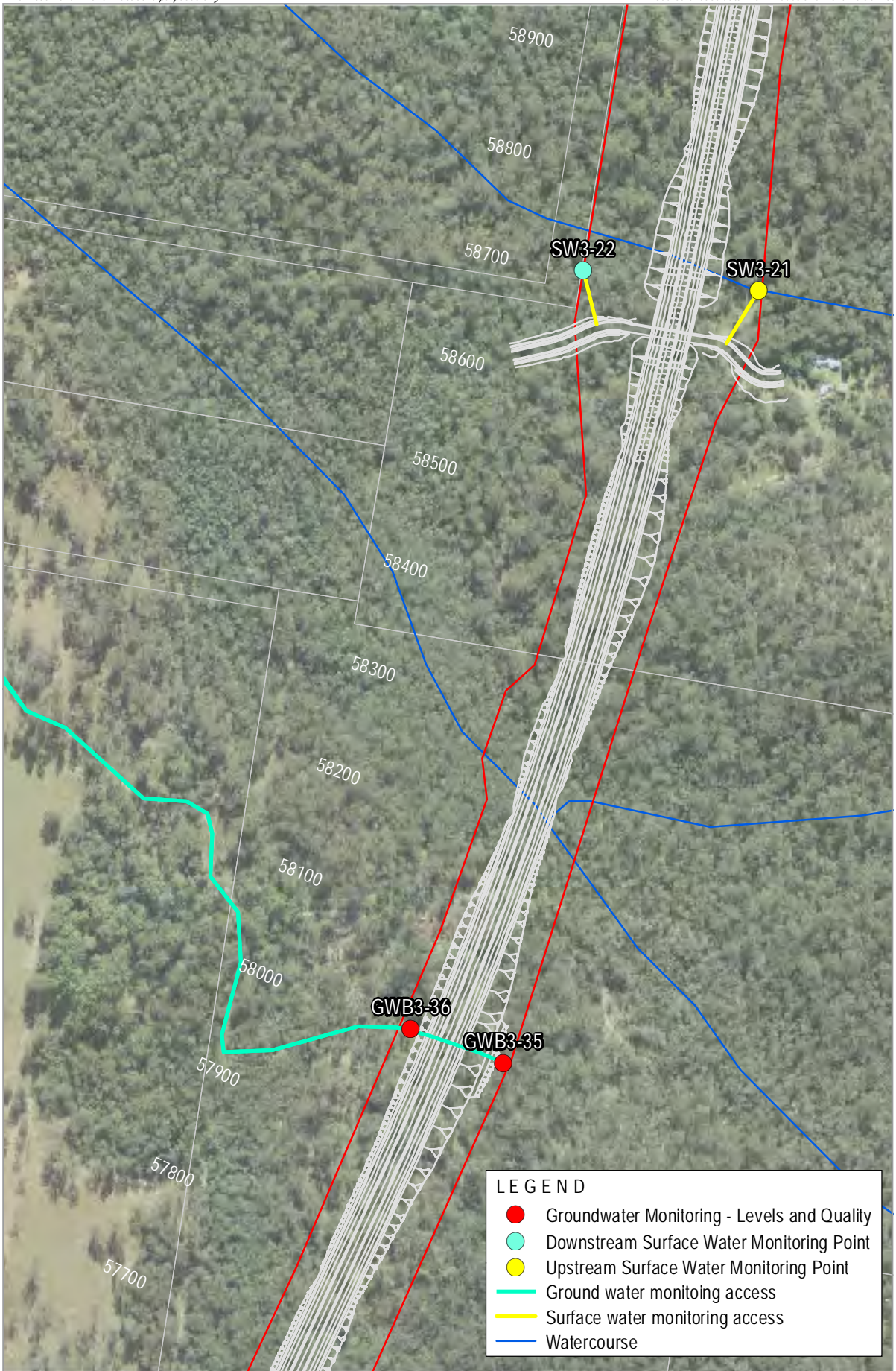
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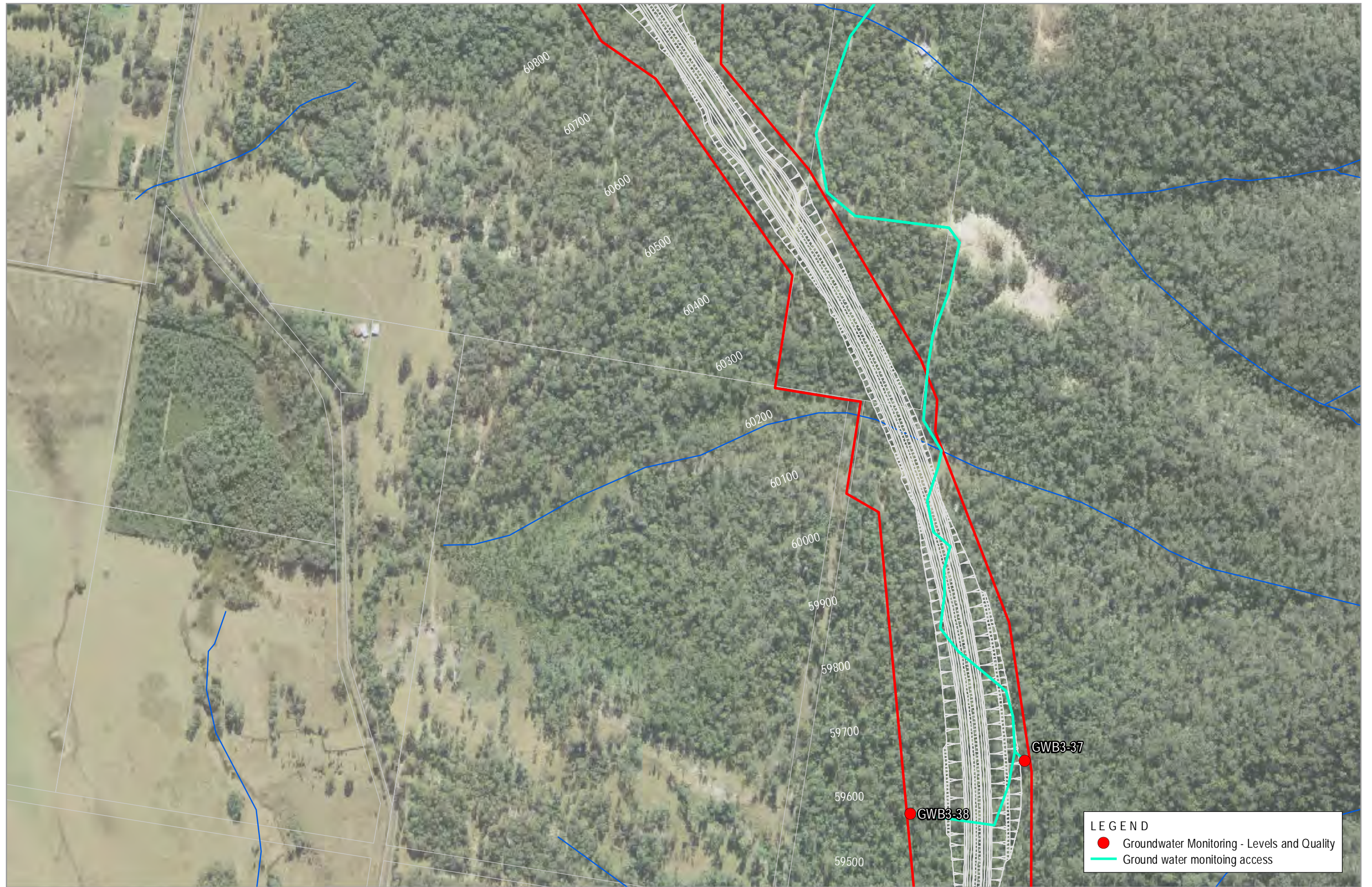
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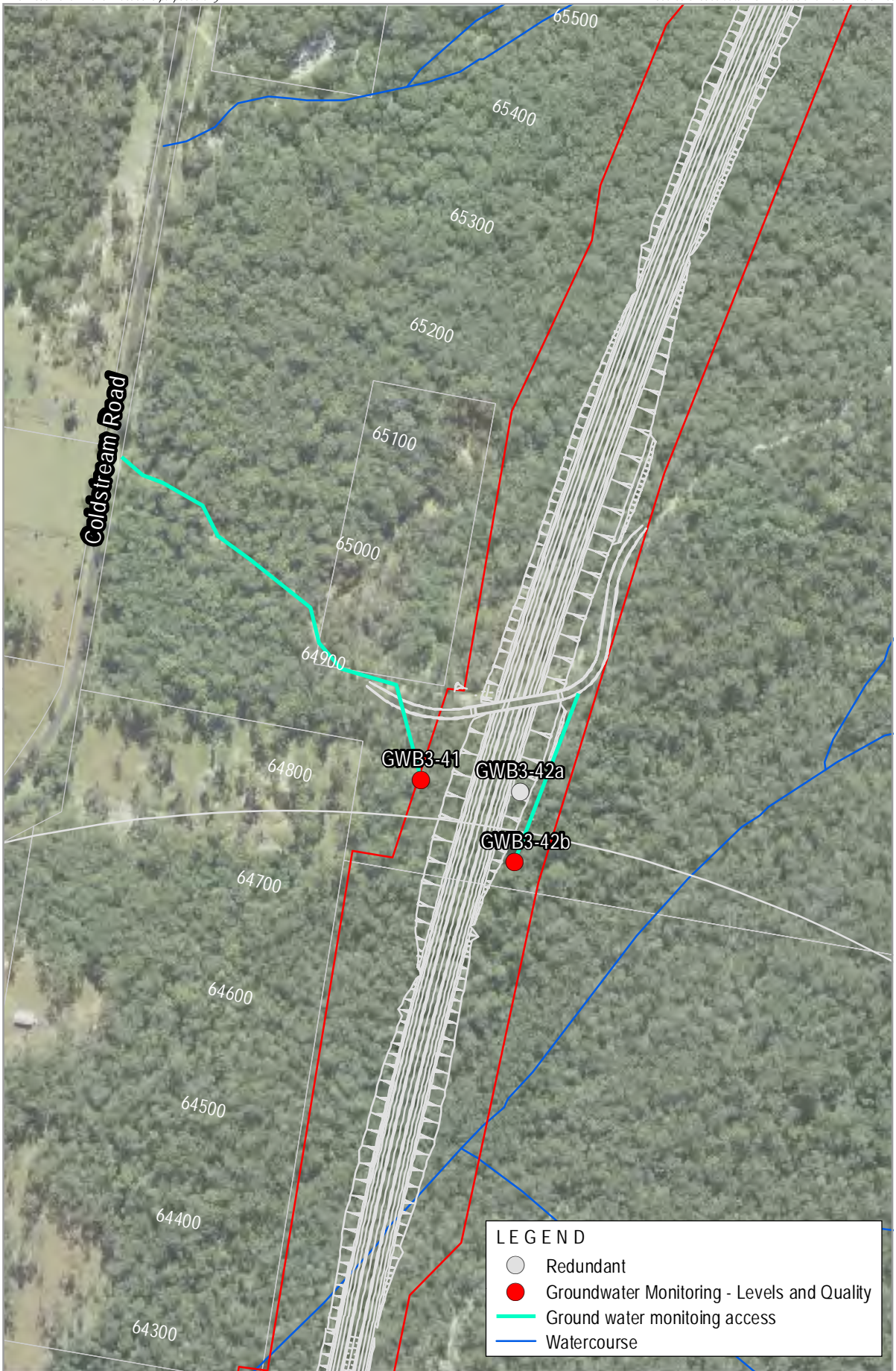
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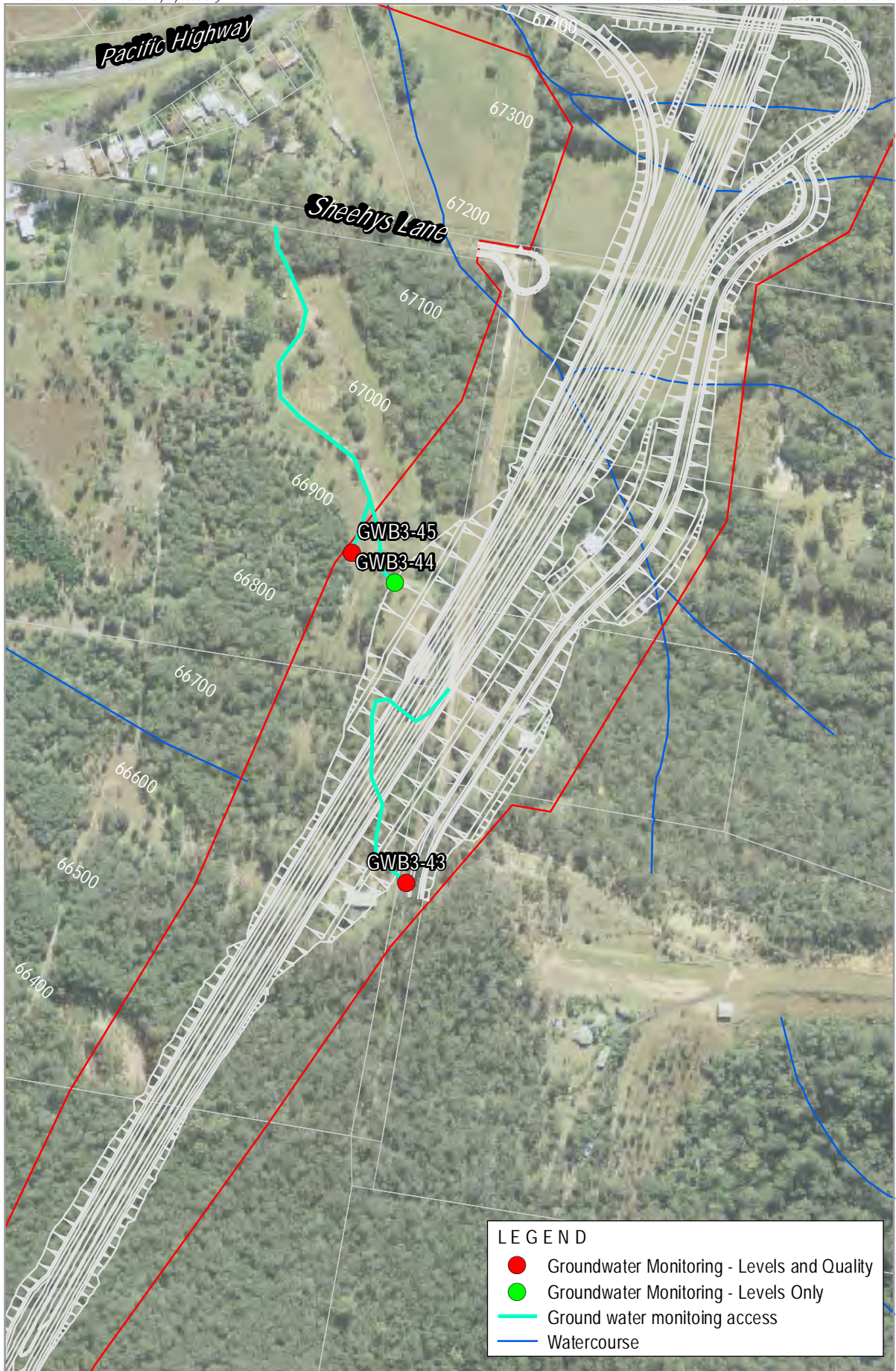
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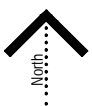
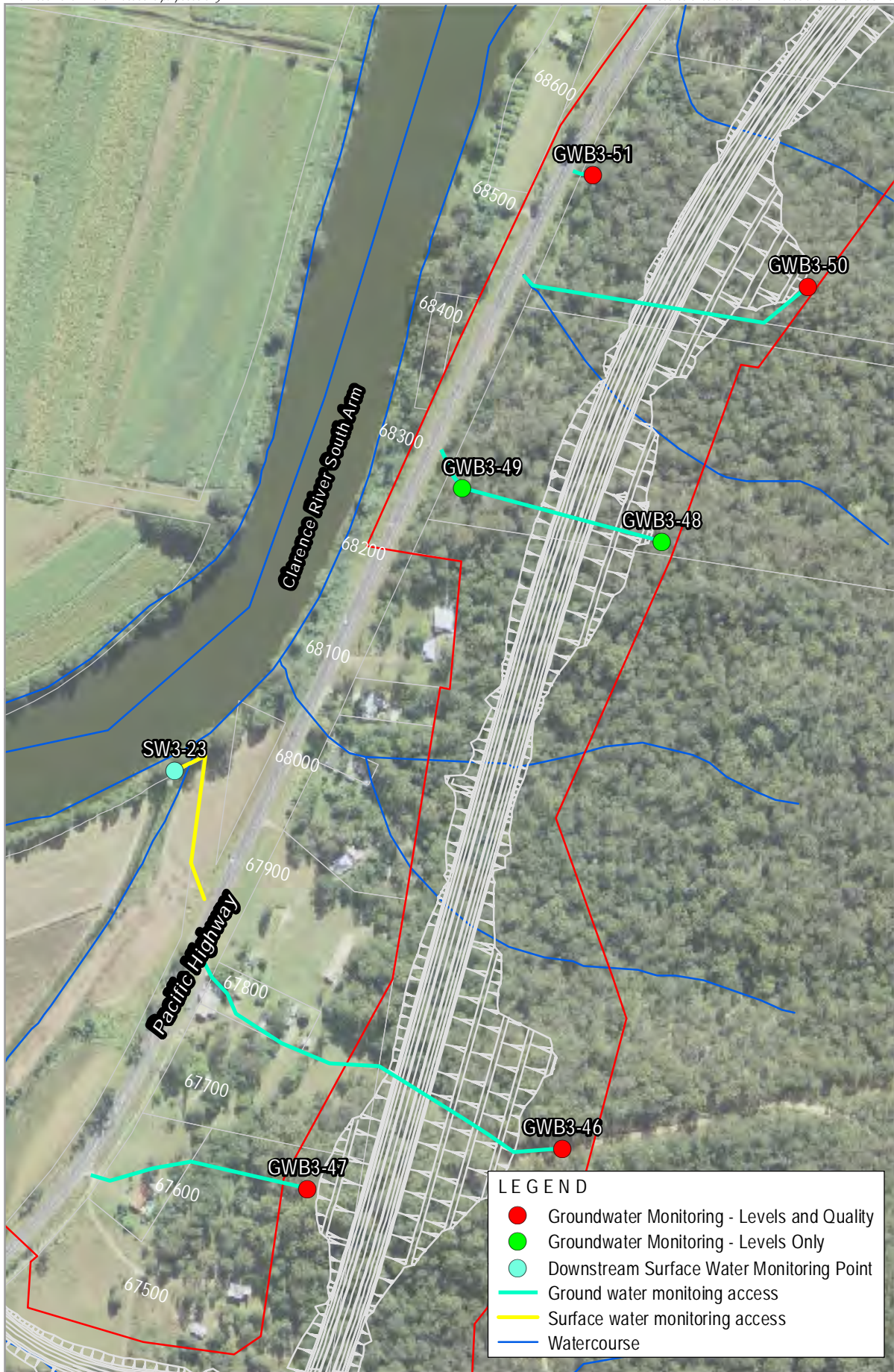
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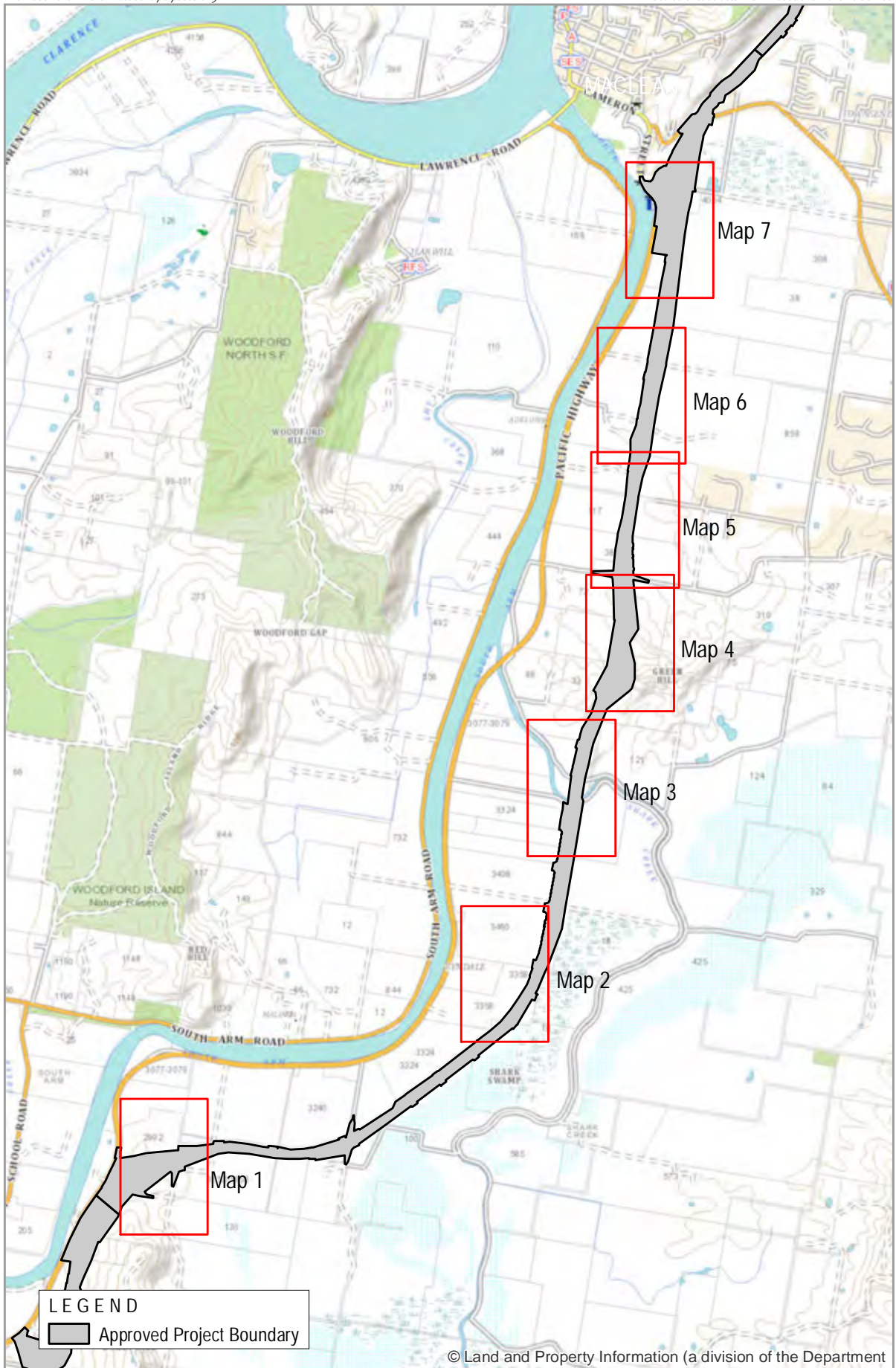
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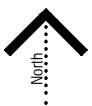
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Woolgoolga to Ballina Section 3 - SW and GW Monitoring Locations



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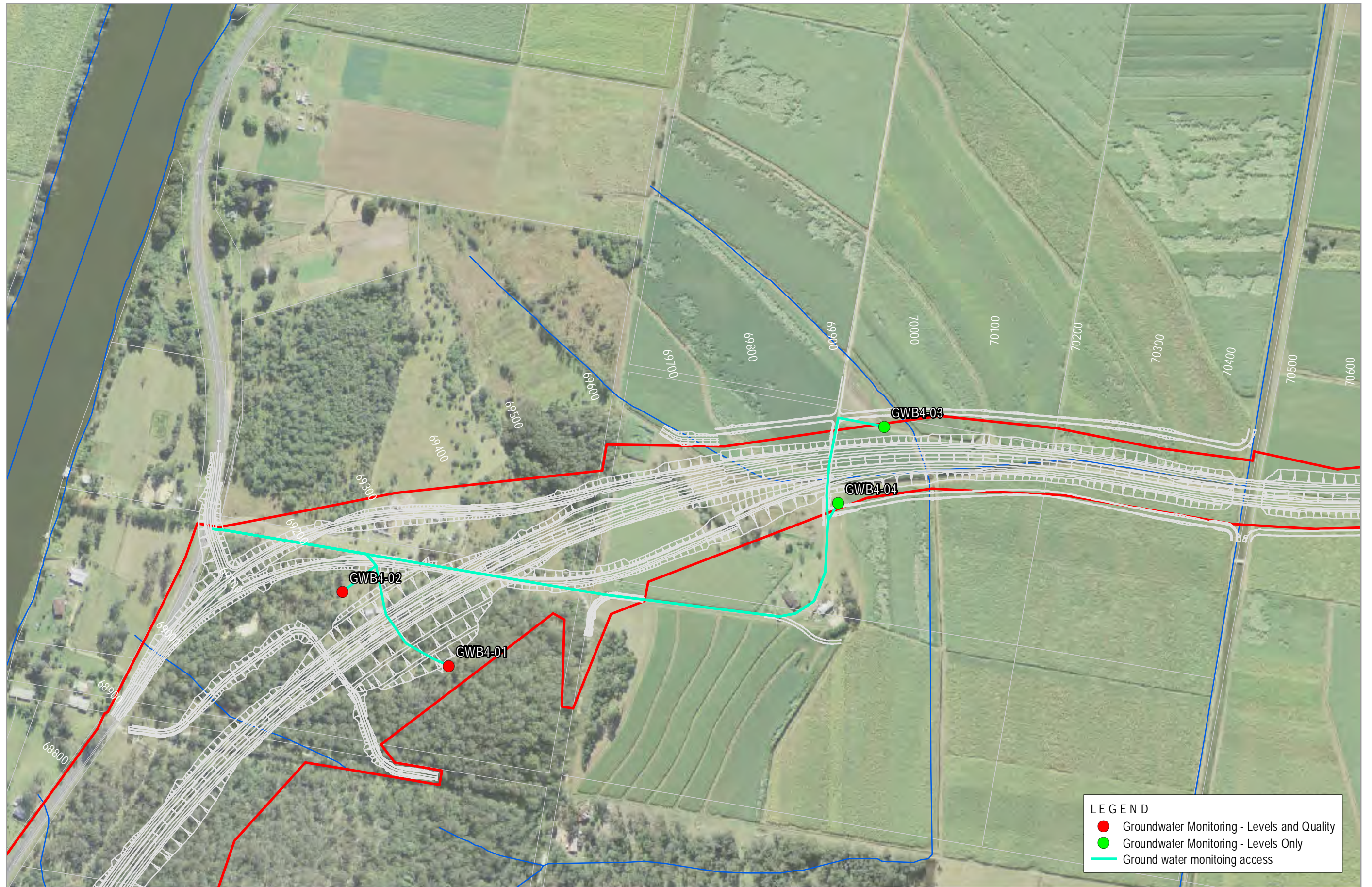


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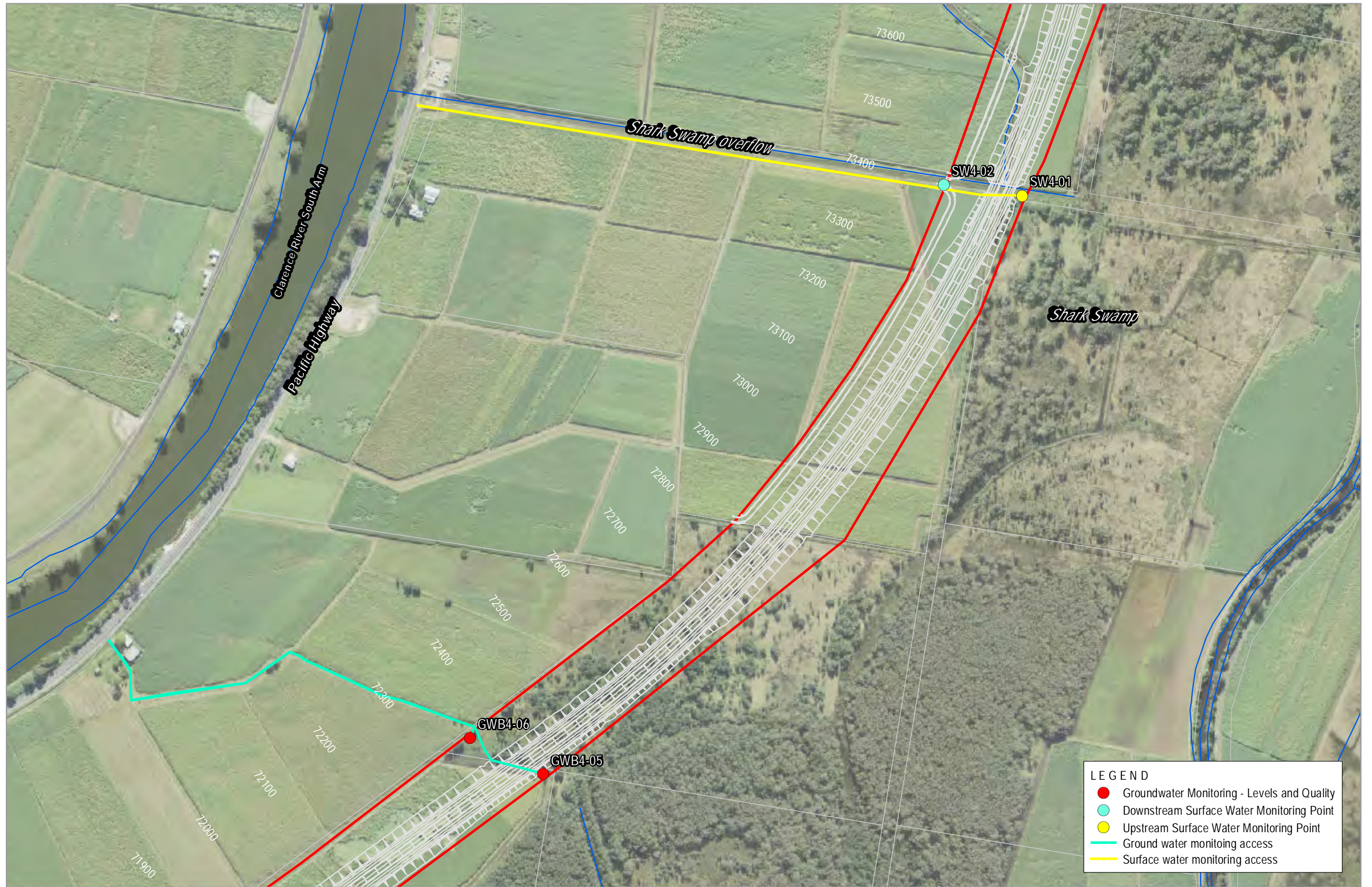
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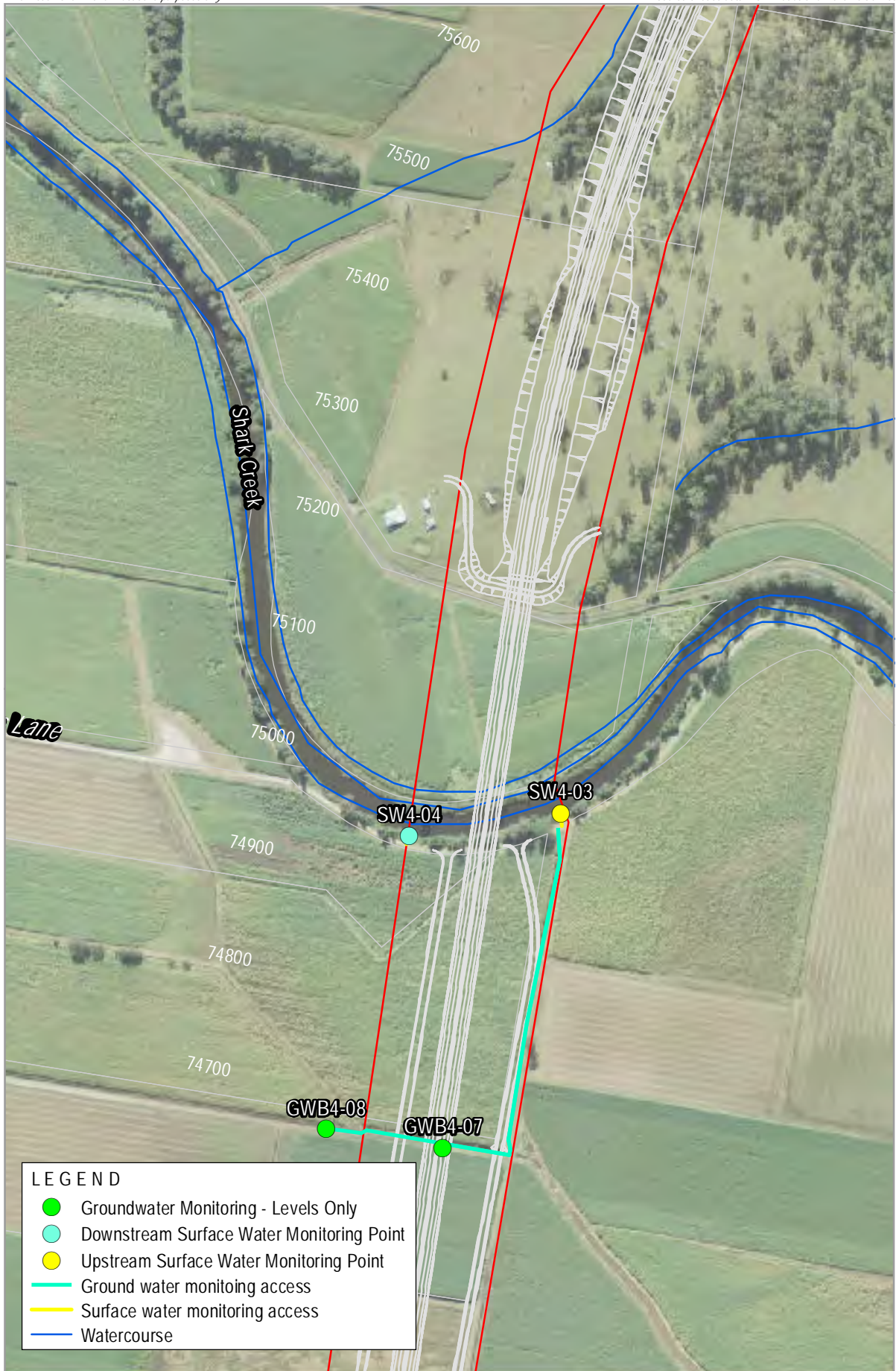
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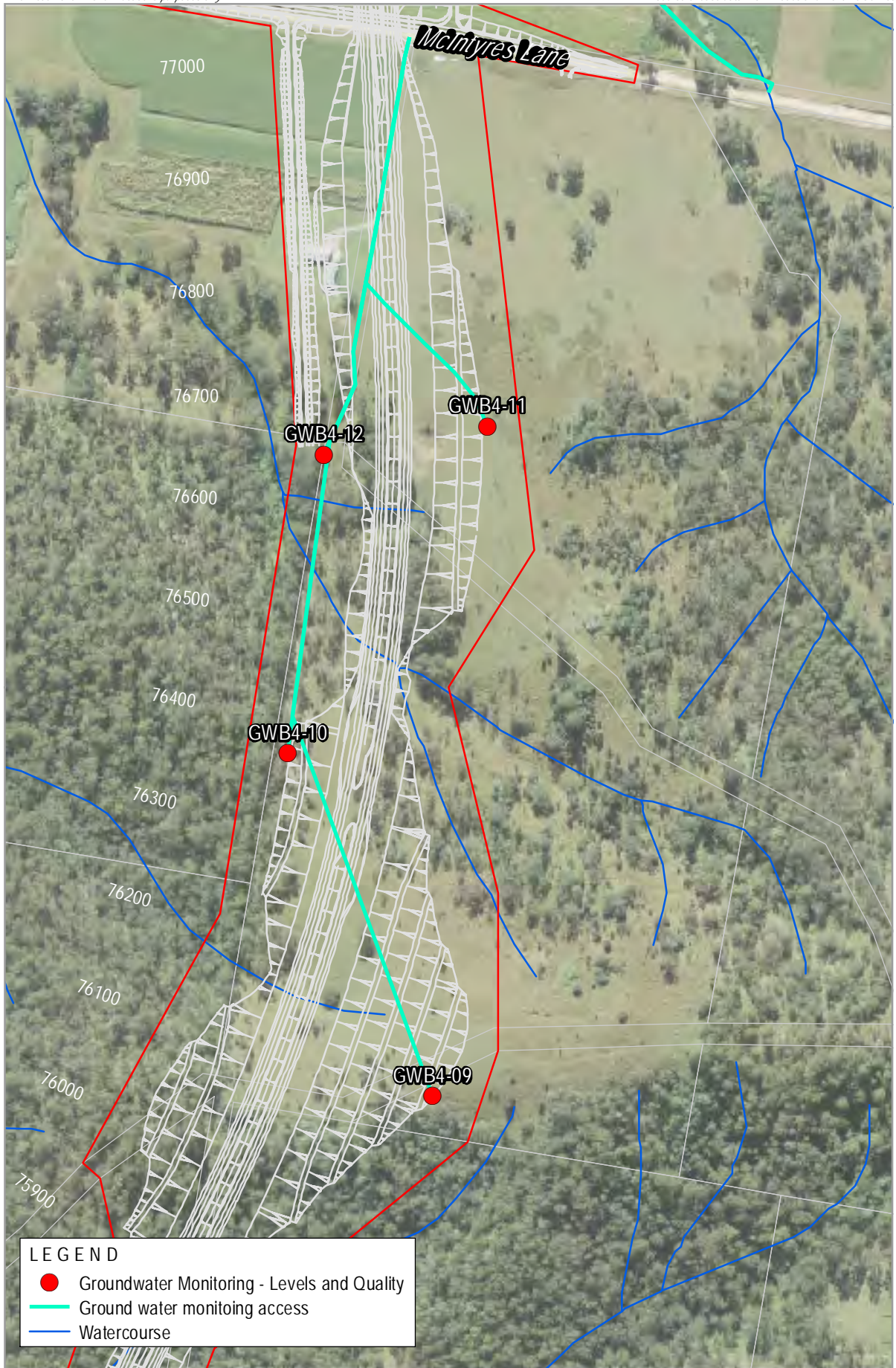






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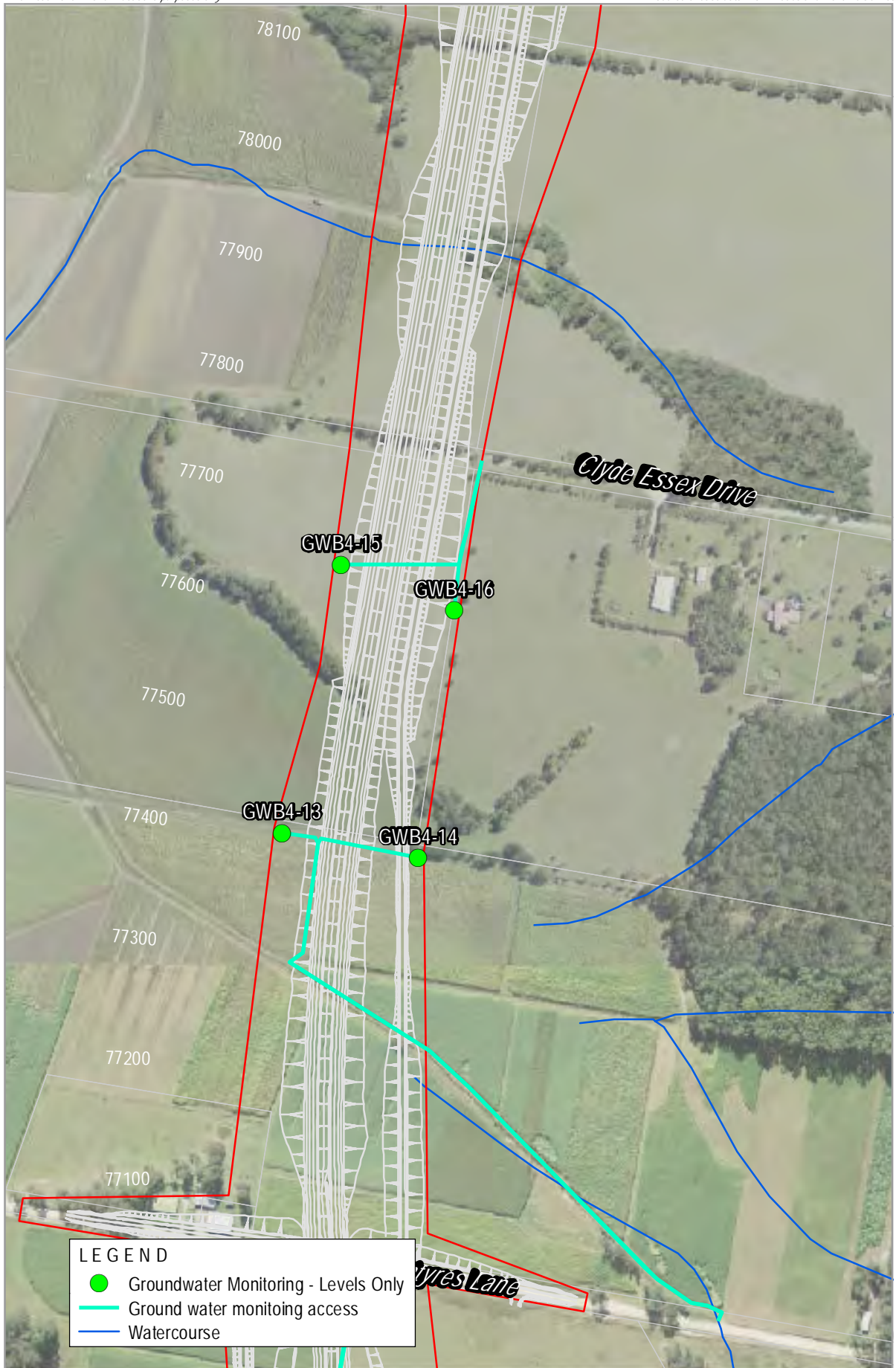


Woolgoolga to Ballina Section 4 - SW and GW Monitoring Locations

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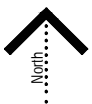
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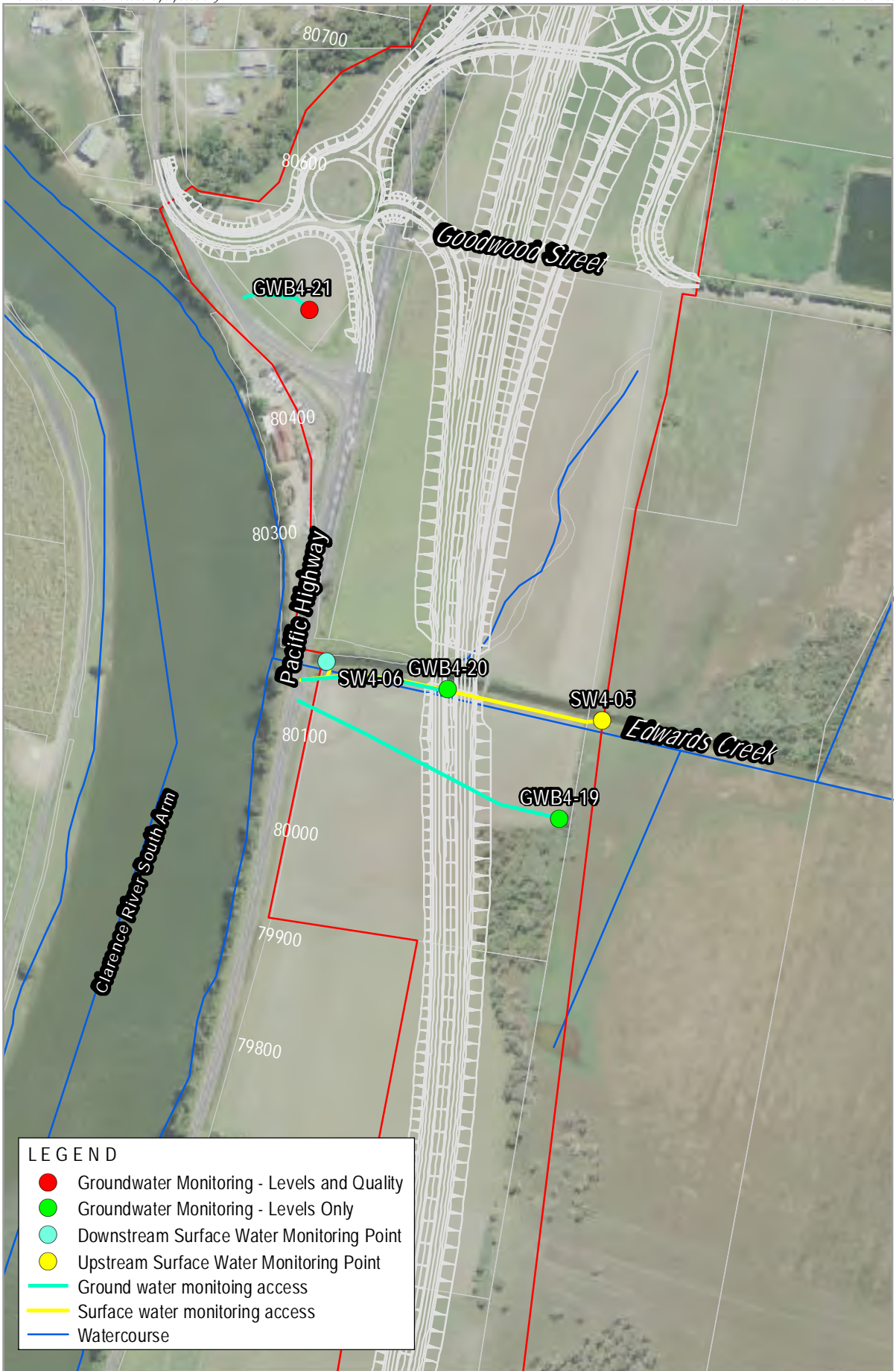


LEGEND

- Groundwater Monitoring - Levels and Quality
- Ground water monitoring access
- Watercourse



Woolgoolga to Ballina Section 4 - SW and GW Monitoring Locations



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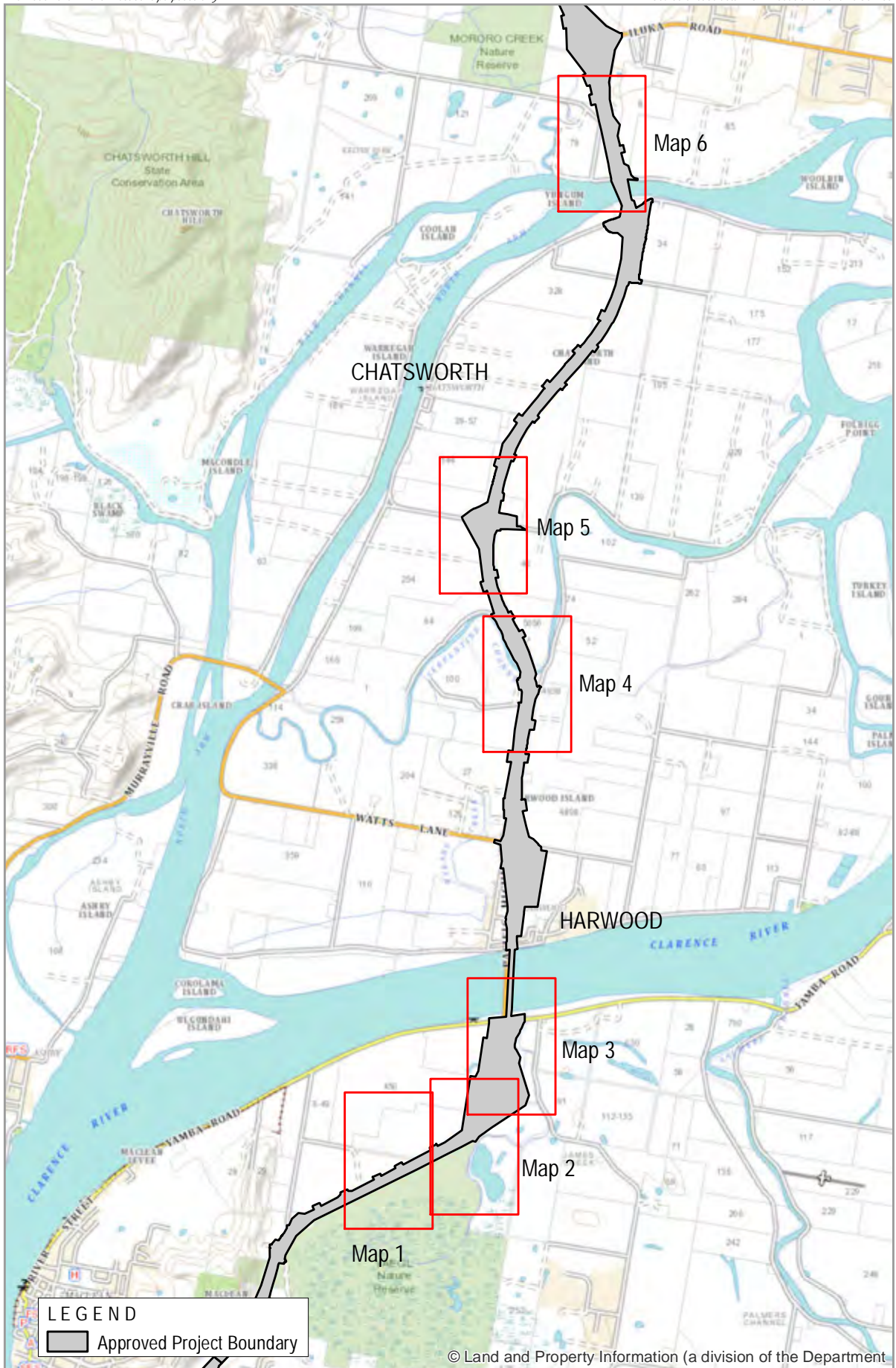


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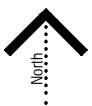
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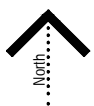
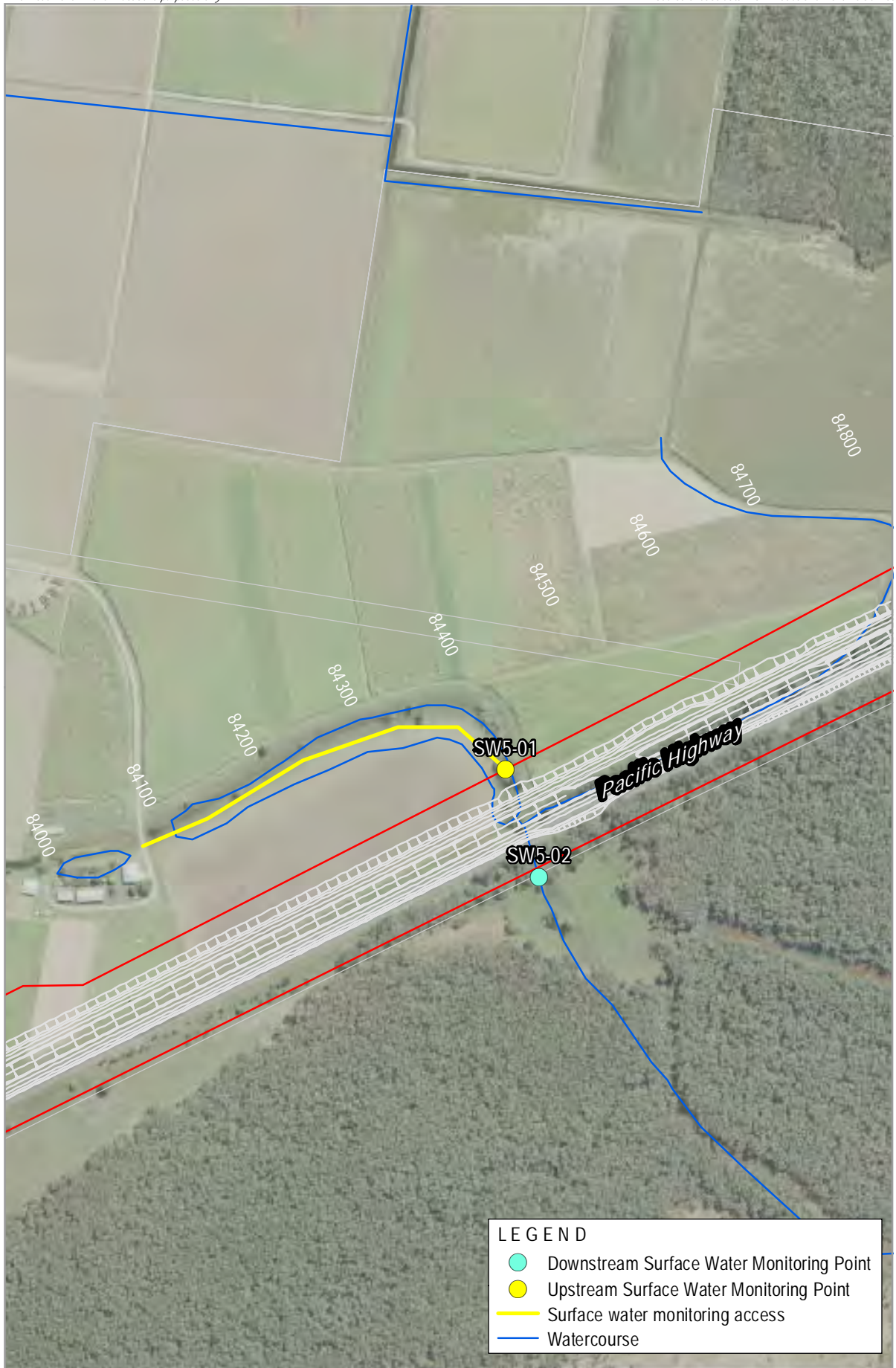


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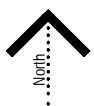
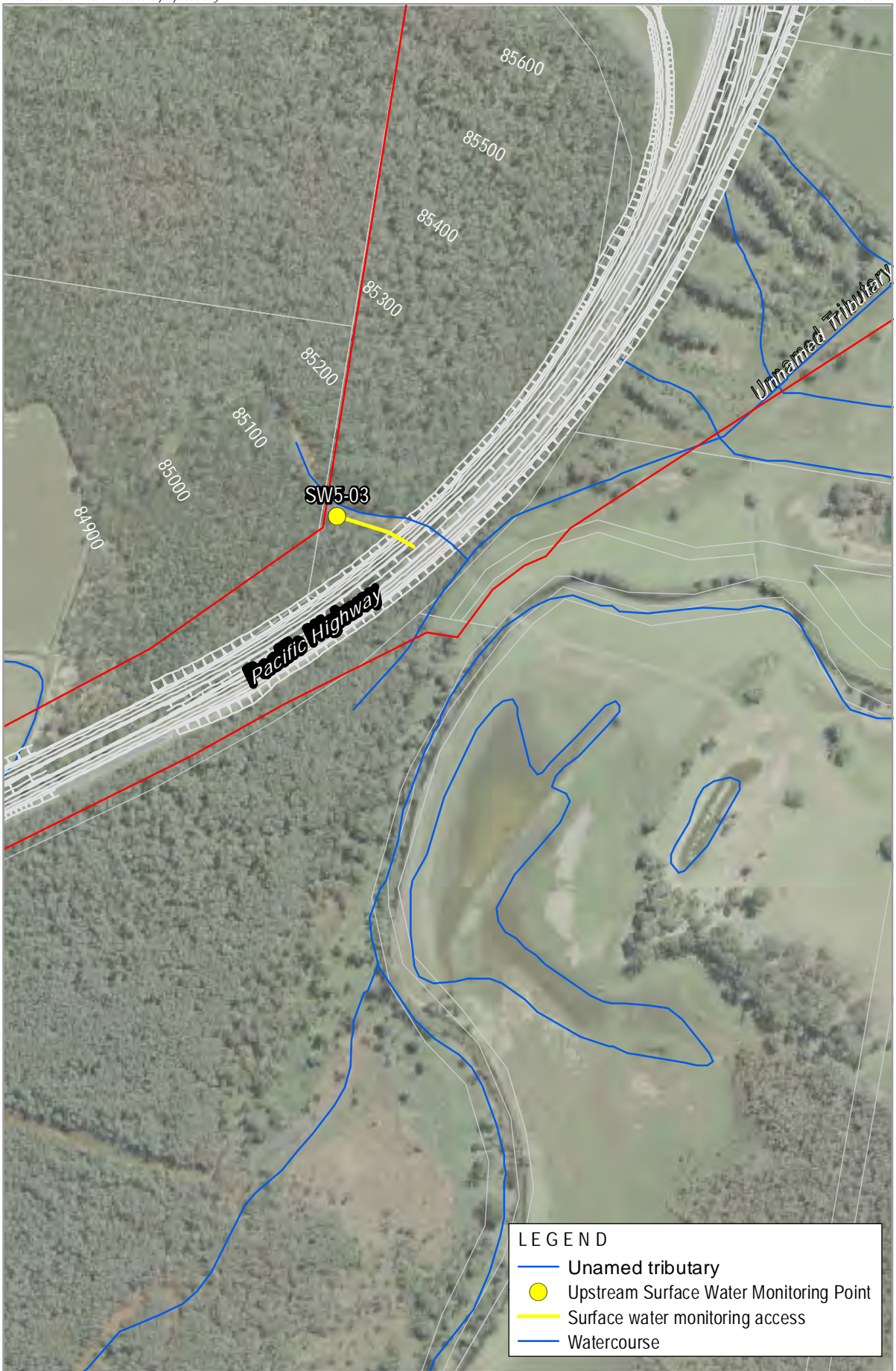
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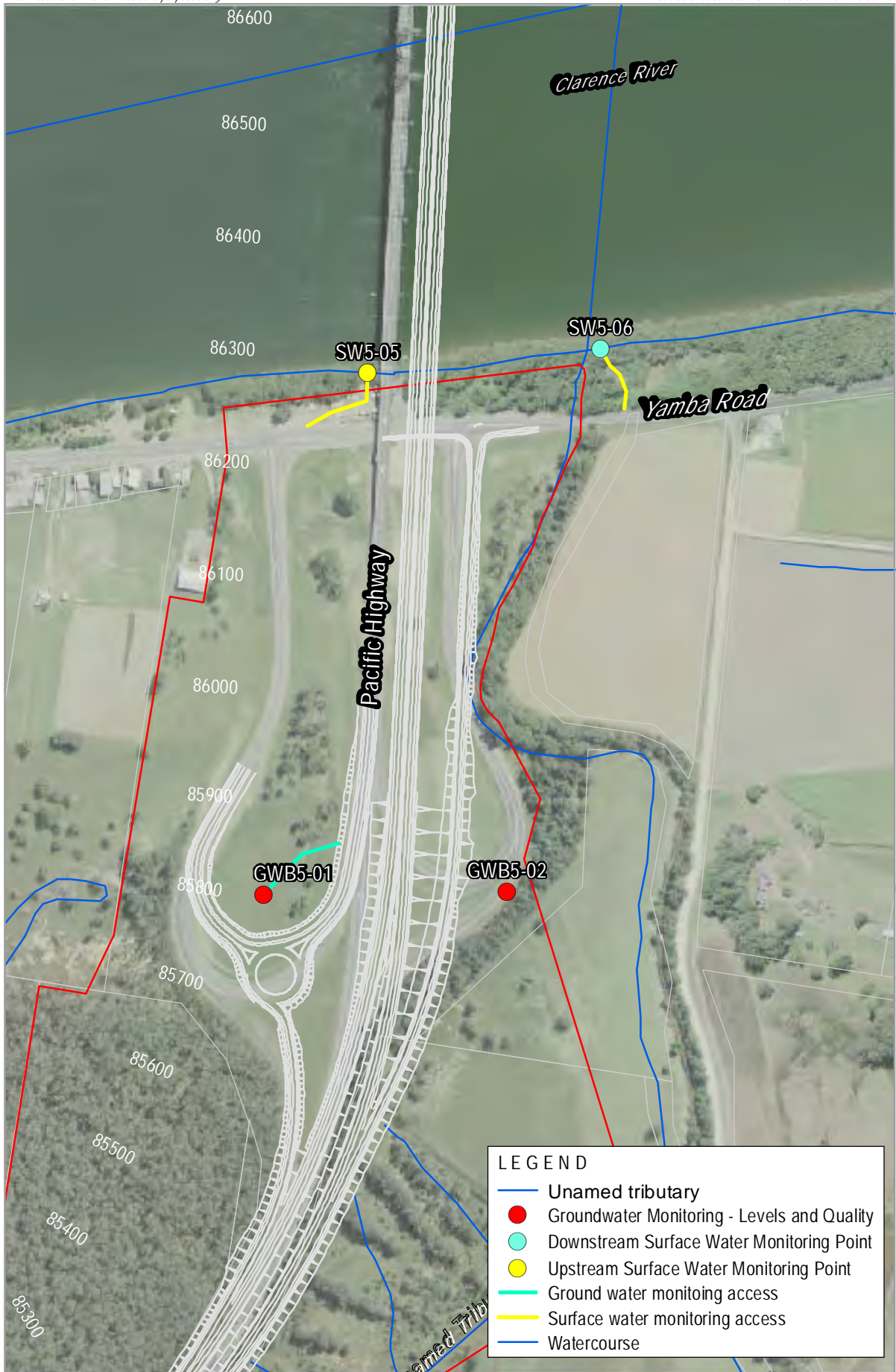


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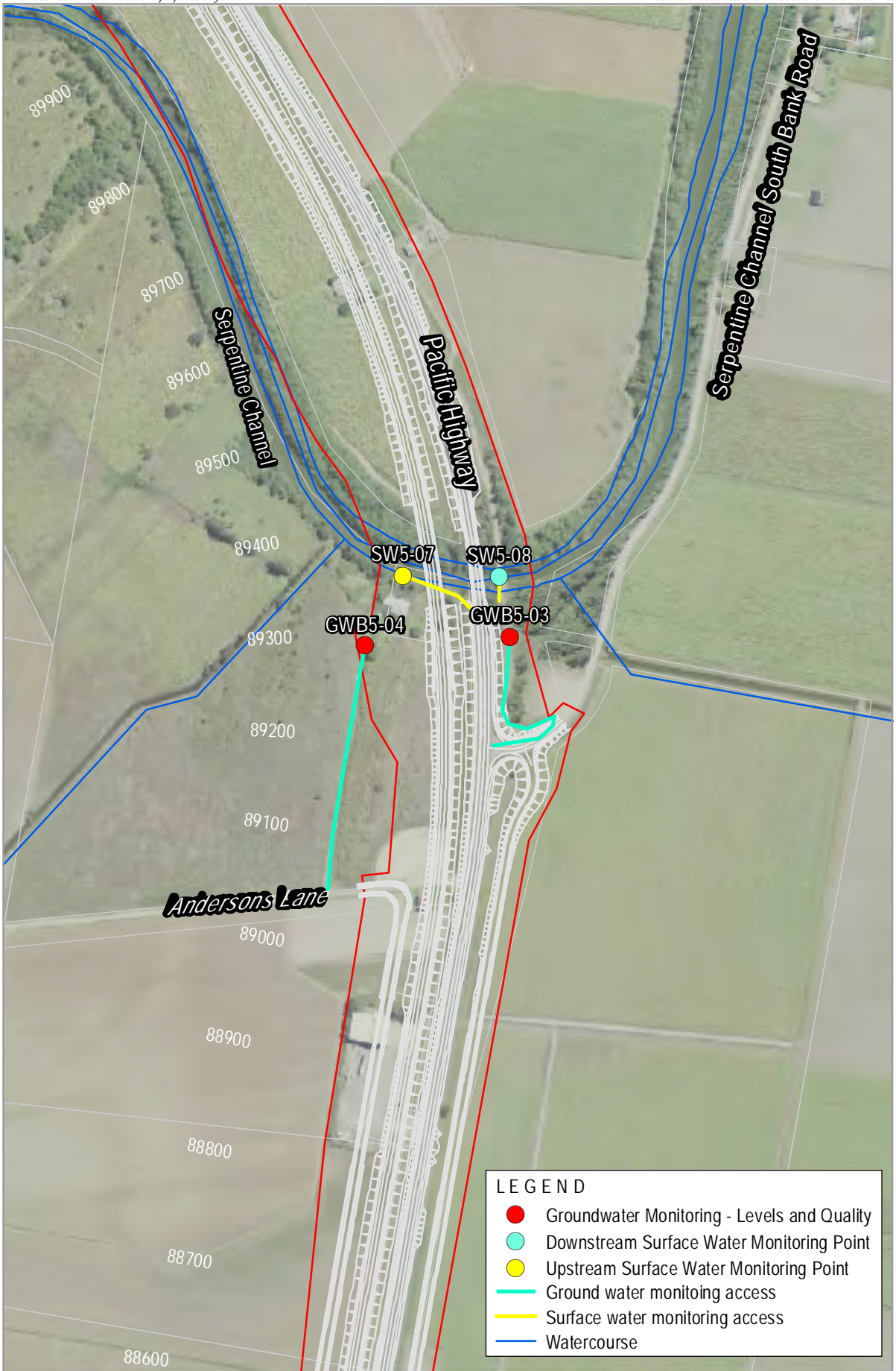
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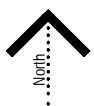
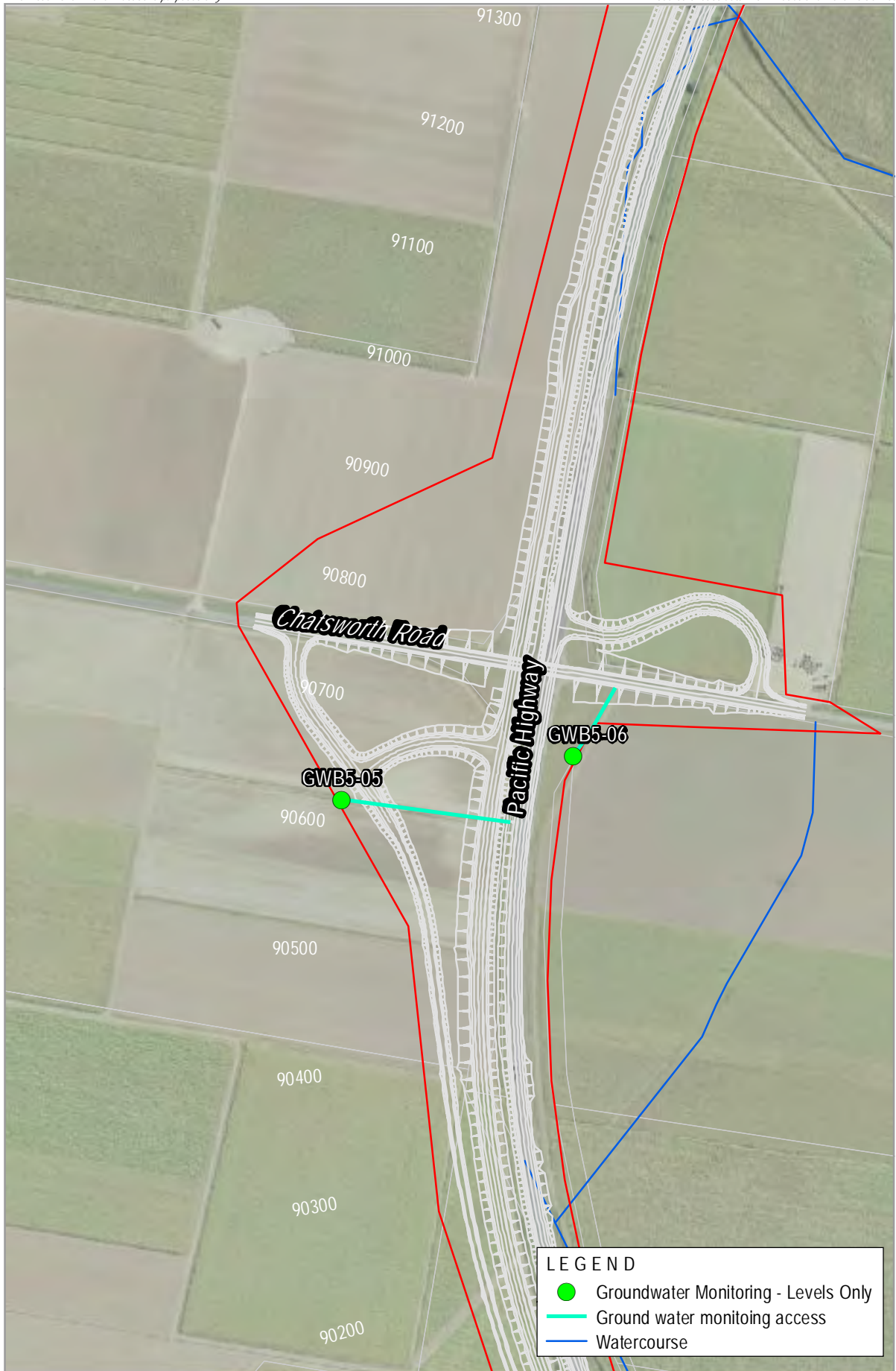
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Woolgoolga to Ballina Section 5 - SW and GW Monitoring Locations



Woolgoolga to Ballina Section 5 - SW and GW Monitoring Locations

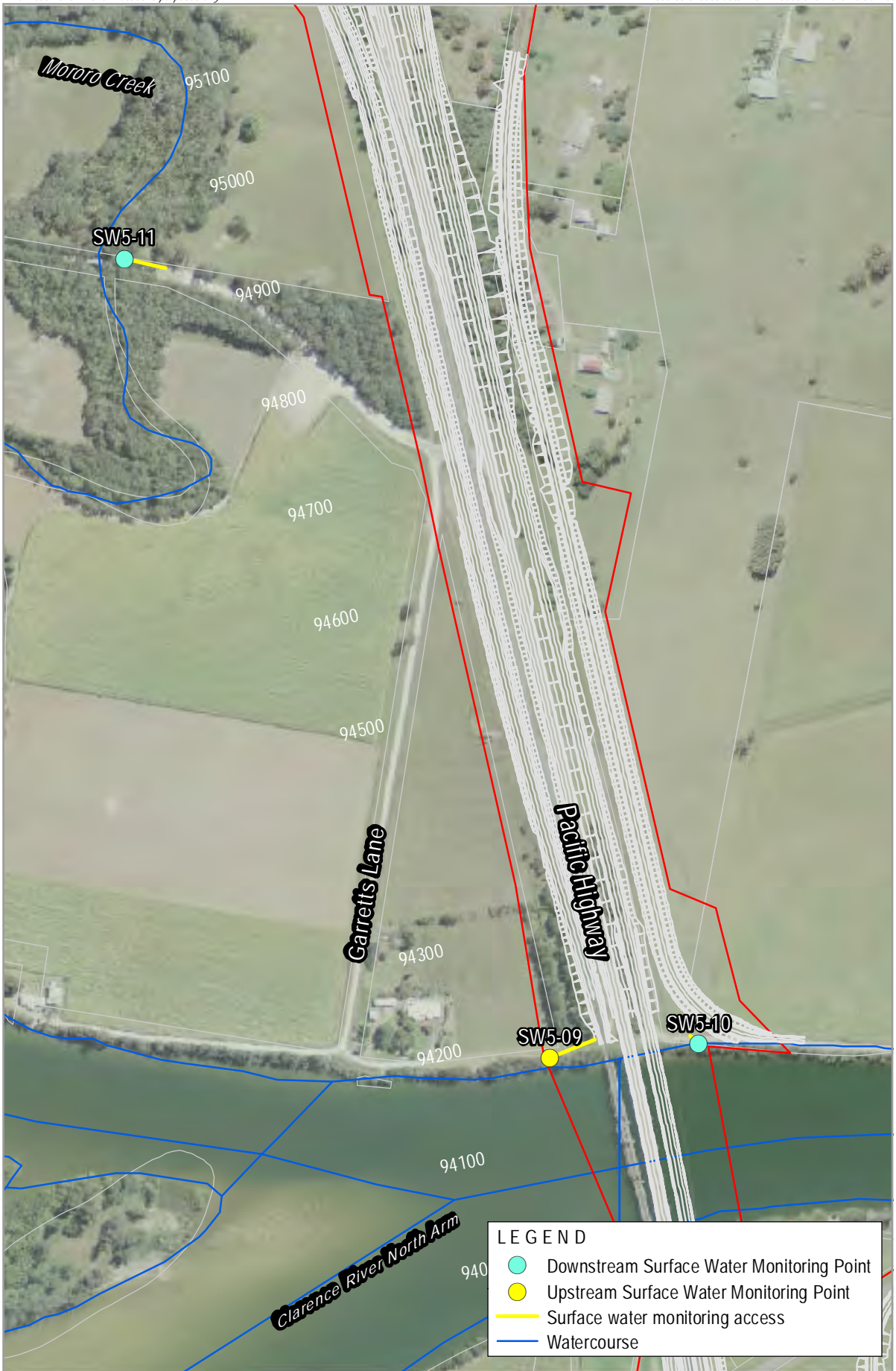


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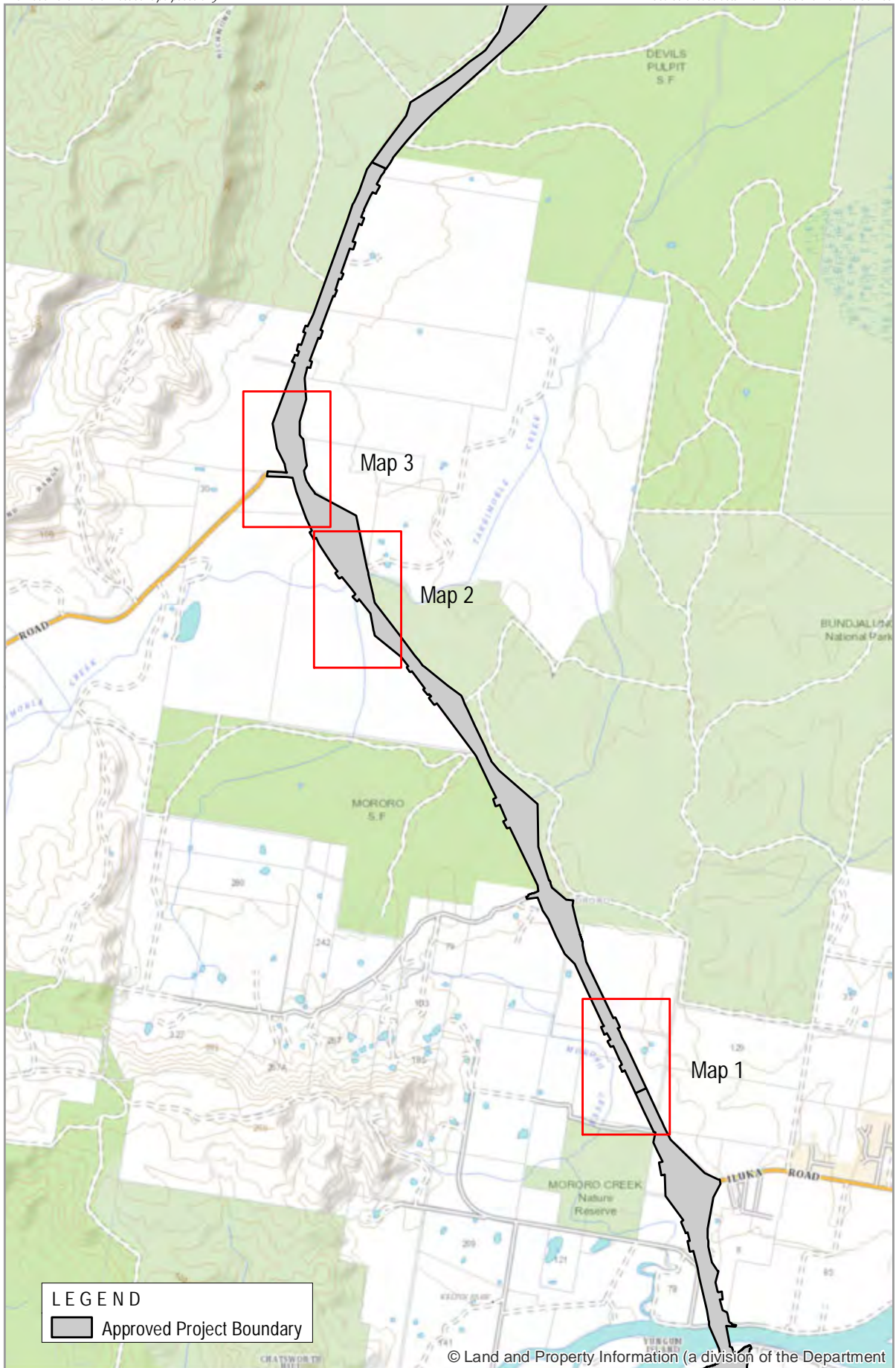
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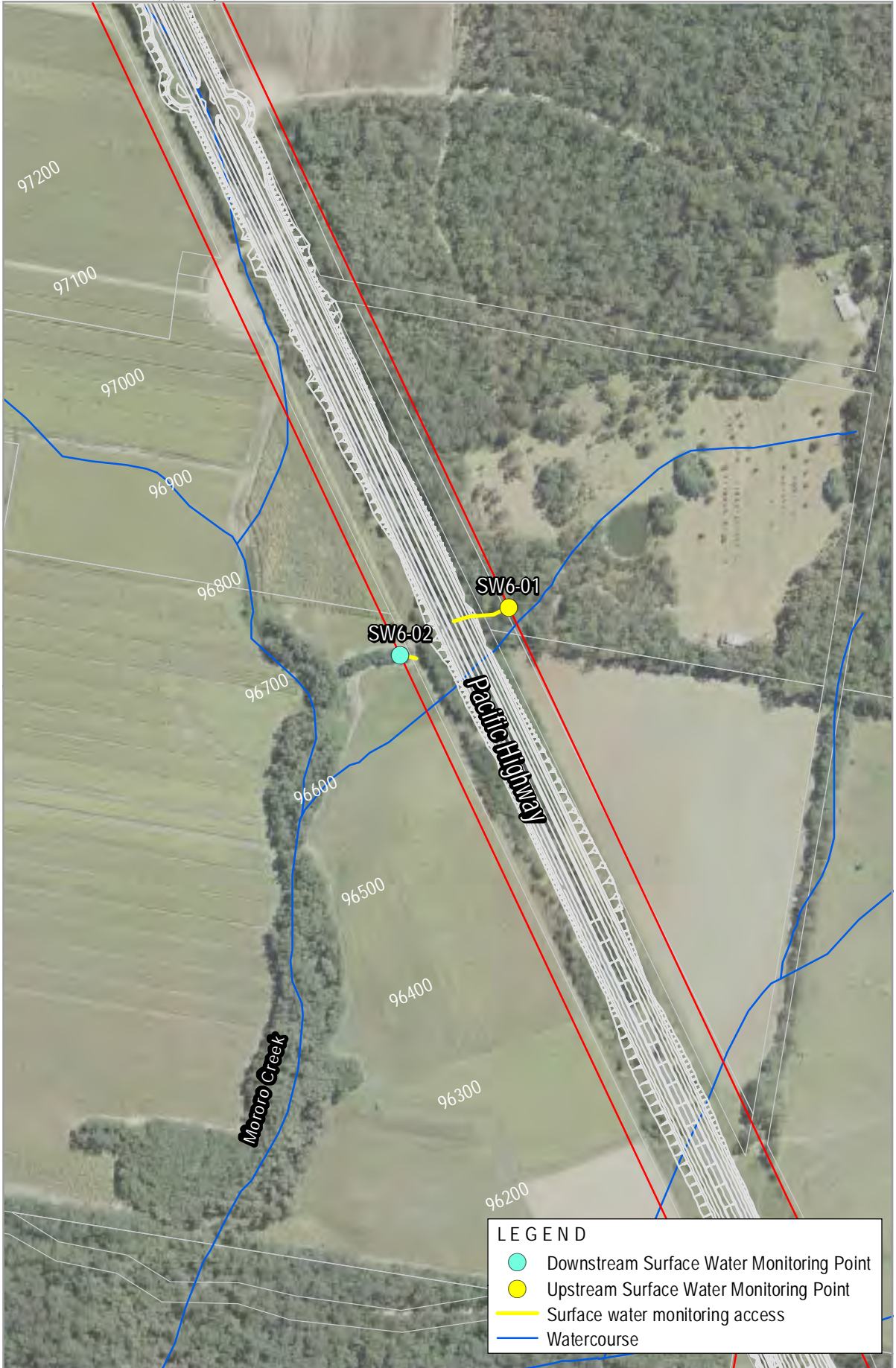
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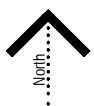
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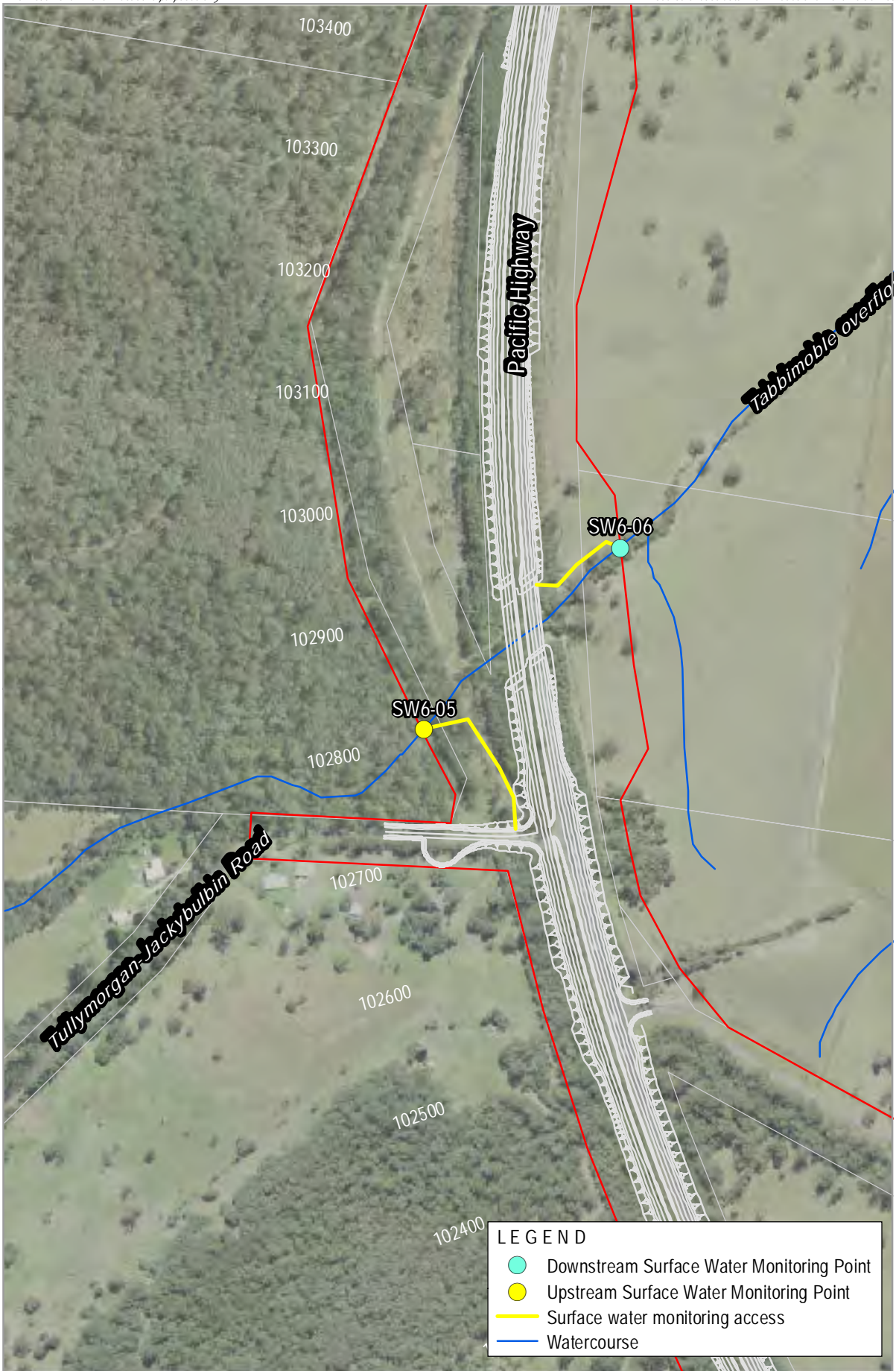


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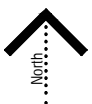
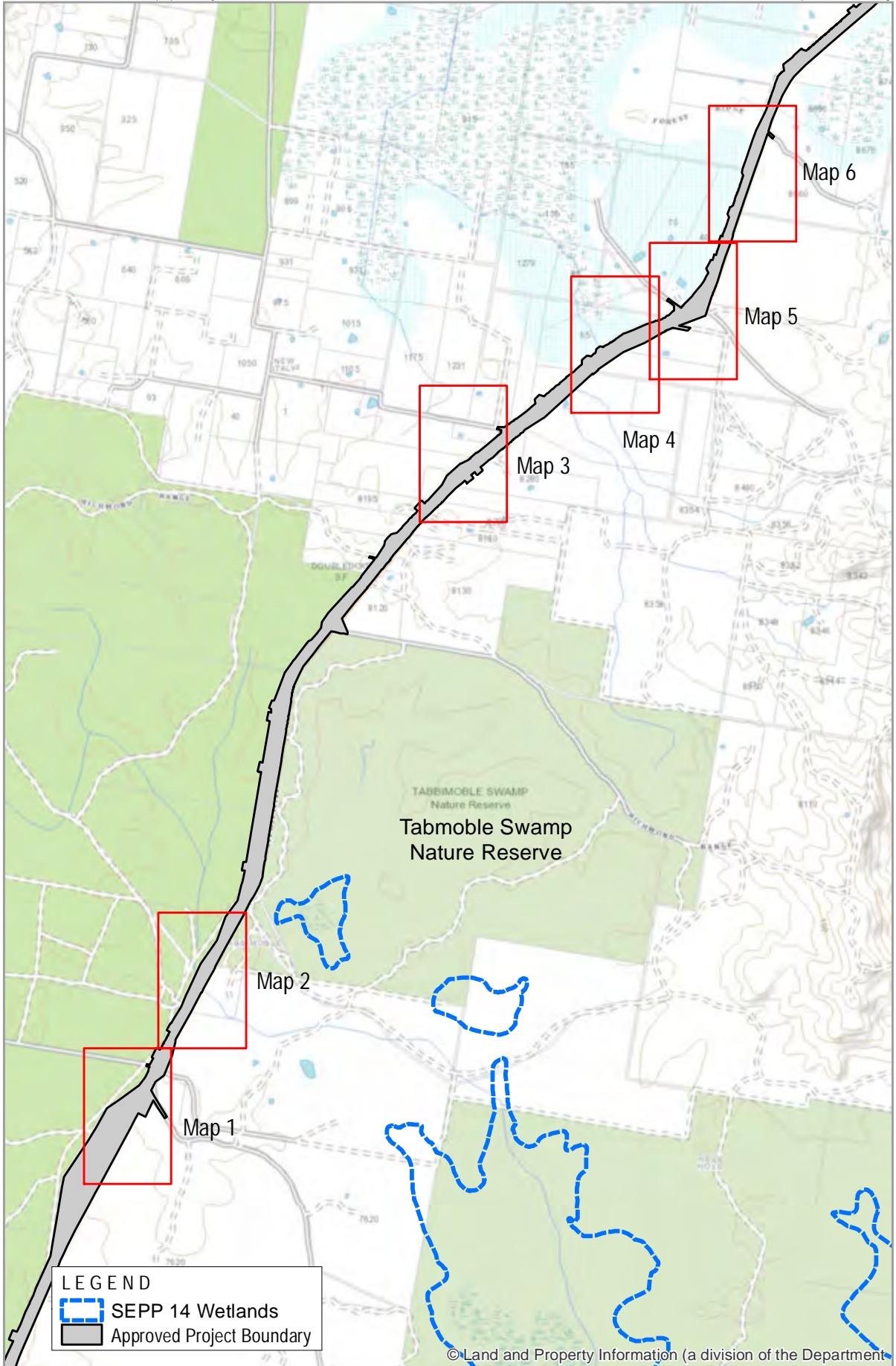


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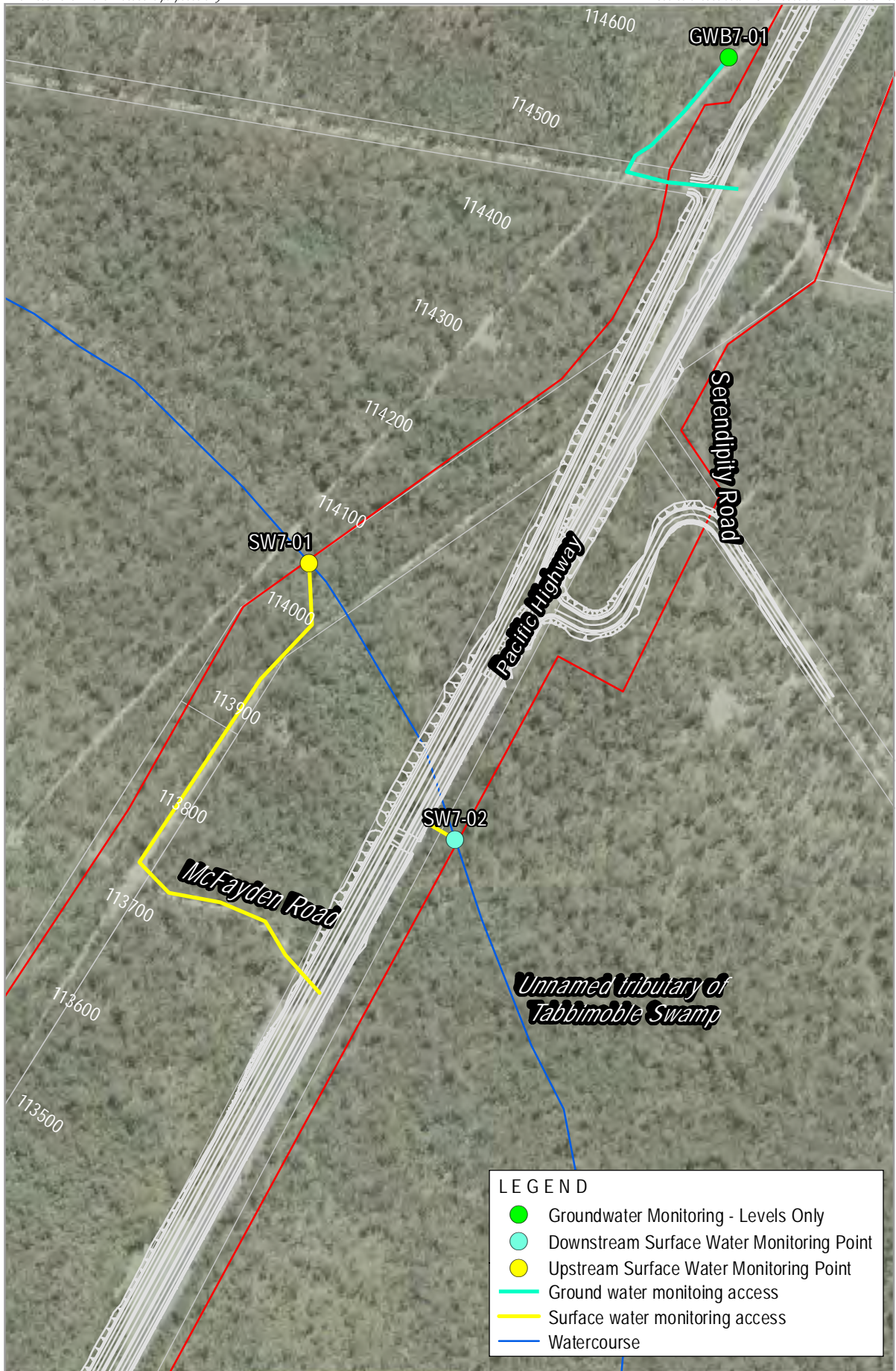


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Woolgoolga to Ballina Section 7 - SW and GW Monitoring Locations



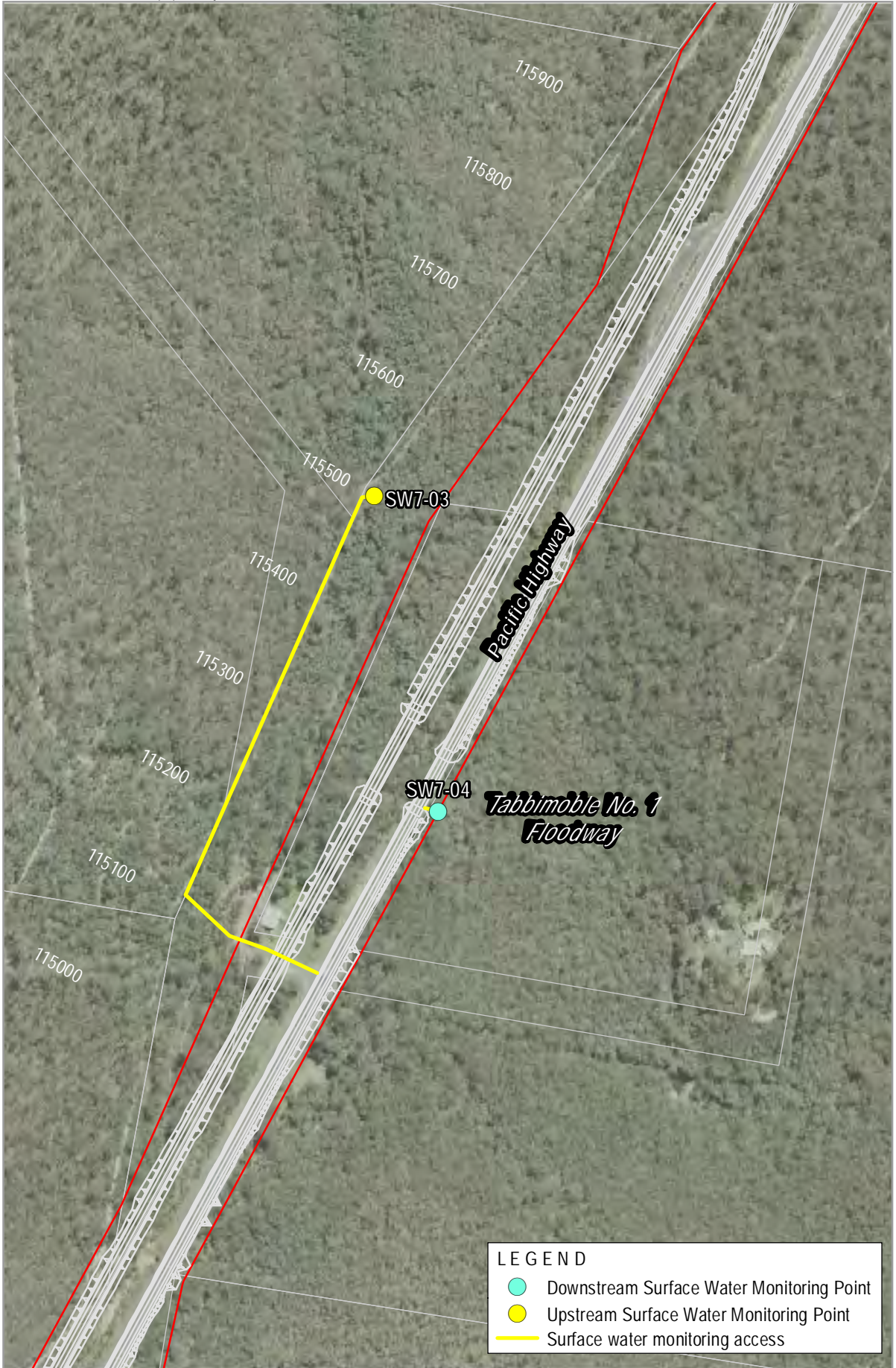
Pacific Highway Upgrade - W2B: Water Quality Monitoring Program Sections 3 to 11
2476-1015



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Woolgoolga to Ballina Section 7 - SW and GW Monitoring Locations

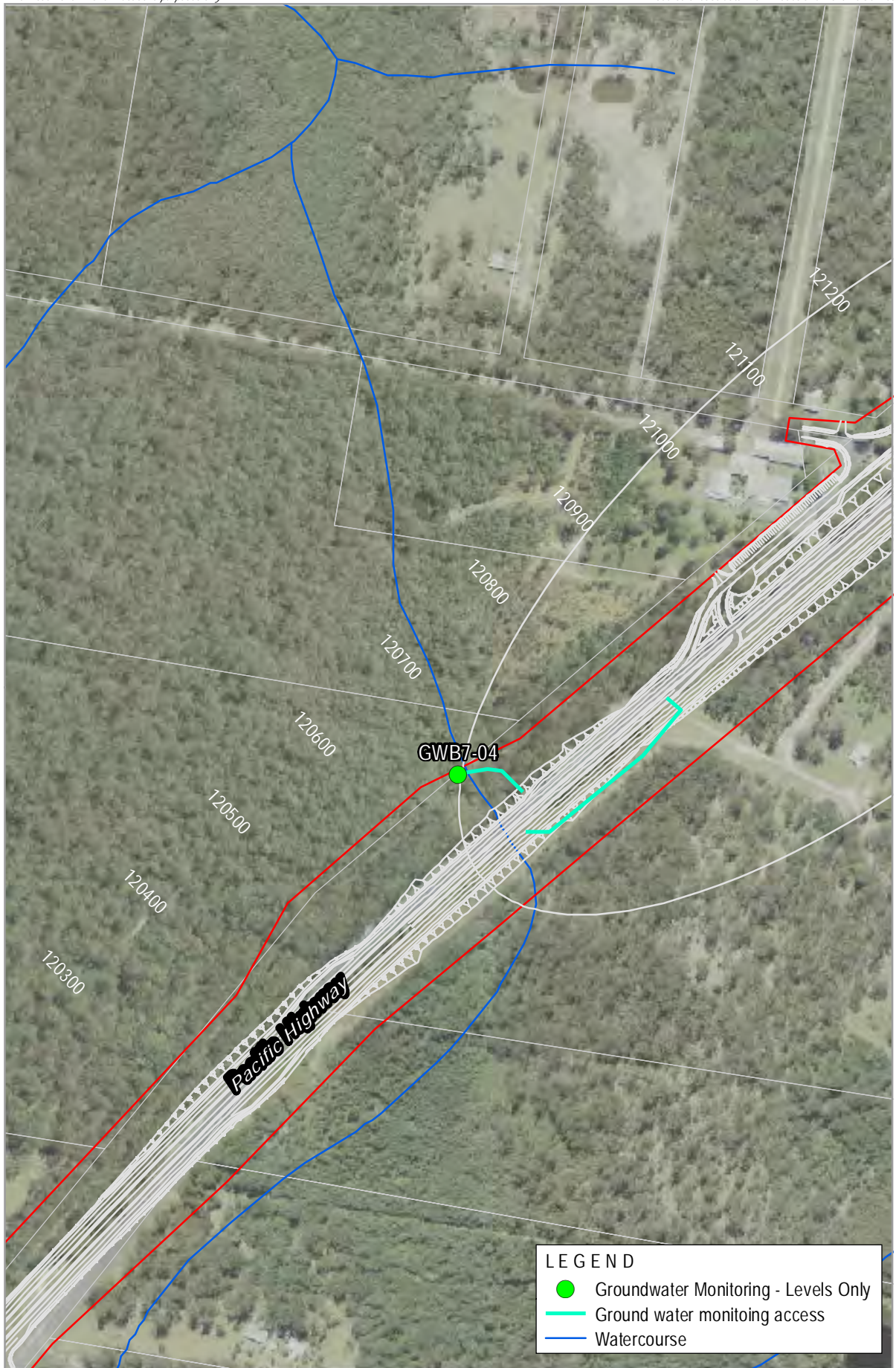


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Woolgoolga to Ballina Section 7 - SW and GW Monitoring Locations

Information shown is for illustrative purposes only



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Woolgoolga to Ballina Section 7 - SW and GW Monitoring Locations

Information shown is for illustrative purposes only



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Woolgoolga to Ballina Section 7 - SW and GW Monitoring Locations

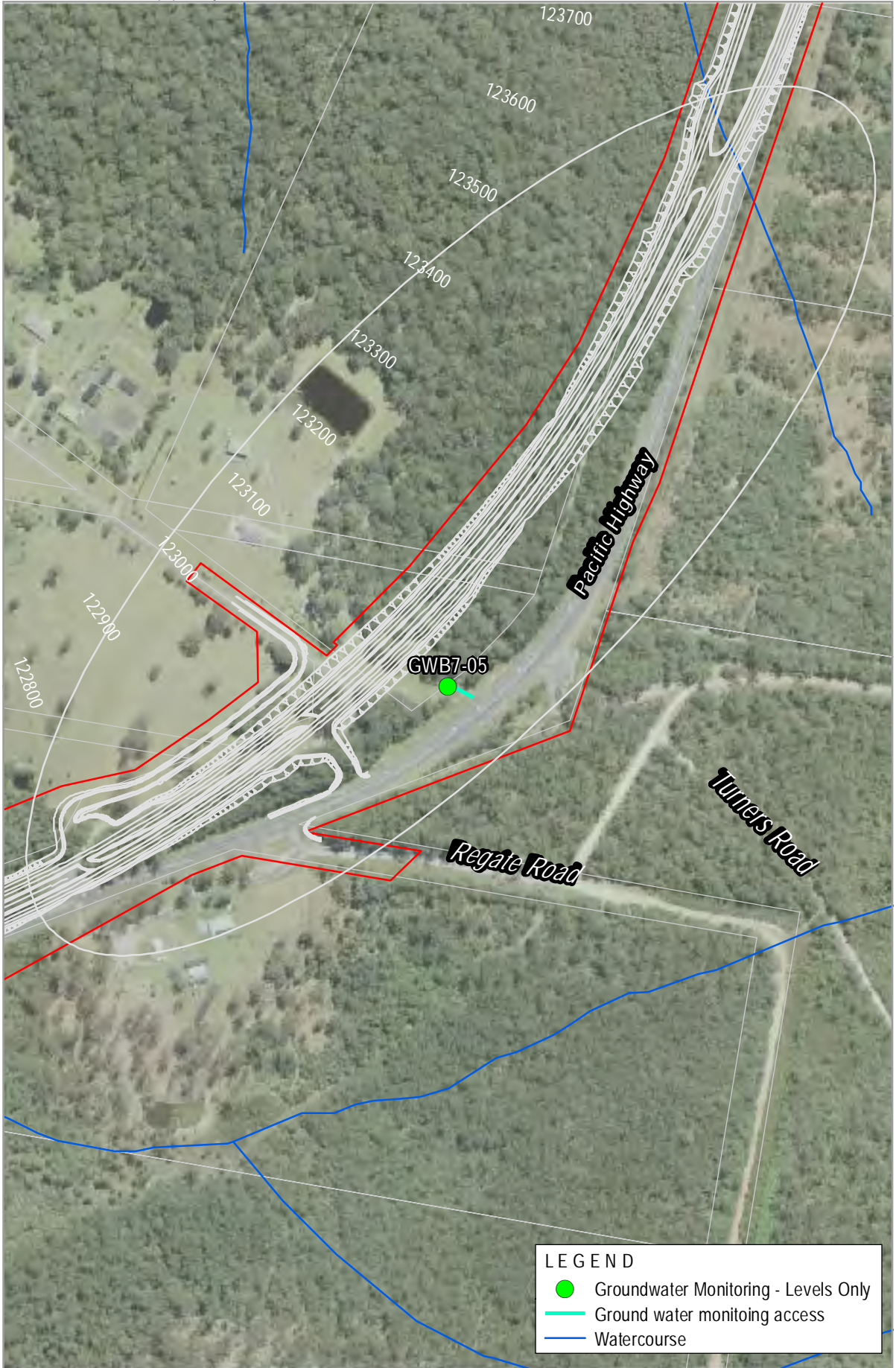
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Map 4 of 6

2476-1015

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Source of base data: NSW Roads and Maritime Service



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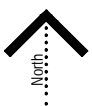
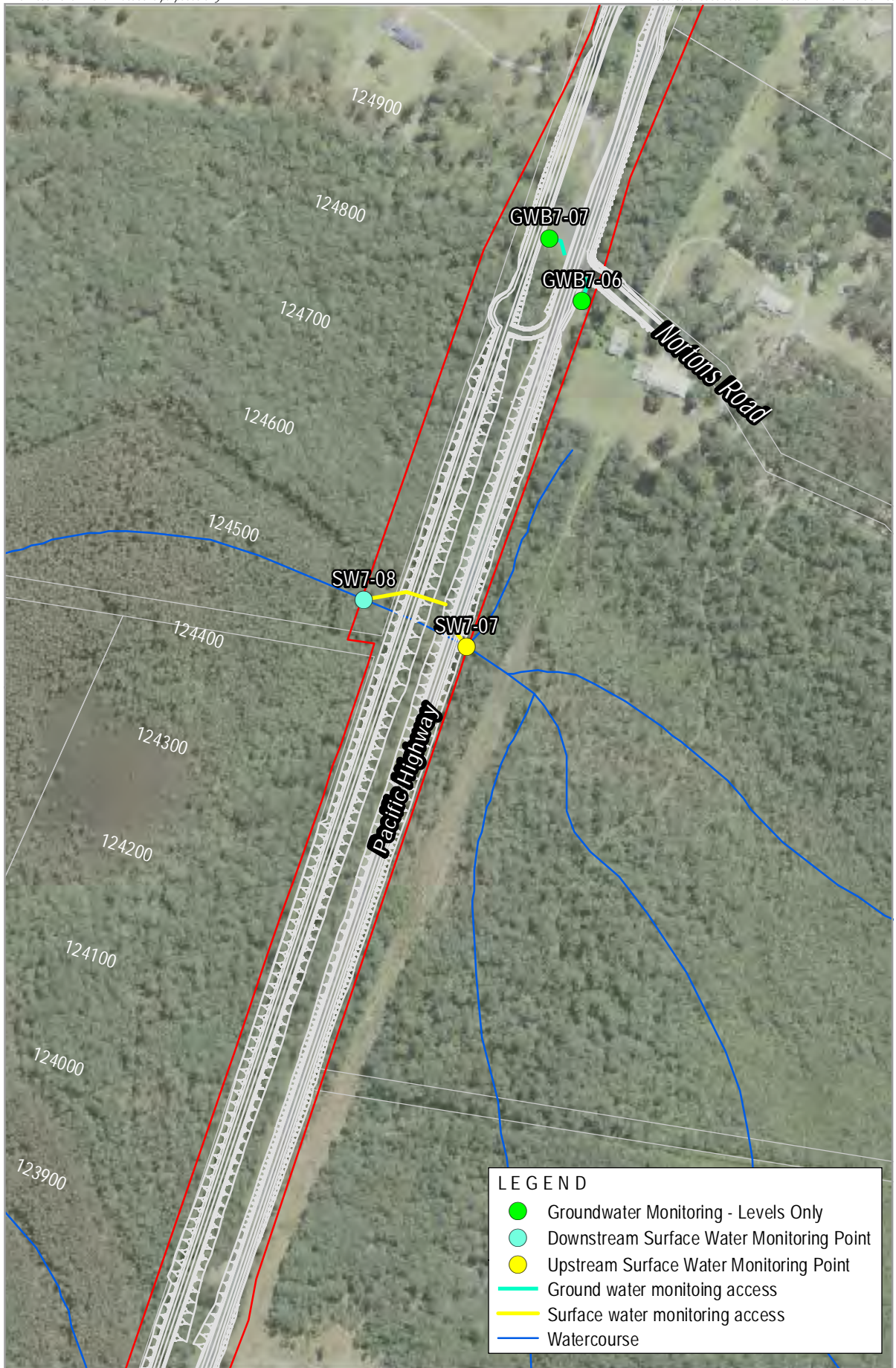


Woolgoolga to Ballina Section 7 - SW and GW Monitoring Locations

Pacific Highway Upgrade - W2B: Water Quality Monitoring Program Sections 3 to 11

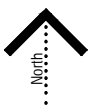
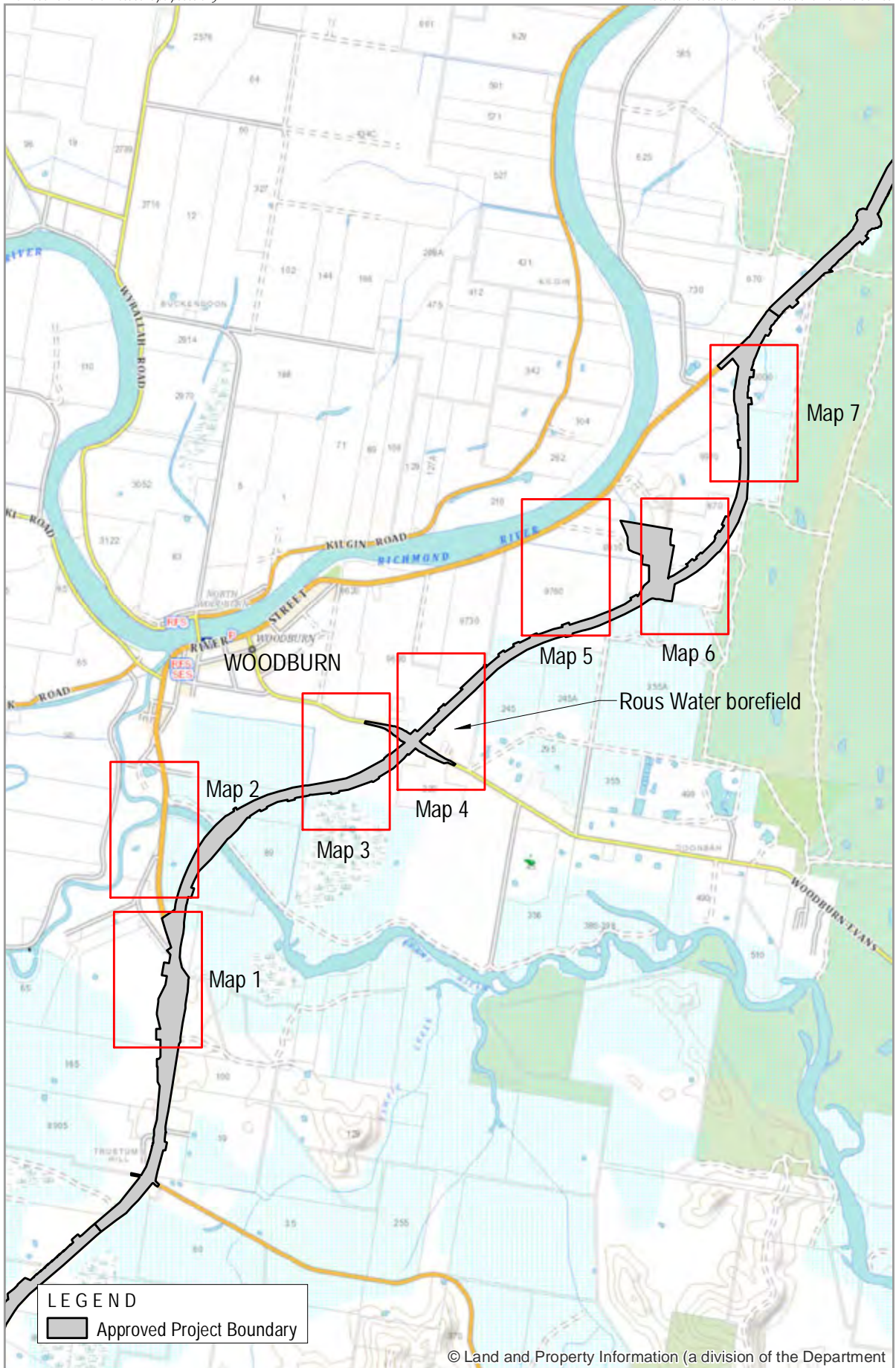
Map 5 of 6

2476-1015



Woolgoolga to Ballina Section 7 - SW and GW Monitoring Locations

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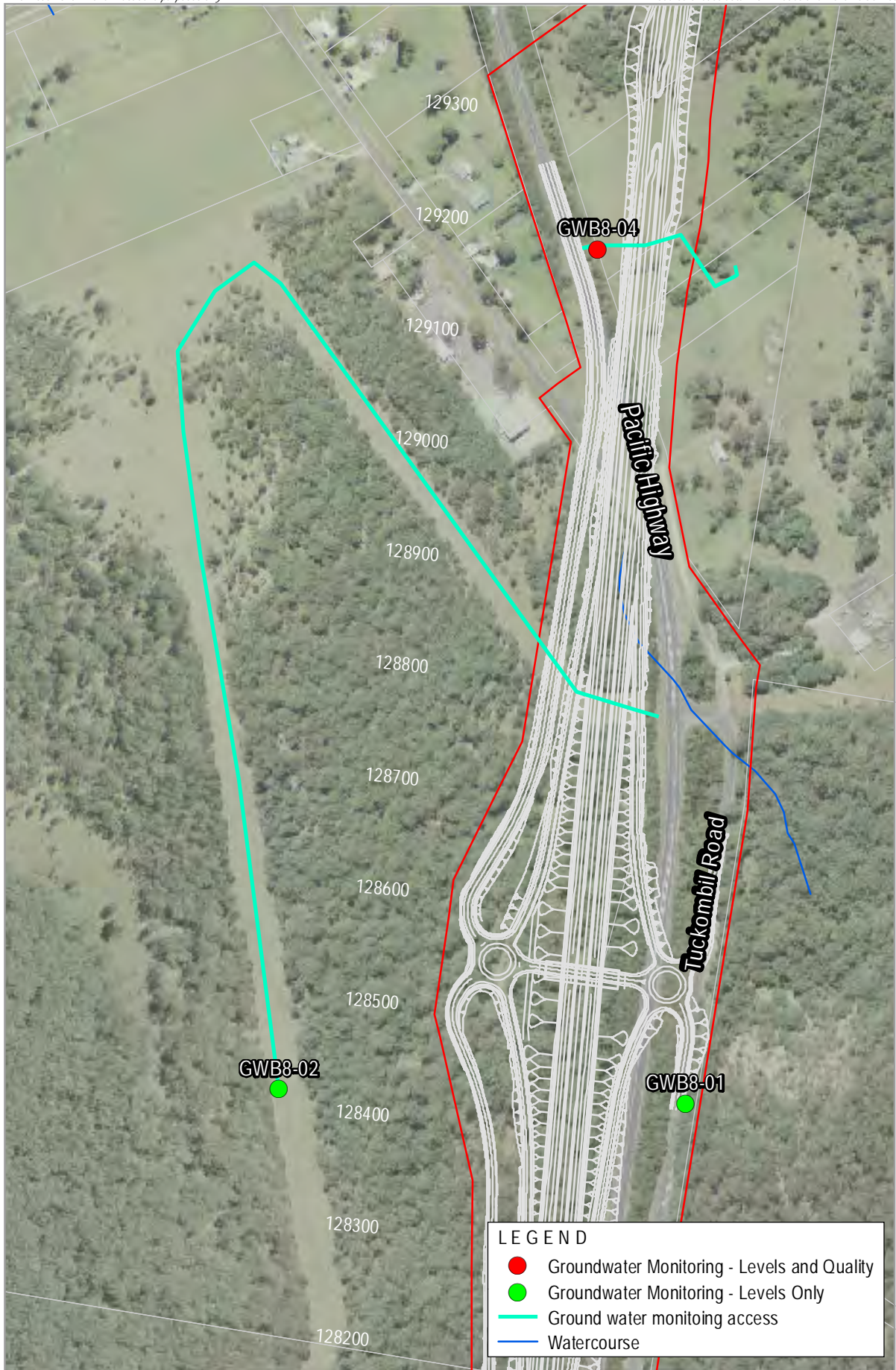
Woolgoolga to Ballina Section 8 - SW and GW Monitoring Locations



Pacific Highway Upgrade - W2B: Water Quality Monitoring Program Sections 3 to 11
2476-1015

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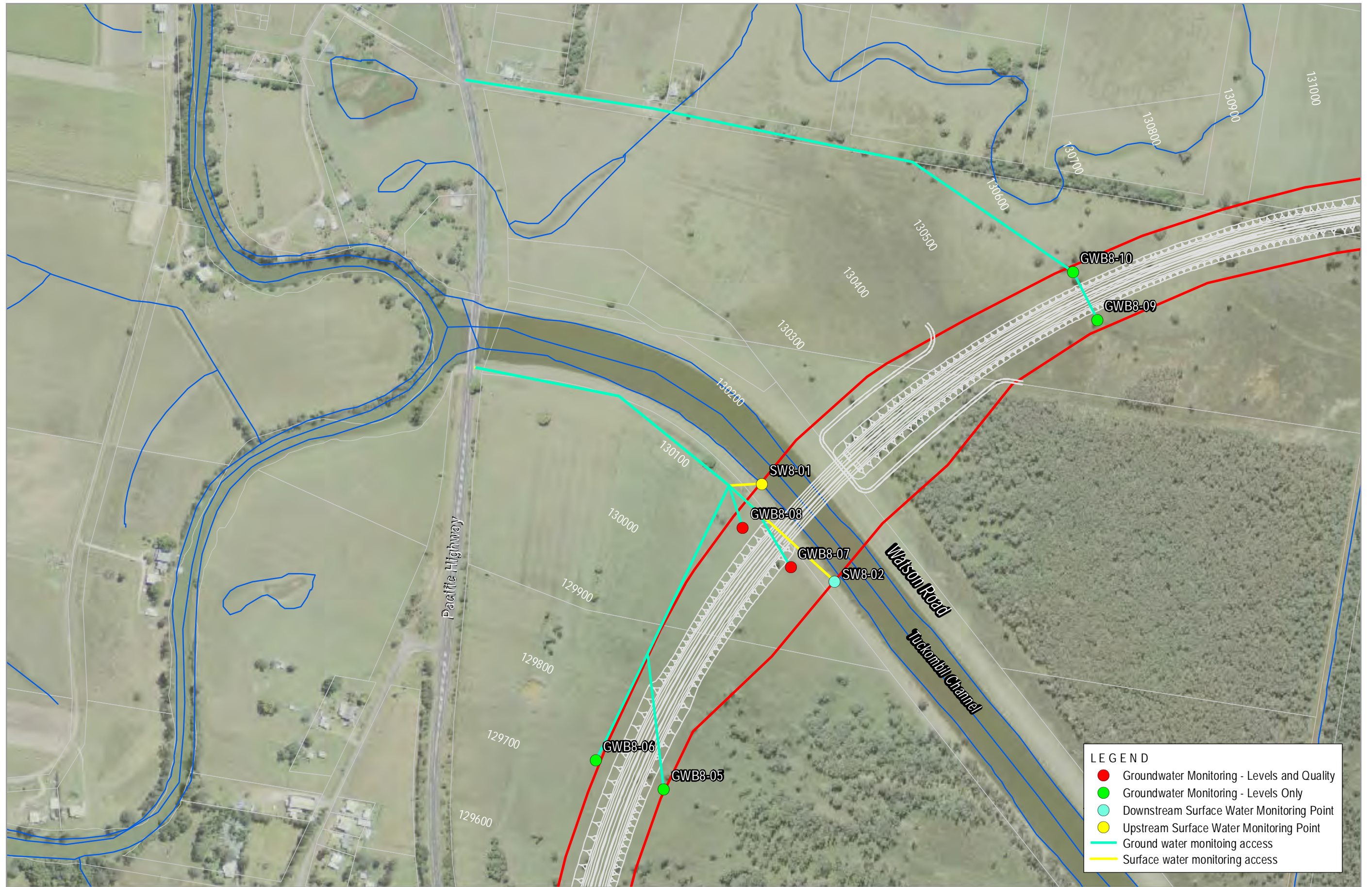
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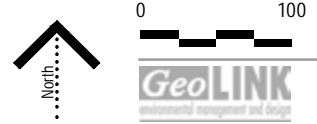


Woolgoolga to Ballina Section 8 - SW and GW Monitoring Locations



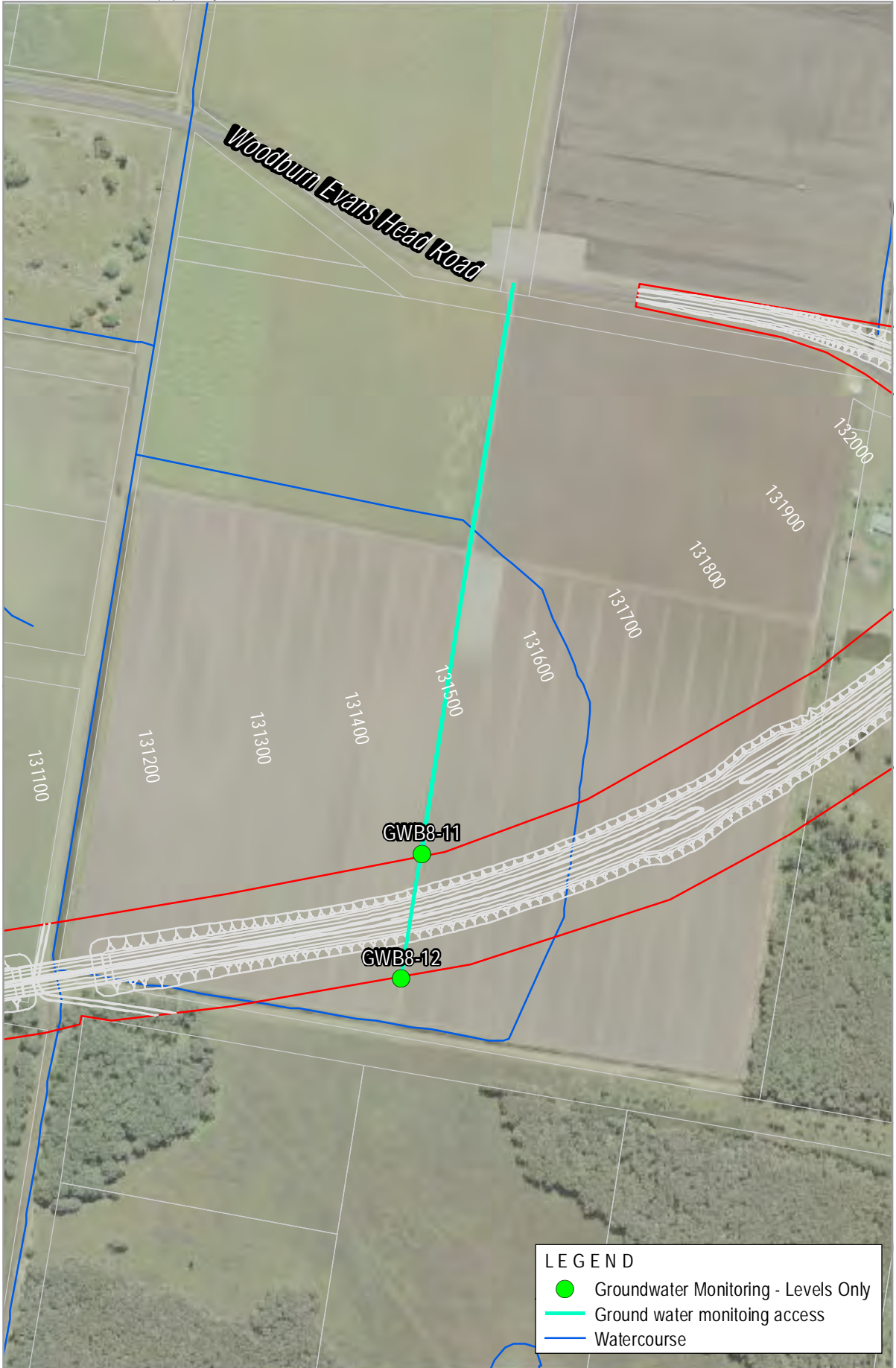
LEGEND

- Groundwater Monitoring - Levels and Quality
- Groundwater Monitoring - Levels Only
- Downstream Surface Water Monitoring Point
- Upstream Surface Water Monitoring Point
- Ground water monitoring access
- Surface water monitoring access



Woolgoolga to Ballina Section 8 - SW and GW Monitoring Locations

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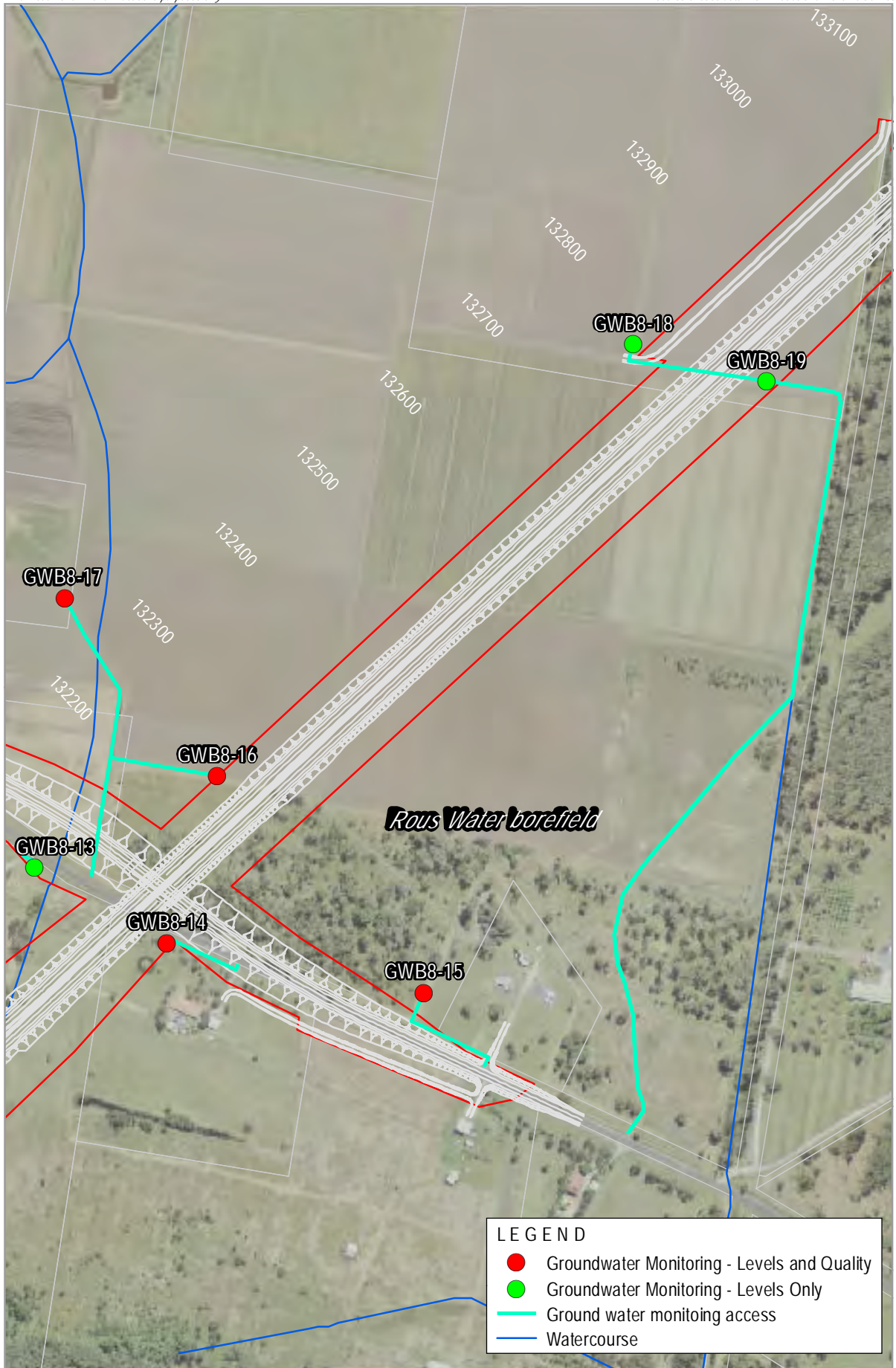


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Woolgoolga to Ballina Section 8 - SW and GW Monitoring Locations

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Woolgoolga to Ballina Section 8 - SW and GW Monitoring Locations

Pacific Highway Upgrade - W2B: Water Quality Monitoring Program Sections 3 to 11

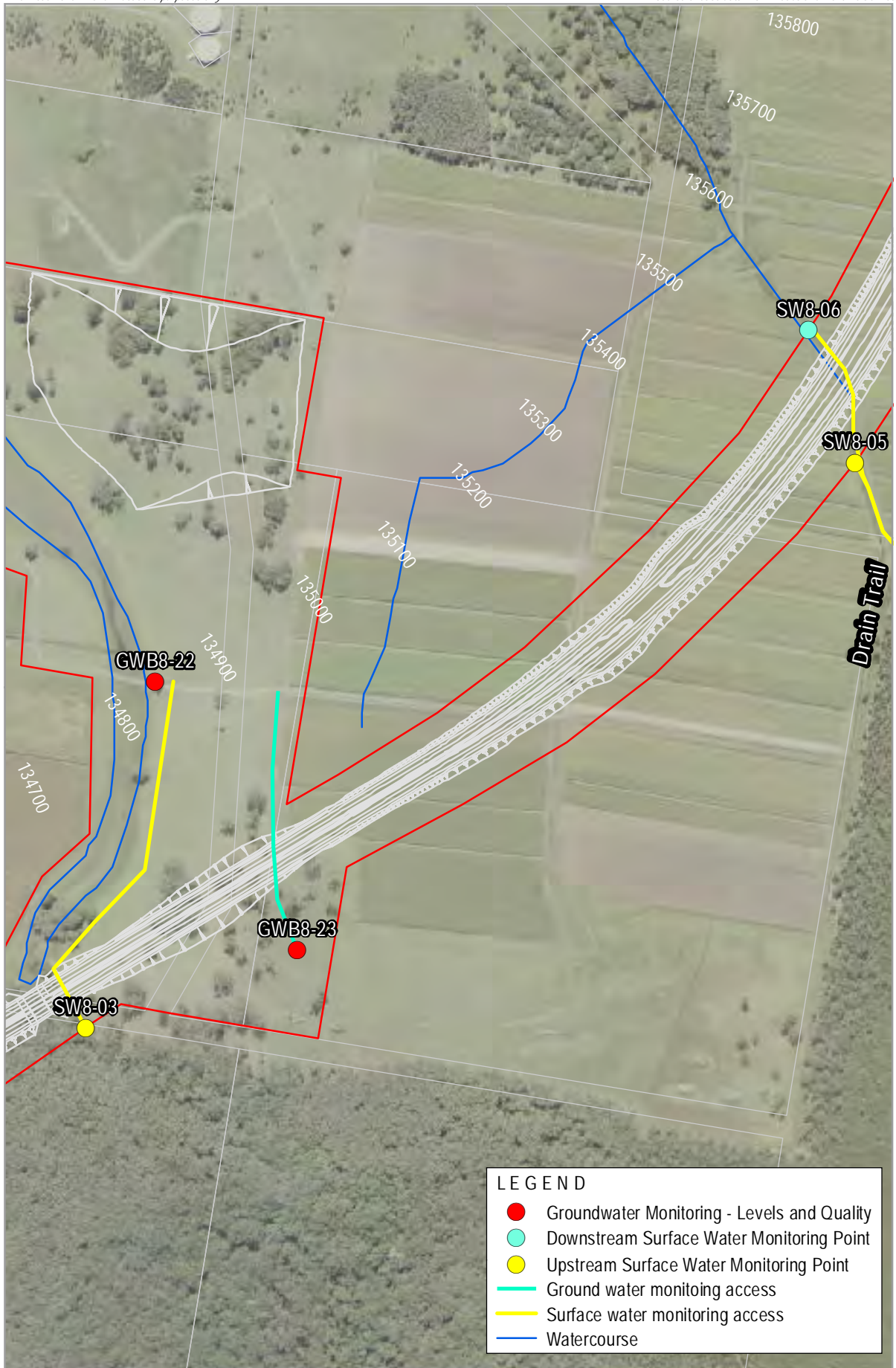
Map 4 of 7

2476-1016



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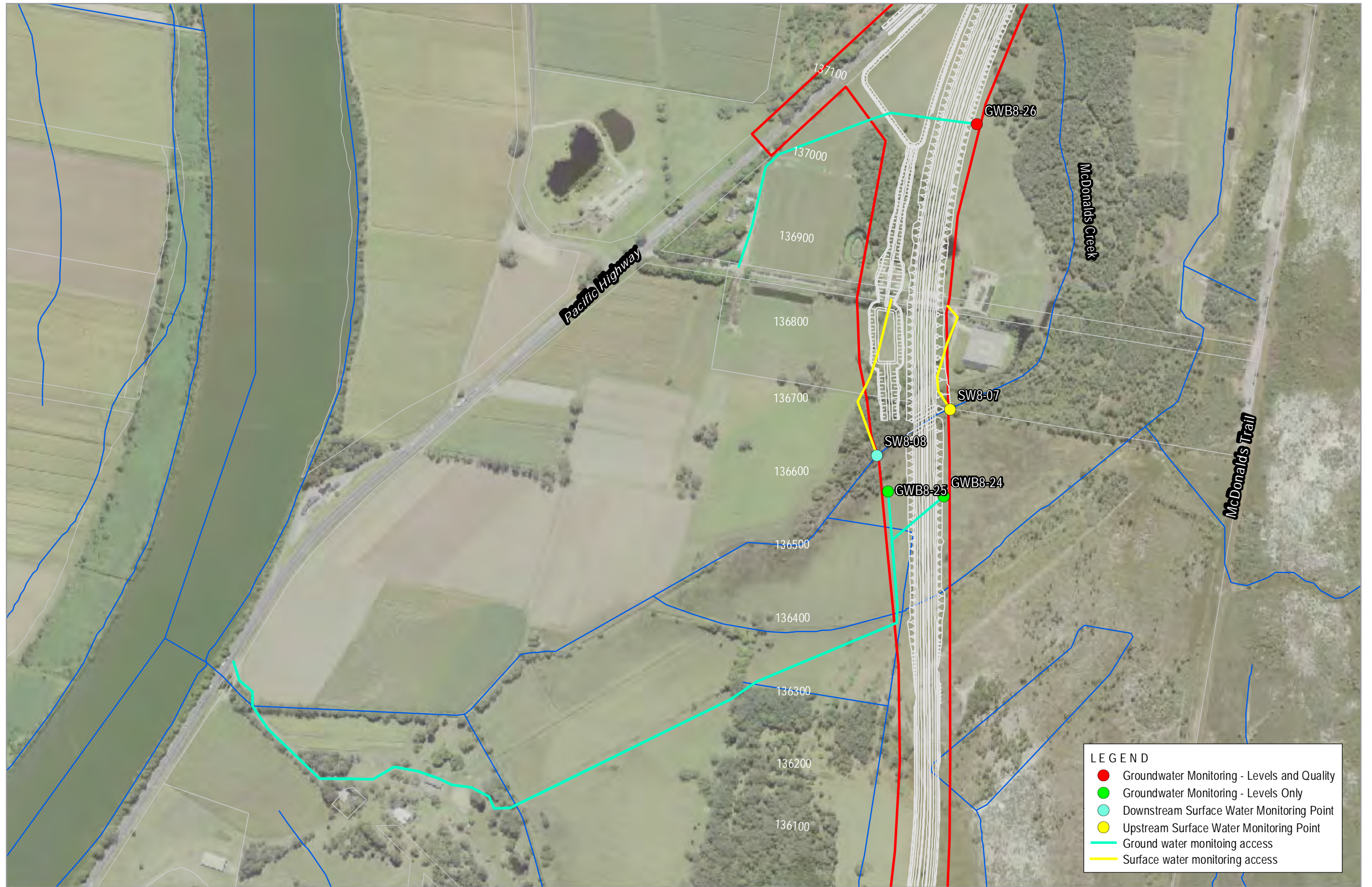


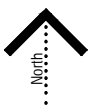
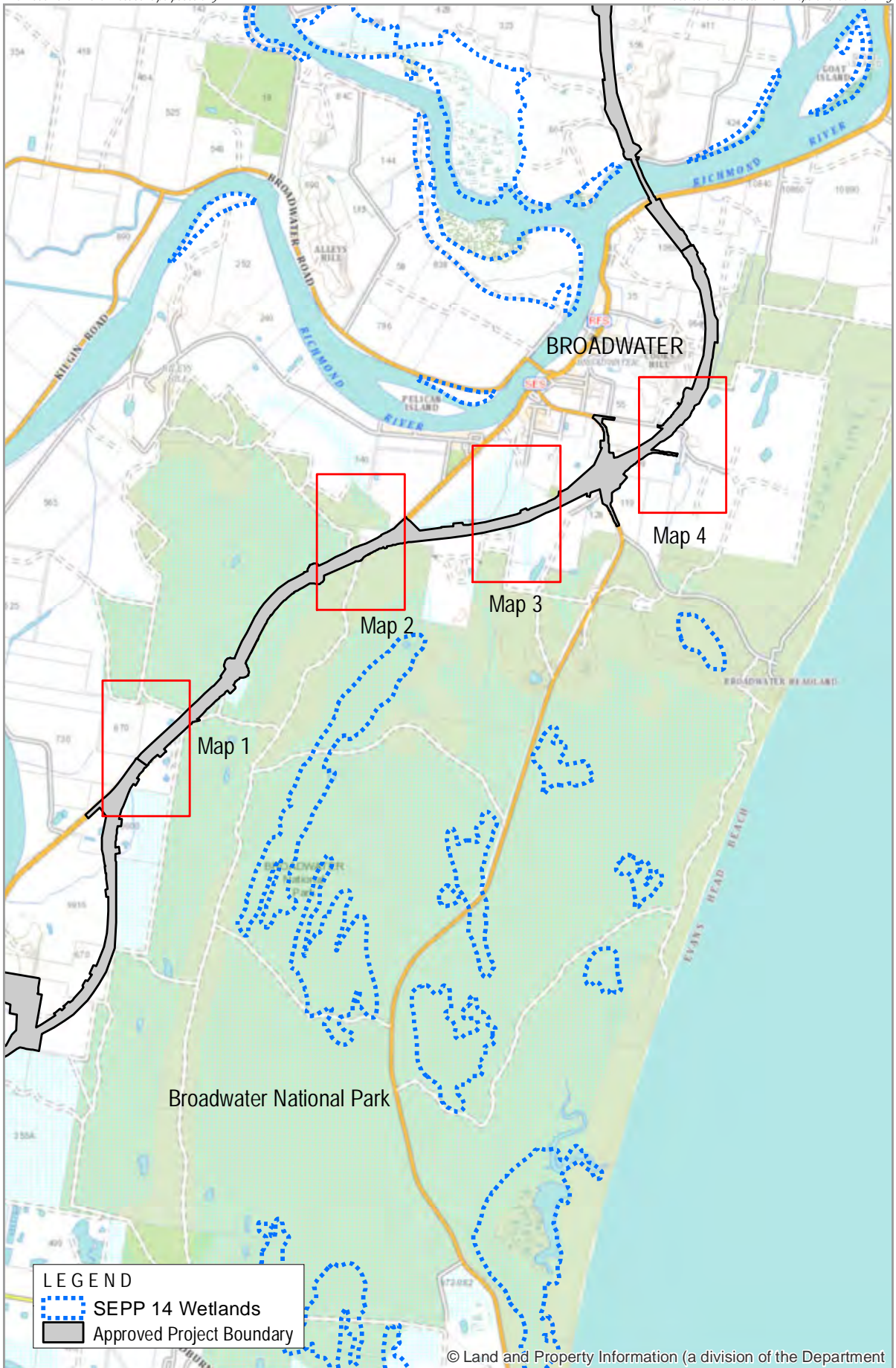
Woolgoolga to Ballina Section 8 - SW and GW Monitoring Locations

Pacific Highway Upgrade - W2B: Water Quality Monitoring Program Sections 3 to 11

Map 6 of 7

2476-1016

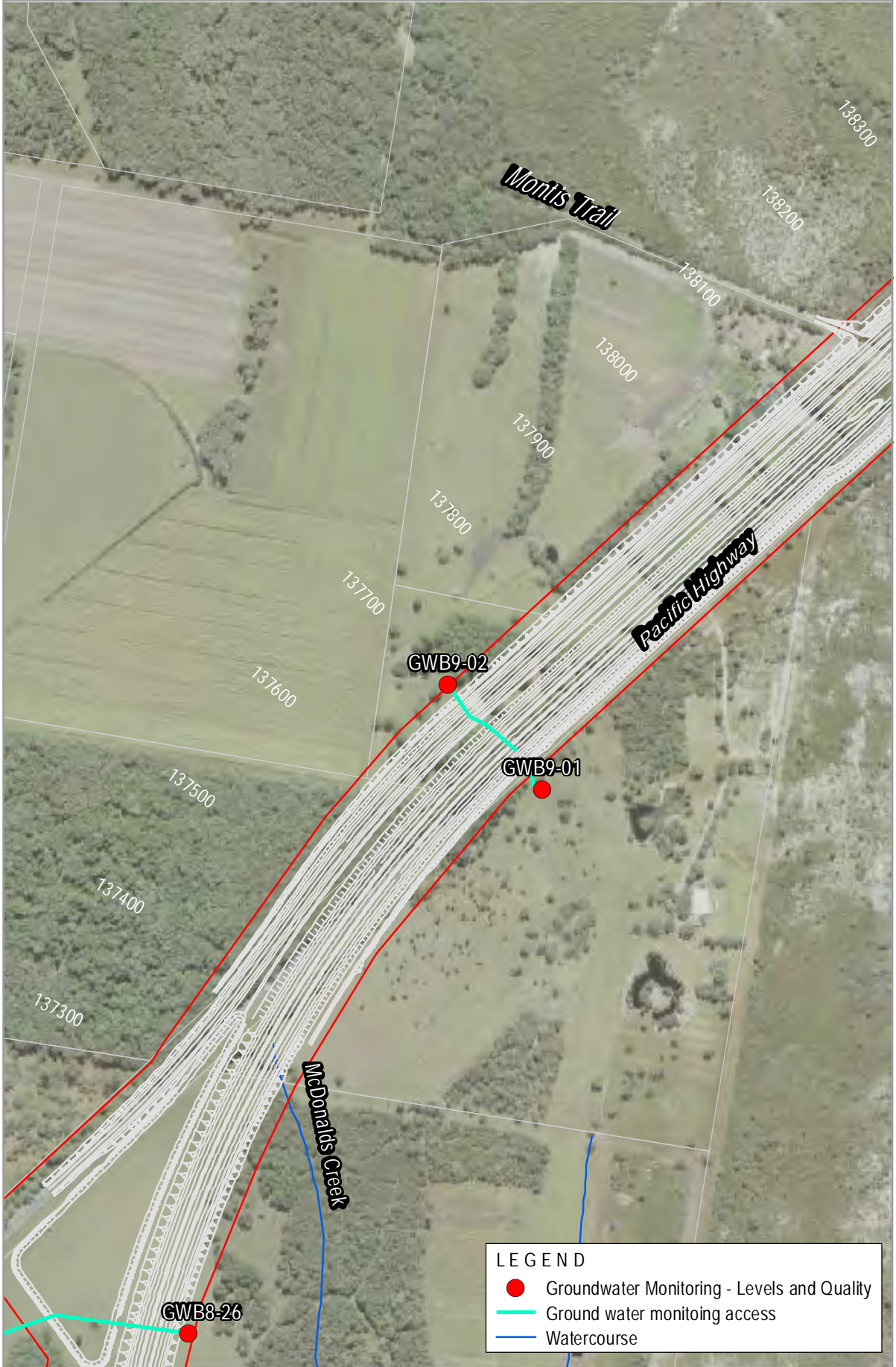




Woolgoolga to Ballina Section 9 - SW and GW Monitoring Locations



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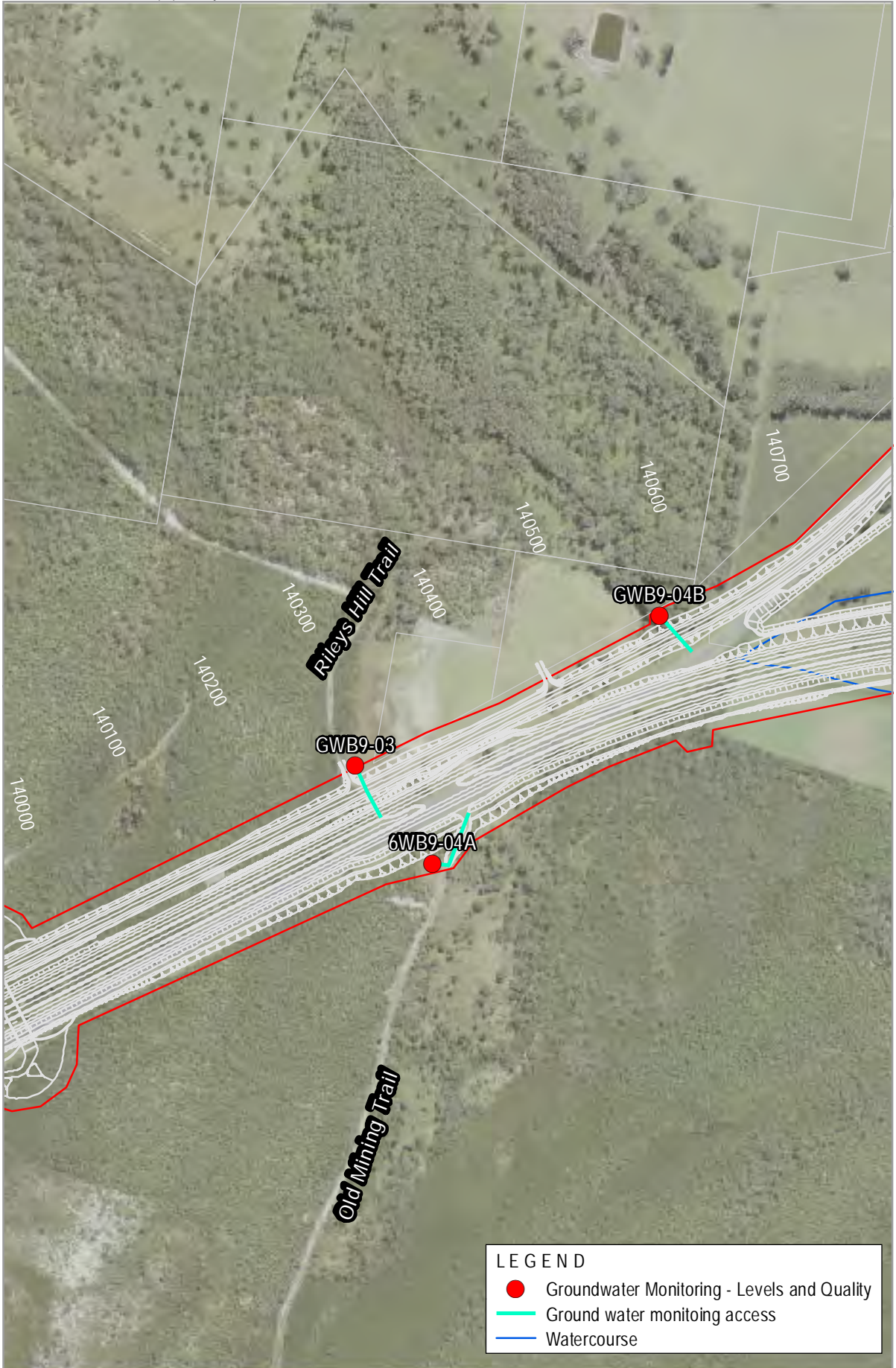


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Woolgoolga to Ballina Section 9 - SW and GW Monitoring Locations

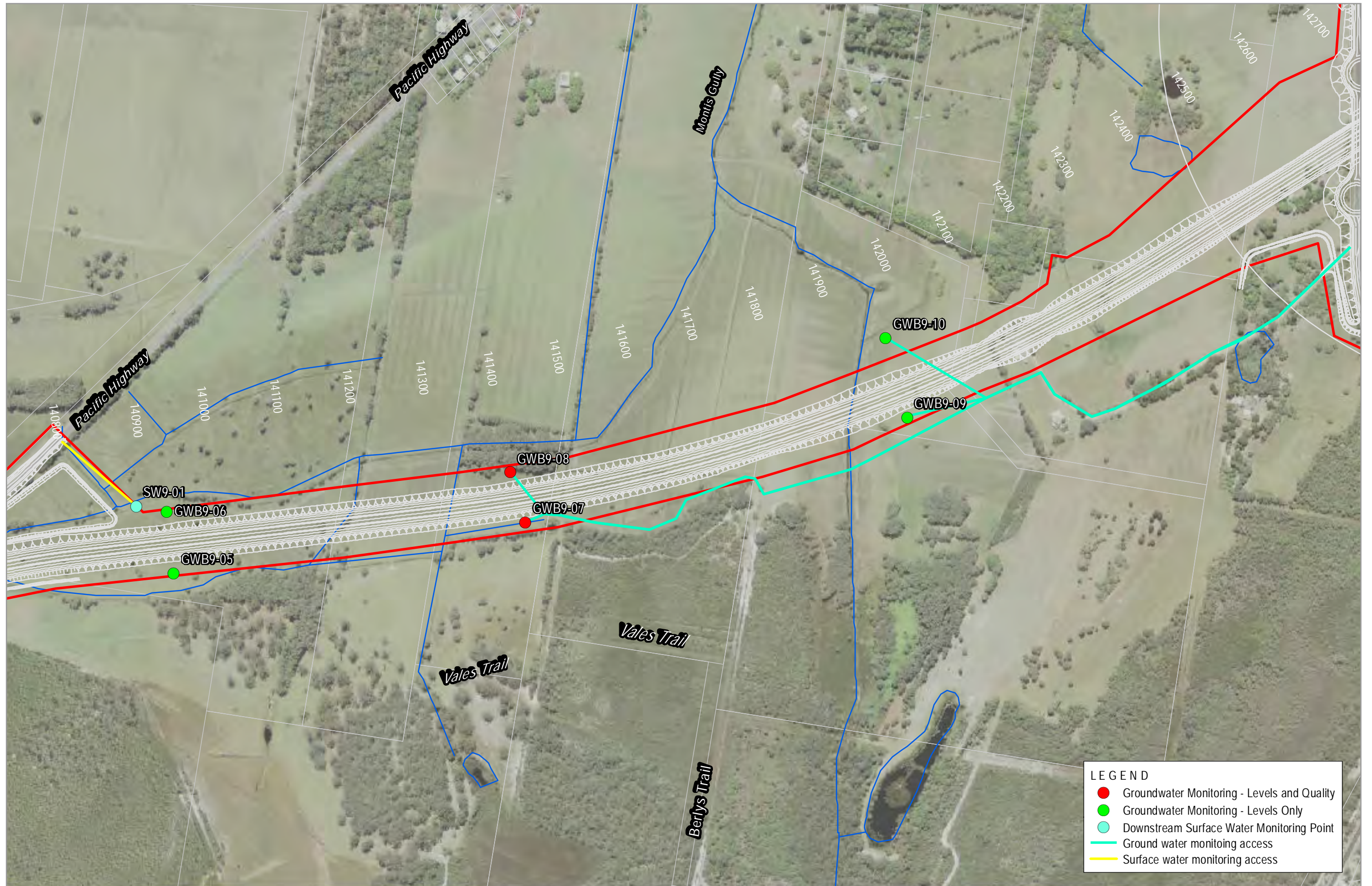
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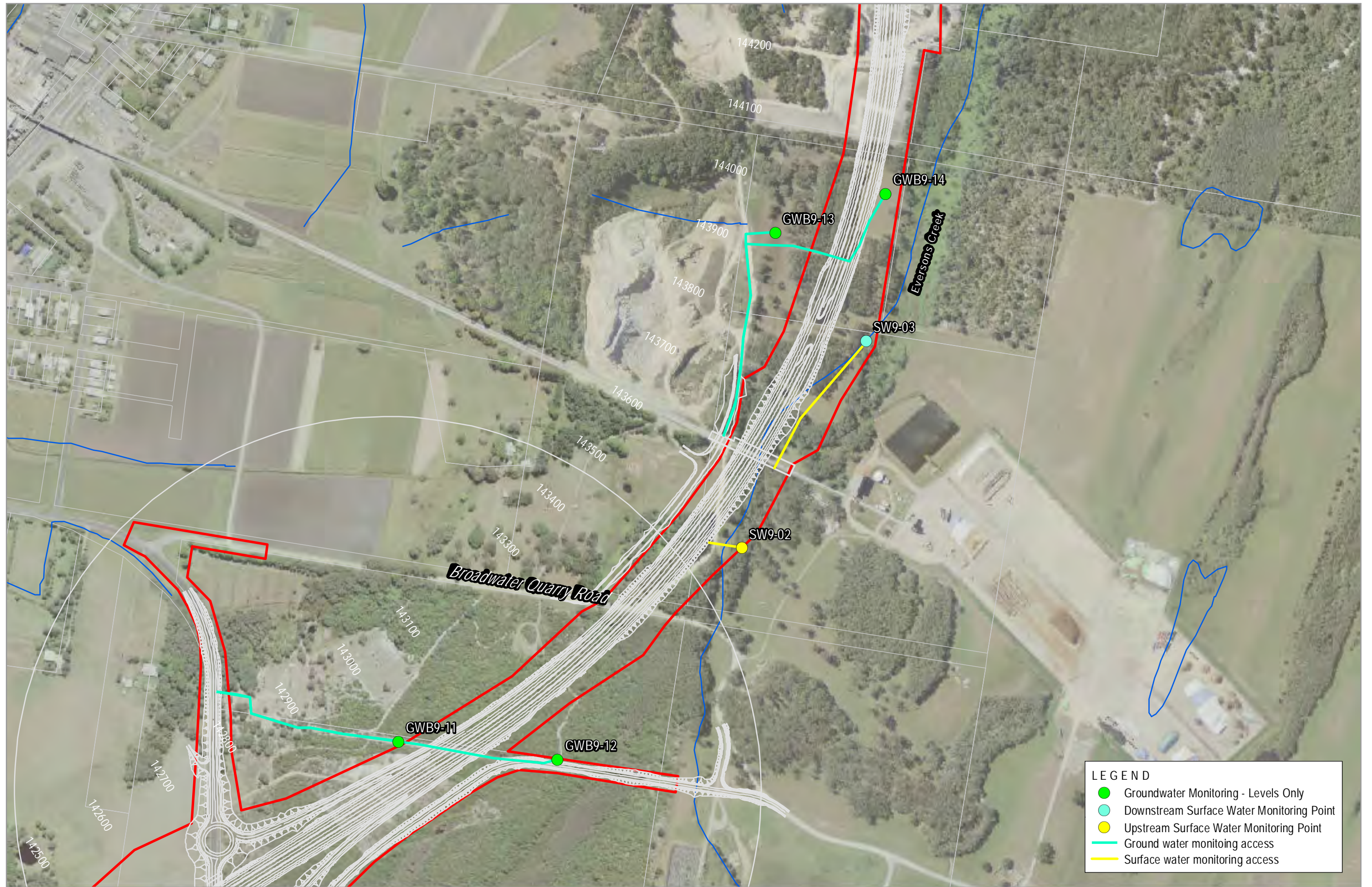


Woolgoolga to Ballina Section 9 - SW and GW Monitoring Locations



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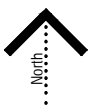
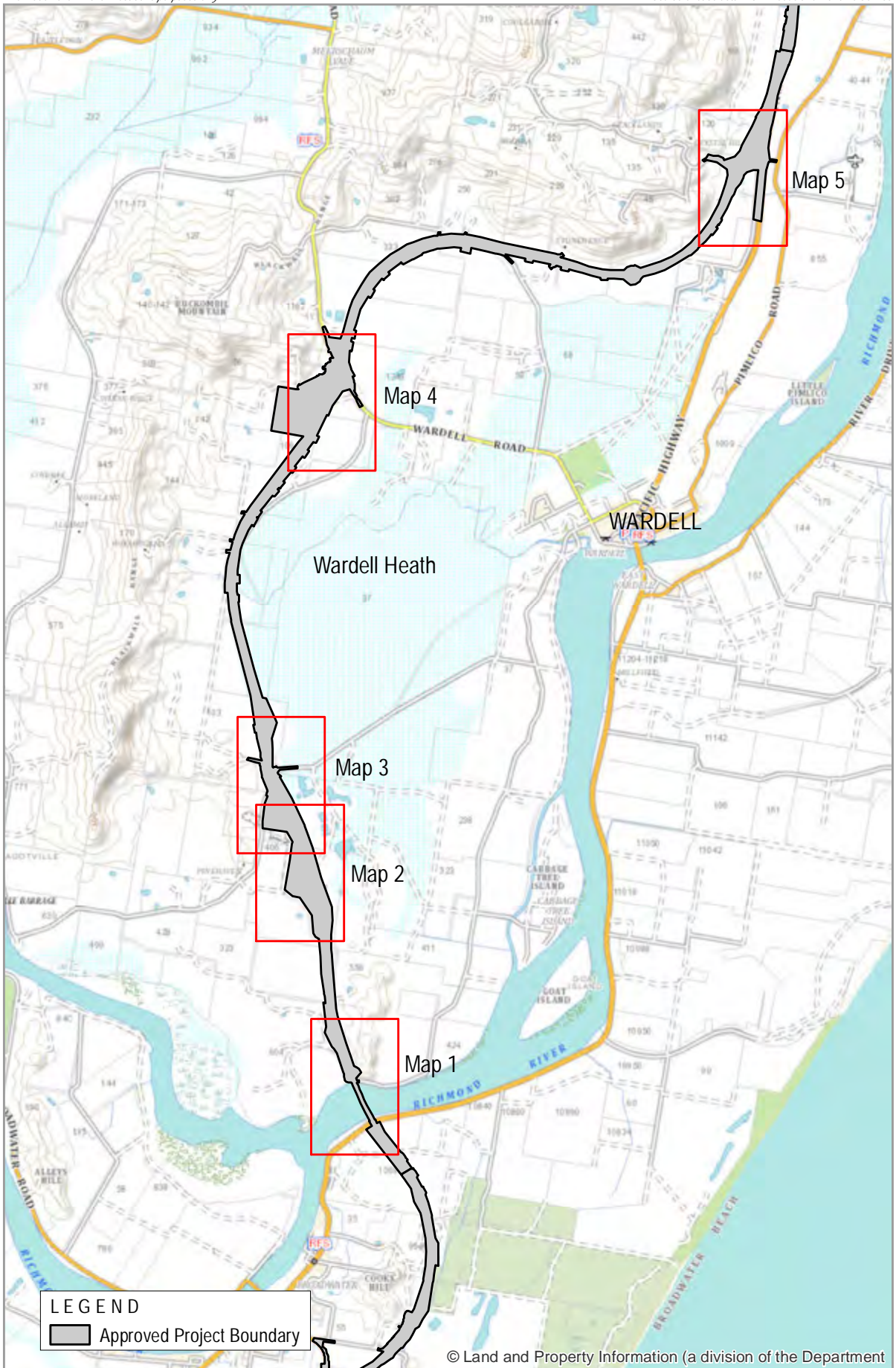




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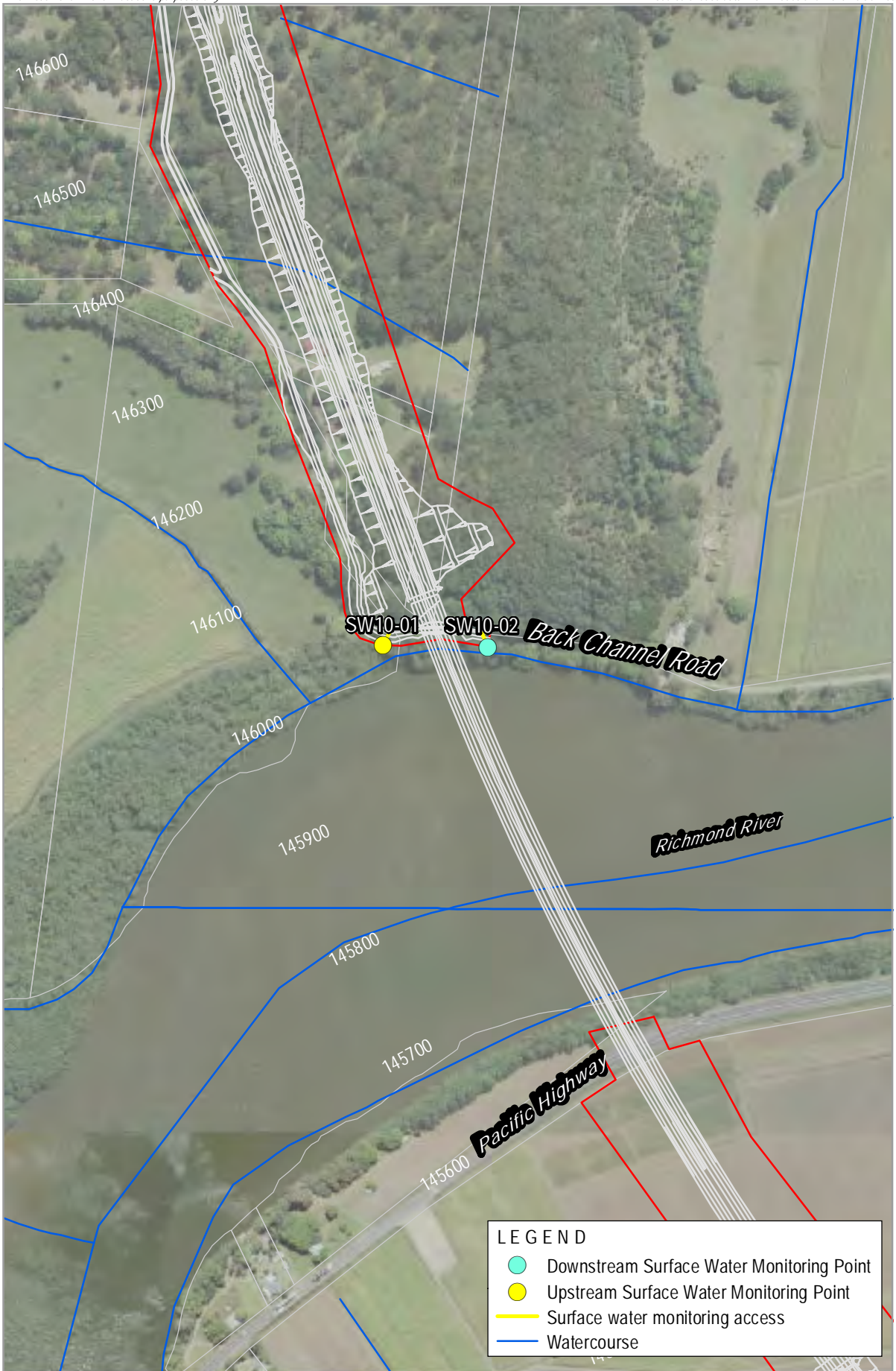


Woolgoolga to Ballina Section 10 - SW and GW Monitoring Locations

Pacific Highway Upgrade - W2B: Water Quality Monitoring Program Sections 3 to 11
2476-1018

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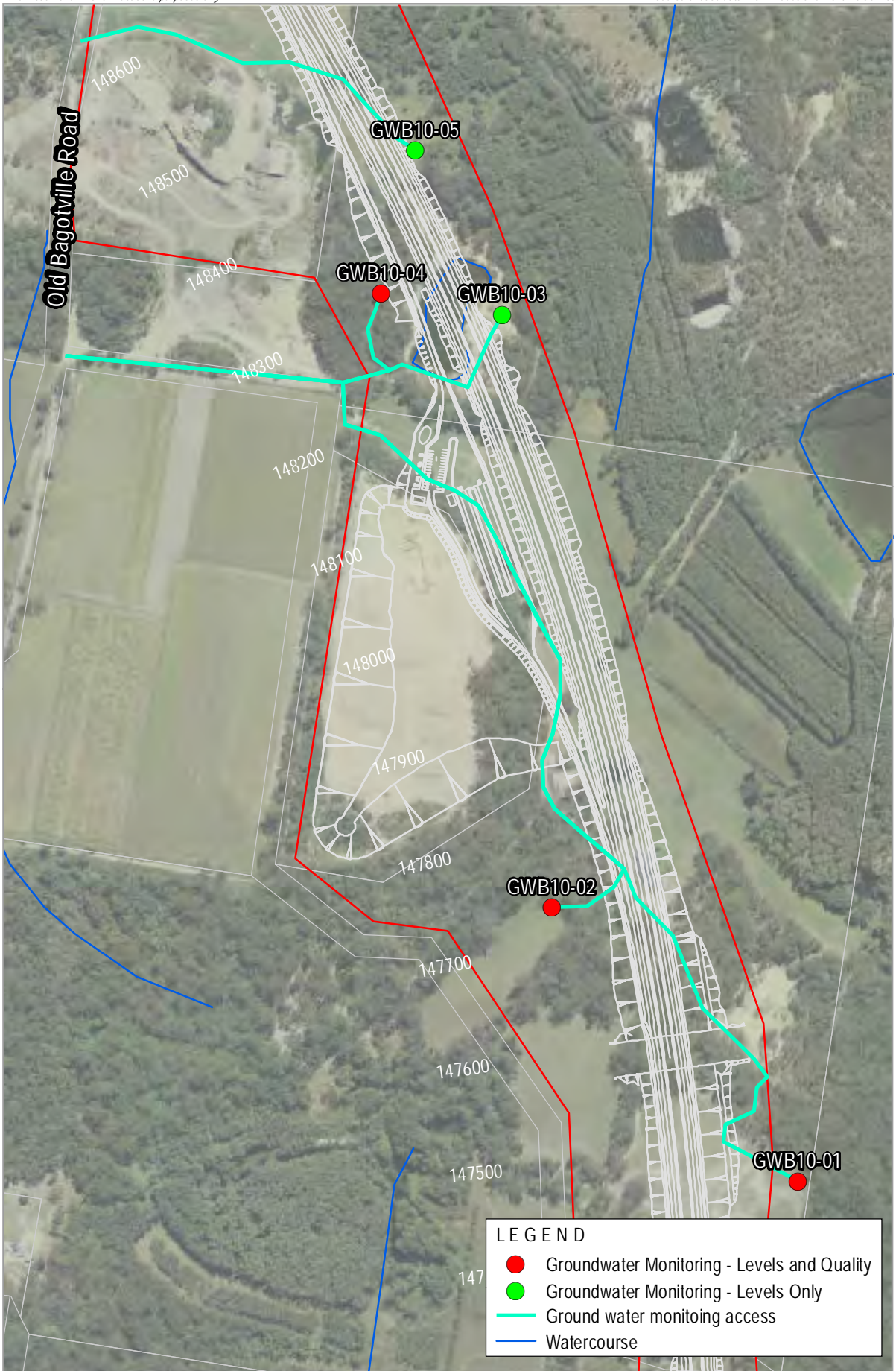
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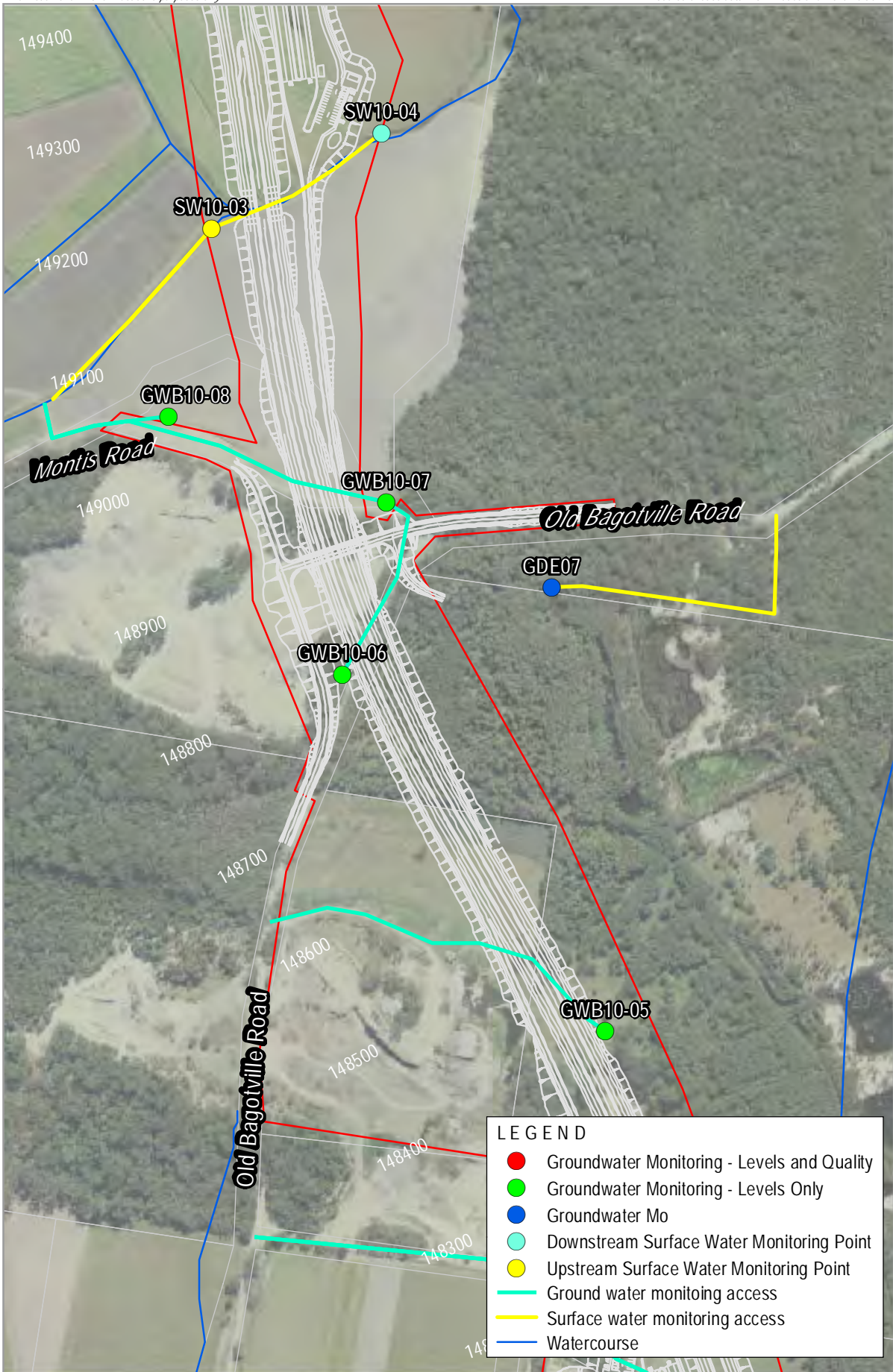
Woolgoolga to Ballina Section 10 - SW and GW Monitoring Locations



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Woolgoolga to Ballina Section 10 - SW and GW Monitoring Locations



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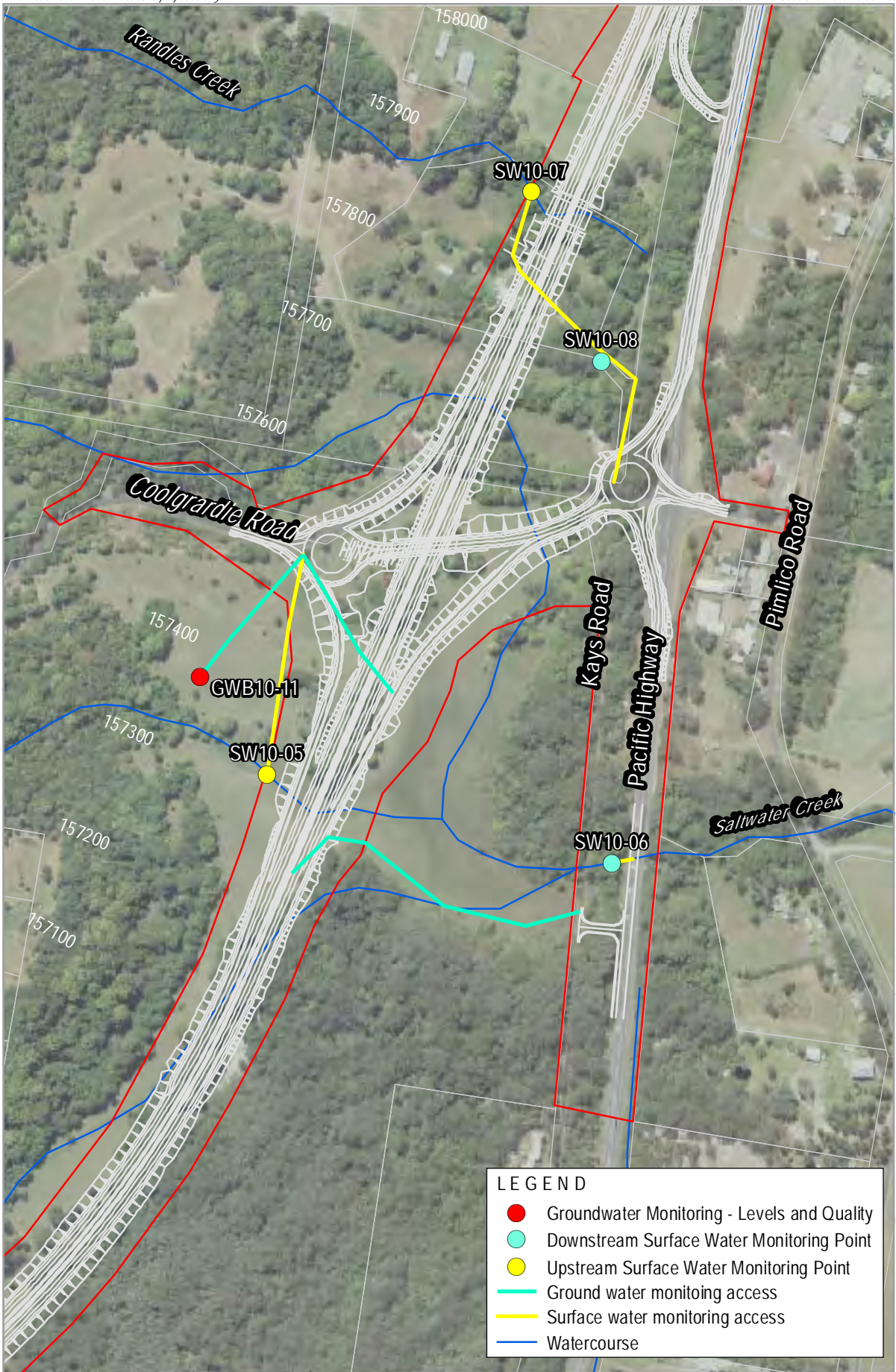
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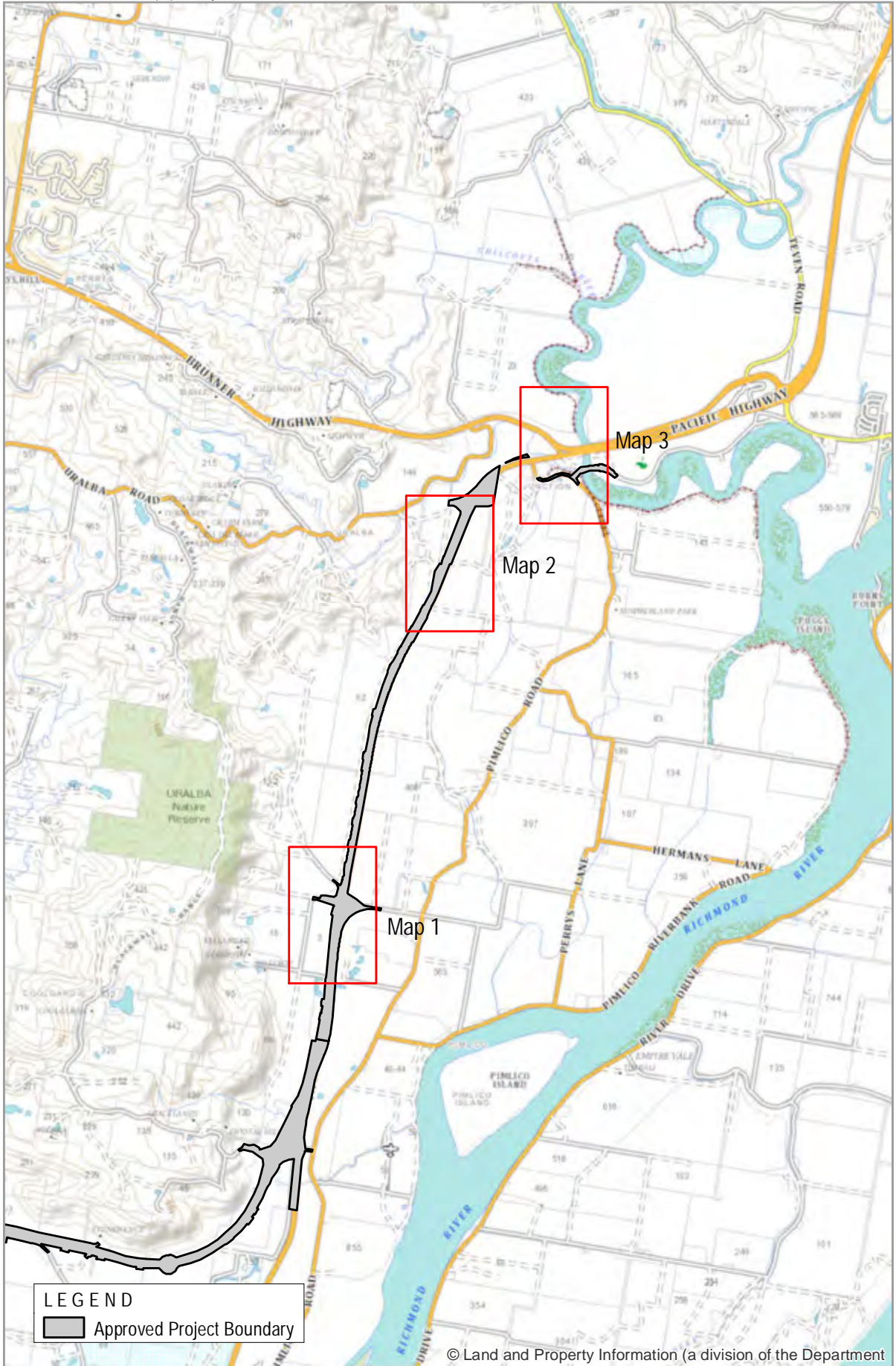
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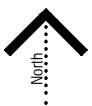
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Woolgoolga to Ballina Section 10 - SW and GW Monitoring Locations



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Woolgoolga to Ballina Section 11 - SW and GW Monitoring Locations

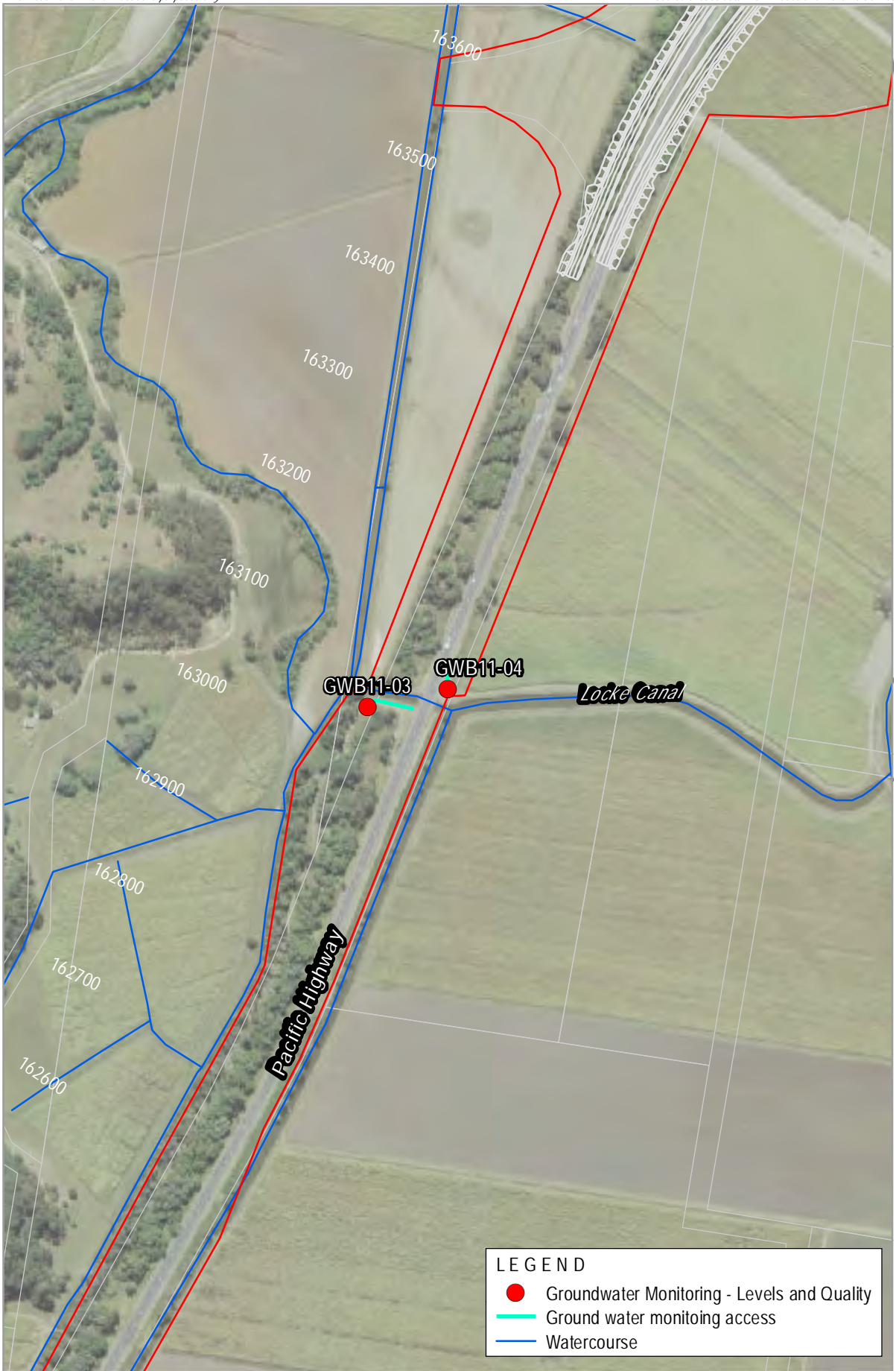
Pacific Highway Upgrade - W2B: Water Quality Monitoring Program Sections 3 to 11
2476-1019



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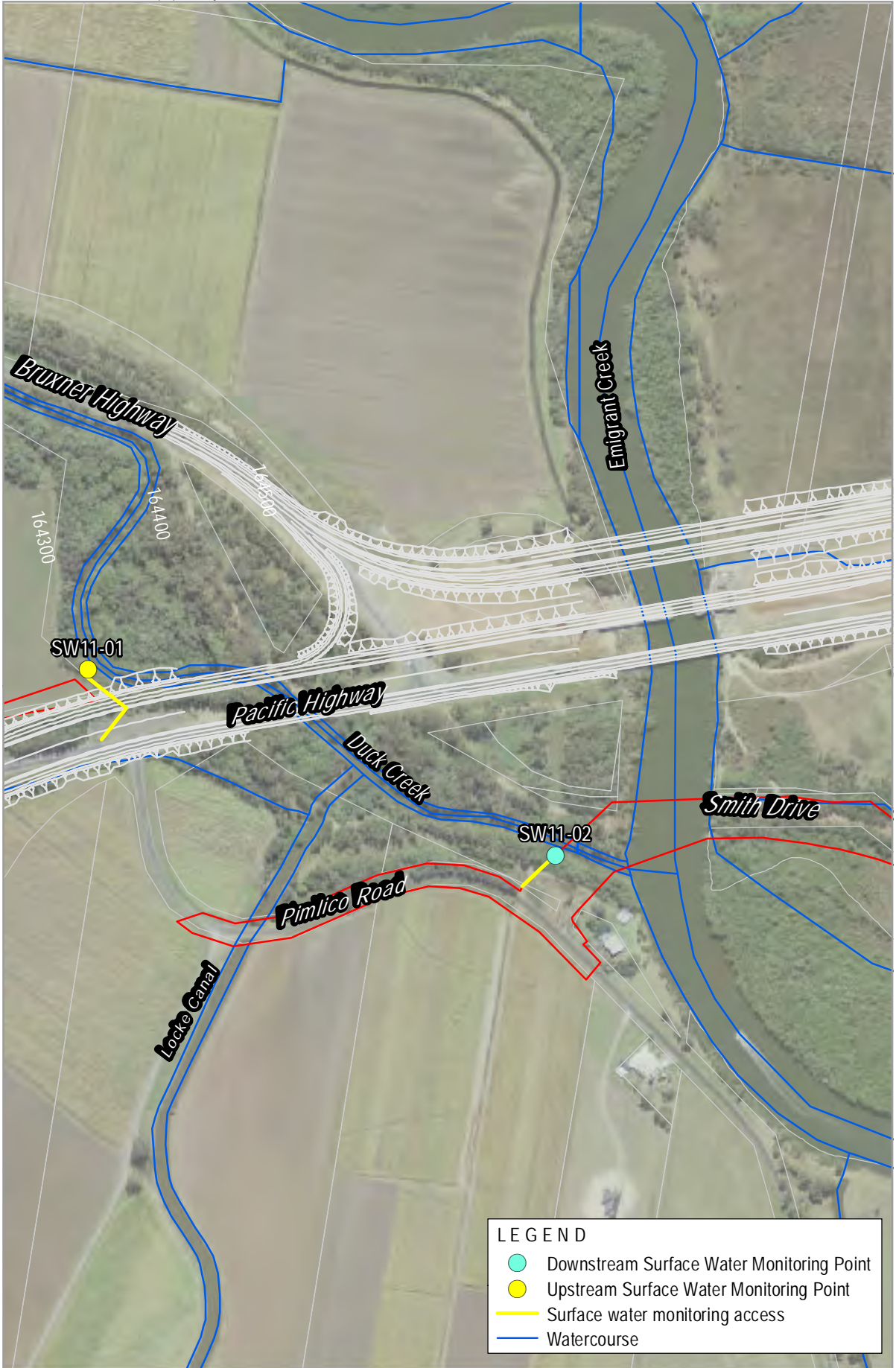
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Woolgoolga to Ballina Section 11 - SW and GW Monitoring Locations



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Woolgoolga to Ballina Section 11 - SW and GW Monitoring Locations



Appendix B

Surface Water Quality: Results of Interest

Surface Water Quality Table of Results of Interest

Portion	Site	Date	Wet or Dry Event	Results of Interest	Field Notes / Comments
A	SW3-02	4/08/2016	Wet	Turbidity = 670 NTU	Very turbid water, fast flowing
A	SW3-02	8/09/2016	Dry	TN = 1.51 mg/L	Intermediate flow
A	SW3-02	6/10/2016	Dry	DO = 3.51 mg/L Turbidity = 272 NTU	No visible flow
A	SW3-02	6/12/2016	Wet	pH = 7.25	
A	SW3-02	1/02/2017	Dry	DO = 1.2 mg/L pH = 7.6	Very low water level, no flow and no connection with u/s site, which was dry
A	SW3-02	28/02/2017	Wet	DO = 2.48 mg/L pH = 6.62	Very low water level and not flowing. Not connected with SW3-01 (upstream site) which was dry.
A	SW3-02	23/03/2017	Dry	DO = 4.2 mg/L	No visible flow. No connection between upstream and downstream monitoring sites.
A	SW3-02	24/04/2017	Dry	DO = 0.34 mg/L	No visible flow. No comparison can be made to upstream monitoring site, which was dry.
A	SW3-02	11/05/2017	Dry	DO = 1.45 mg/L	Upstream and downstream sites not connected. No visible flow. Moderate water level. Weather fine.
A	SW3-02	8/06/2017	Dry	DO = 2.23 mg/L	Weather fine. Water level moderate. No comparison can be made to upstream site which was dry.
A	SW3-04	8/09/2016	Dry	DO = 2.00 mg/L pH = 6.73	No visible flow
A	SW3-04	6/10/2016	Dry	DO = 1.86 mg/L	Stagnant water, no visible flow. Isolated water hole.
A	SW3-04	1/11/2016	Dry	Turbidity = 278 NTU TP = 0.10 mg/L TN = 2.21 mg/L >C16 - C34 Fraction = 130 µg/L	
A	SW3-04	10/11/2016	Wet	DO = 0.26 mg/L TN = 3.44 mg/L	
A	SW3-04	6/12/2016	Wet	pH = 7.42	
A	SW3-04	8/12/2016	Dry	DO = 1.43 mg/L EC = 0.31 mS/cm	
A	SW3-04	7/01/2017	Wet	TP = 0.21 mg/L TN = 2.78 mg/L DO = 1.3 mg/L Turbidity = 294 NTU	Very low water level, stagnant and no flow. Not connected with u/s site, which was dry
A	SW3-04	13/01/2017	Dry	TP = 0.16 mg/L TN = 2.5 mg/L Hydrocarbons present DO = 1.7 mg/L	Very low water level, no flow and no connection with u/s site, which was dry
A	SW3-04	1/02/2017	Dry	DO = 0.7 mg/L pH = 7.7	Very low water level, no flow and no connection with u/s site, which was dry
A	SW3-04	24/04/2017	Dry	DO = 2.64 mg/L	No visible flow. No comparison can be made to upstream monitoring site, which was dry.
A	SW3-04	11/05/2017	Dry	DO = 2.31 mg/L pH 6.53	Upstream and downstream sites not connected. No visible flow, low water level. Isolated pools. Weather fine.
A	SW3-04	8/06/2017	Dry	DO = 3.35 mg/L pH = 6.58	Weather fine. Water level very low. Stagnant. No comparison can be made to upstream site which was dry.
A	SW3-06	8/09/2016	Dry	DO = 1.85 mg/L	No visible flow
A	SW3-06	6/10/2016	Dry	Turbidity = 293 NTU	Stagnant, no visible flow
A	SW3-06	1/11/2016	Dry	>C16 - C34 Fraction = 190 µg/L	
A	SW3-06	10/11/2016	Wet	pH = 7.00	
A	SW3-06	6/12/2016	Wet	pH = 7.42 Turbidity = 149 NTU	
A	SW3-06	8/12/2016	Dry	Turbidity = 75 NTU	
A	SW3-06	7/01/2017	Wet	TP = 0.17 mg/L TN = 3.93 mg/L Hydrocarbons present	Very low water level, no flow and no connection with u/s site
A	SW3-06	13/01/2017	Dry	TSS = 13,100 mg/L TP = 1.77 mg/L TN = 9.3 mg/L Hydrocarbons present DO = 0 mg/L	Very low water level, no flow and no connection with u/s site. Sample taken from isolated pool. Strong odour
A	SW3-06	14/03/2017	Wet	TSS = 1625 mg/L TP = 0.51 mg/L TN = 3.4 mg/L	Low flow. Turbidity elevated - reading exceeded maximum range for in-situ monitoring. No connection between upstream and downstream monitoring sites.

Portion	Site	Date	Wet or Dry Event	Results of Interest	Field Notes / Comments
A	SW3-06	23/03/2017	Dry	SS = 127 mg/L TN = 2.73 mg/L Turbidity = 69 NTU	Upstream and downstream sites were connected.
A	SW3-06	24/04/2017	Dry	pH = 7.06 Turbidity = 137 NTU	No visible flow.
A	SW3-06	11/05/2017	Dry	TP = 0.07 mg/L	Upstream and downstream sites connected. No visible flow, low water level. Odour (sulfur?) apparent. Weather fine.
A	SW3-06	8/06/2017	Dry	Turbidity = 465 NTU	Weather fine. Connected by slight trickle. Water level low. Stagnant water.
A	SW3-06	14/06/2017	Wet	Turbidity = 143 NTU	Upstream and downstream sites connected. Water level high, slight flow. Showers.
A	SW3-08	6/10/2016	Dry	Turbidity = 98 NTU	
A	SW3-08	10/11/2016	Wet	DO = 1.47 mg/L	
A	SW3-08	6/12/2016	Wet	pH = 7.34 Turbidity = 192 NTU	
A	SW3-08	8/12/2016	Dry	DO = 4.01 mg/L Turbidity = 19 NTU	
A	SW3-08	7/01/2017	Wet	TSS = 767 mg/L TP = 0.43 mg/L TN = 4.19 mg/L Hydrocarbons present	Low water level, no flow and no connection with u/s site, which was dry
A	SW3-08	13/01/2017	Dry	TSS = 37 mg/L TP = 0.11 mg/L TN = 1.7 mg/L Hydrocarbons present Turbidity = 102 NTU DO = 2.6 mg/L	Very low water level, no flow and no connection with u/s site, which was dry
A	SW3-08	27/01/2017	Wet	Turbidity = 56 NTU DO = 1.6 mg/L	Low water level, no flow and no connection with u/s site, which was dry
A	SW3-08	1/02/2017	Dry	Turbidity = 34 NTU DO = 2.5 mg/L pH = 6.9	Very low water level, no flow and no connection with u/s site, which was dry
A	SW3-08	28/02/2017	Wet	DO = 3.51 mg/L Turbidity = 41.3 NTU	Water level low, no flow and no connection to SW3-07 (upstream site) which was dry.
A	SW3-08	7/03/2017	Wet	TP = 0.06 mg/L	Very low water level, no visible flow. No connection to upstream monitoring site which was dry.
A	SW3-08	14/03/2017	Wet	TP = 0.06 mg/L DO = 2.91 mg/L	Water level low, no visible flow. No connection between upstream and downstream monitoring sites.
A	SW3-08	24/03/2017	Dry	DO = 1.23 mg/L	Visible flow.
A	SW3-08	11/05/2017	Dry	pH 6.87	Upstream and downstream sites connected. No visible flow. Low water level. Samples taken amongst aquatic macrophytes. Weather fine.
A	SW3-10	6/10/2016	Dry	Turbidity = 90 NTU	Slight flow visible.
A	SW3-10	3/11/2016	Dry	DO = 2.71 mg/L Turbidity = 18 NTU TSS = 16 mg/L TN = 1.01 mg/L	
A	SW3-10	7/01/2017	Wet	TSS = 290 mg/L TN = 4.01 mg/L Turbidity = 583 NTU pH = 5.5	No flow
A	SW3-10	13/01/2017	Dry	TSS = 27 mg/L TP = 0.05 mg/L TN = 1.6 mg/L Hydrocarbons present	Very low water level, no flow and no connection with u/s site.
A	SW3-10	27/01/2017	Wet	Turbidity = 31 NTU	Very low water level, no flow and no connection with u/s site.
A	SW3-10	1/02/2017	Dry	Turbidity = 34 NTU	Very low water level, no flow and no connection with u/s site.
A	SW3-10	28/02/2017	Wet	pH = 5.07 Turbidity = >800 NTU	Very low water level, no flow and not connected to SW3-09 (upstream site).
A	SW3-10	7/03/2017	Wet	TN = 4.8 mg/L >C16 - C34 Fraction = 100 µg/L pH = 6.05	Turbidity & TSS elevated, but lower than result at upstream site.
A	SW3-10	14/03/2017	Wet	TSS = 242 mg/L TP = 0.1 mg/L	Slight visible flow. Overnight rainfall.
A	SW3-10	8/06/2017	Dry	DO = 4.05 mg/L	Weather fine. Connected. High flow. Water level low. Sample site adjacent to cattle crossing.
A	SW3-14	4/08/2016	Wet	Turbidity = 133 NTU	Very turbid water, fast flowing.

Portion	Site	Date	Wet or Dry Event	Results of Interest	Field Notes / Comments
A	SW3-14	10/11/2016	Wet	DO = 1.75 mg/L TN = 1.19 mg/L >C16 - C34 Fraction = 210 µg/L	
A	SW3-14	8/12/2016	Dry	DO = 0.80 mg/L	
A	SW3-14	7/01/2017	Wet	Hydrocarbons present	Very low water level and no flow
A	SW3-14	13/01/2017	Dry	Hydrocarbons present DO = 1.8 mg/L	Very low water level, no flow and no connection with u/s site. Hydrocarbons also present u/s but at lower levels
A	SW3-14	1/02/2017	Dry	DO = 1.2 mg/L	Very low water level, no flow and no connection with u/s site
A	SW3-14	7/03/2017	Wet	SS = 66 mg/L TN = 1.2 mg/L	No visible flow. No connection between upstream and downstream monitoring sites.
A	SW3-14	14/03/2017	Wet	TSS = 66 mg/L TN = 1.1 mg/L	Very low visible flow. No connection between upstream and downstream sites.
A	SW3-14	8/06/2017	Dry	Turbidity = 106 NTU	Weather fine. Upstream and downstream sites connected by a trickle of water. Water level very low. Slightly stagnant
A	SW3-16	4/08/2016	Wet	Turbidity = 71 NTU	Fast flowing water
A	SW3-16	6/10/2016	Dry	DO = 2.16 mg/L	Flowing
A	SW3-16	1/11/2016	Dry	DO = 2.32 mg/L TN = 1.40 mg/L >C16 - C34 Fraction = 160 µg/L	
A	SW3-16	6/12/2016	Wet	Turbidity = 72 NTU	
A	SW3-16	8/12/2016	Dry	DO = 1.68 mg/L	
A	SW3-16	7/01/2017	Wet	DO = 2.4 mg/L	DO was also relatively low at u/s site (3.1 mg/L)
A	SW3-16	13/01/2017	Dry	DO = 2.8 mg/L	Low water level and slight flow
A	SW3-16	27/01/2017	Wet	DO = 2.8 mg/L	Low water level, no flow
A	SW3-16	7/03/2017	Wet	DO = 3.1 mg/L	
A	SW3-16	14/03/2017	Wet	TSS = 19 mg/L TN = 0.7 mg/L	
A	SW3-16	24/03/2017	Dry	DO = 2.33 mg/L	Upstream and downstream sites were connected.
A	SW3-16	11/05/2017	Dry	DO = 2.61 mg/L	Upstream and downstream sites connected. Low flow, water level low. Shady. Weather fine.
A	SW3-20	25/08/2016	Wet	DO = 3.03 mg/L	Low water level (0.3-0.5 m), no visible flow, no main channel identifiable.
A	SW3-20	6/12/2016	Wet	EC = 0.34 mS/cm pH = 7.33	
A	SW3-20	8/12/2016	Dry	DO = 1.31 mg/L EC = 0.38 mS/cm Turbidity = 88 NTU	
A	SW3-20	7/01/2017	Wet	TSS = 44 mg/L TN = 1.45 mg/L Turbidity = 63 NTU pH = 4.3 DO = 0.8 mg/L	No flow, low water level. Sample taken from isolated pool of water. Not connected with u/s site, which was dry
A	SW3-20	13/01/2017	Dry	pH = 3.6	Very low water level, no flow and no connection with u/s site, which was dry
A	SW3-20	27/01/2017	Wet	DO = 1.5 mg/L pH = 4.0	Low water level, no flow and no connection with u/s site. Sample taken from isolated pool of water.
A	SW3-20	1/02/2017	Dry	DO = 2.1 mg/L pH = 4.2	Very low water level, no flow and no connection with u/s site
A	SW3-20	28/02/2017	Wet	DO = 0.18 mg/L pH = 4.58 Turbidity = 232 NTU	Slight flow, low water level. Not connected to SW3-19 (upstream site) which was dry.
A	SW3-20	7/03/2017	Wet	TSS = 76 mg/L TP = 0.06 mg/L TN = 1.2 mg/L >C16 - C34 Fraction = 110 µg/L DO = 0 mg/L	No connection to upstream monitoring site which was dry.
A	SW3-20	14/03/2017	Wet	TSS = 45 mg/L DO = 3 mg/L Turbidity = 52 NTU	Slight visible flow. No comparison can be made to upstream monitoring site which was dry.
A	SW3-20	11/05/2017	Dry	DO = 0.3 mg/L	Upstream and downstream sites not connected. No visible flow. Water level low, isolated pool. Moderate to heavy surface scum. Weather fine. No comparison can be made to upstream site due to data download error.

Portion	Site	Date	Wet or Dry Event	Results of Interest	Field Notes / Comments
A	SW3-20	11/05/2017	Dry	TSS = 27 mg/L DO = 0.3 mg/L	Upstream and downstream sites not connected. No visible flow. Water level low, isolated pool. Moderate to heavy surface scum. Weather fine. No comparison can be made to upstream site for in-situ data due to data download error.
A	SW3-20	8/06/2017	Dry	DO = 0.77 mg/L	Weather fine. Not connected. Water level low. Stagnant
A	SW3-22	2/08/2016	Dry	pH = 4.86	Intermittent watercourse - monitoring conducted in isolated pool
A	SW3-22	25/08/2016	Wet	TN = 0.61 mg/L	
A	SW3-22	1/11/2016	Dry	pH = 5.54 SS = 15 mg/L	
A	SW3-22	10/11/2016	Wet	DO = 3.88 mg/L >C16 - C34 Fraction = 250 µg/L	
A	SW3-23	2/08/2016	Dry	pH = 6.34 Turbidity = 21 NTU	
A	SW3-23	4/08/2016	Wet	EC = 0.08 mS/cm Turbidity = 215 NTU	
A	SW3-23	8/09/2016	Dry	DO = 5.21 mg/L pH = 6.52	Flowing
A	SW3-23	1/11/2016	Dry	DO = 5.33 mg/L EC = 3.84 mS/cm TN = 0.91 mg/L	
A	SW3-23	10/11/2016	Wet	EC = 5.64 mg/L pH = 6.89	
A	SW3-23	6/12/2016	Dry	EC = 8.37 mS/cm	
A	SW3-23	6/12/2016	Wet	EC = 8.2 mS/cm pH = 7.23	
A	SW3-23	7/01/2017	Wet	EC = 11.5 mS/cm	Tidal.
A	SW3-23	13/01/2017	Dry	DO = 4.9 mg/L	
A	SW3-23	1/02/2017	Dry	DO = 4.2 mg/L	No u/s site for comparison
A	SW3-23	28/02/2017	Wet	pH = 7.12	Tidal site. There is no corresponding upstream monitoring site.
A	SW3-23	7/03/2017	Wet	pH = 7.01	No upstream monitoring site for comparison.
A	SW3-23	24/03/2017	Dry	SS = 41 mg/L TP = 0.24 mg/L TN = 1.25 mg/L DO = 2.17 mg/L pH = 6.09 Turbidity = 34 NTU	High water level. No upstream monitoring site for comparison.
A	SW3-23	24/04/2017	Dry	DO = 3.13 mg/L	Tidal. No upstream monitoring site for comparison of results.
A	SW3-23	18/05/2017	Dry	pH = 7.14	Incoming tide. No upstream monitoring site for comparison.
A	SW3-23	8/06/2017	Dry	pH = 7.25	Weather fine. Flow moderate. Mid water level. Tide outgoing. No upstream site to compare values.
A	SW4-02	2/08/2016	Dry	EC = 0.00 mS/cm	
A	SW4-02	11/11/2016	Wet	Oil & grease = 12 mg/L SS = 1230 mg/L >C16 - C34 Fraction = 240 µg/L	
A	SW4-02	5/12/2016	Dry	Turbidity = 187 NTU	
A	SW4-02	18/01/2017	Dry	SS = 39 mg/L TN = 8.09 mg/L	Very low water level, no flow and stagnant. Not connected with upstream monitoring site
A	SW4-02	1/02/2017	Dry	pH = 3.0	Very low water level, no flow and no connection with u/s site
A	SW4-02	7/03/2017	Wet	pH = 3.79	Tidal
A	SW4-02	10/03/2017	Dry	TN = 3.9 mg/L	Stagnant, no visible flow.
A	SW4-04	11/11/2016	Wet	TN = 1.36 mg/L	
A	SW4-06	7/10/2016	Dry	DO = 4.86 mg/L Turbidity = 33 NTU	
A	SW4-06	3/11/2016	Dry	DO = 5.40 mg/L	
A	SW4-06	6/01/2017	Wet	DO = 2.8 mg/L EC = 22.3 mS/cm	
A	SW4-06	1/02/2017	Dry	DO = 3.5 mg/L	
A	SW4-06	1/03/2017	Wet	pH = 7.38	
A	SW4-06	10/03/2017	Dry	pH = 8.14	Tidal
B	SW5-02	5/09/2016	Dry	DO = 0.86 mg/L TP = 0.75 mg/L TN = 4.52 mg/L	Appears disconnected from upstream site.
B	SW5-02	13/06/2017	Wet	pH = 6.89	Weather showers. Water level high. No comparison can be made to upstream site which was dry.
B	SW5-04	5/09/2016	Dry	DO = 2.57 mg/L	

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B	SW5-04	10/10/2016	Dry	Turbidity = 524 NTU	
B	SW5-04	1/11/2016	Dry	DO = 0.82 mg/L EC = 20.60 mS/cm pH = 6.79 Oil & grease = 4 mg/L	
B	SW5-04	11/11/2016	Wet	EC = 21.30 mS/cm pH = 7.29 Oil & grease = 8 mg/L	
B	SW5-04	13/12/2016	Dry	EC = 29.10 mS/cm pH = 7.49	
B	SW5-04	6/01/2017	Wet	Turbidity = >800 NTU EC = 26.9 mS/cm	Stagnant, no flow and low water level. Not connected with u/s site, which was dry
B	SW5-04	18/01/2017	Dry	TP = 2.84 mg/L TN = 16.4 mg/L DO = 0.2 mg/L	Very low water level - stagnant, no flow and not connected with upstream monitoring site, which was dry.
B	SW5-04	1/02/2017	Dry	Turbidity = 462 NTU DO = 1.4 mg/L pH = 6.9	Very low water level, no flow and no connection with u/s site, which was dry
B	SW5-04	1/03/2017	Wet	TP = 0.91 mg/L pH = 6.65	Slight flow, water level low. No comparison can be made with upstream monitoring site which was dry.
B	SW5-04	6/03/2017	Wet	pH = 6.87	Bacteria scum layer. Gentle flow. u/s site was dry.
B	SW5-04	10/03/2017	Dry	TP = 0.81 mg/L >C16 - C34 Fraction = 330 µg/L pH = 6.75	Stagnant, no visible flow. Foul odour. No comparison can be made to upstream monitoring site which was dry.
B	SW5-04	6/04/2017	Wet	DO = 0.81 mg/L pH = 6.98	No visible flow. No connection to upstream monitoring site. No comparison can be made to upstream site due to access issues.
B	SW5-04	12/04/2017	Dry	DO = 0 mg/L	Stagnant, no visible flow. No connection between upstream and downstream monitoring site. No comparison of results can be made with upstream site, which was dry.
B	SW5-04	3/05/2017	Dry	DO = 0 mg/L pH = 6.78 TP = 0.42 mg/L >C16-C34 fraction = 210 µg/L	Stagnant, no flow. No comparison could be made to upstream site which was dry.
B	SW5-04	4/05/2017	Wet	DO = 0 mg/L pH = 6.88 Turbidity = 117 NTU	Low water level, stagnant. Drizzle. No comparison could be made with upstream site which was dry.
B	SW5-04	7/06/2017	Dry	DO = 0 mg/L	Weather fine. Low water level. Stagnant. No comparison can be made to upstream site which was dry.
B	SW5-04	13/06/2017	Wet	pH = 6.60 Turbidity = 81 NTU	Weather showers. Water level high. No comparison can be made to upstream site which was dry.
B	SW5-06	2/08/2016	Dry	Turbidity = 132 NTU	
B	SW5-06	11/11/2016	Wet	EC = 27.50 mS/cm pH = 7.94	
B	SW5-06	18/01/2017	Dry	pH = 5.5	
B	SW5-06	10/03/2017	Dry	TSS = 78 mg/L	Very high tide.
B	SW5-06	12/04/2017	Dry	DO = 2.52 mg/L	High tide
B	SW5-06	7/06/2017	Dry	DO = 5.98 mg/L	Weather fine. Upstream and downstream sites connected. Mid water level, outgoing tide.
B	SW5-08	2/08/2016	Dry	pH = 8.18	
B	SW5-08	1/03/2017	Wet	Oil & grease = 5 mg/L TN = 2.9 mg/L	
B	SW5-08	10/03/2017	Dry	TP = 0.11 mg/L	Very high tide.
B	SW5-08	6/04/2017	Wet	TP = 0.26 mg/L	Moderate flow, outflowing tide.
B	SW5-10	6/04/2017	Wet	DO = 4.67 mg/L	Moderate flow. Outgoing tide.
B	SW5-10	12/04/2017	Dry	DO = 4.6 mg/L	High tide
B	SW5-10	13/06/2017	Wet	Turbidity = 142 NTU	Weather showers. Upstream and downstream sites connected. High water level, outgoing tide.
B	SW5-11	3/08/2016	Dry	DO = 3.61 mg/L EC = 20.90 mS/cm pH = 7.79	Stagnant water.
B	SW5-11	5/09/2016	Dry	DO = 3.37 mg/L pH = 6.68 Oil & grease = 5 mg/L	
B	SW5-11	10/10/2016	Dry	DO = 0.80 mg/L EC = 17.20 mS/cm pH = 6.75	

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B	SW5-11	1/11/2016	Dry	DO = 1.39 mg/L EC = 25.80 mS/cm pH = 6.84 Oil & grease = 5 mg/L	
B	SW5-11	11/11/2016	Wet	DO = 2.75 mg/L EC = 28.10 mS/cm pH = 6.86	
B	SW5-11	13/12/2016	Dry	DO = 2.27 mg/L EC = 28.10 mS/cm	
B	SW5-11	6/01/2017	Wet	DO = 2.5 mg/L EC = 28.5 mS/cm	No u/s site for comparison. Similar DO and EC results for recent dry and wet monitoring
B	SW5-11	18/01/2017	Dry	SS = 31mg/L TP = 1.98 mg/L TN = 1.98 mg/L Turbidity = 127 NTU	Tidal - very low water level with no flow. No upstream monitoring site for comparison.
B	SW5-11	1/02/2017	Dry	DO = 1.1 mg/L pH = 7.0	Very low water level, no flow and no u/s site for comparison
B	SW5-11	1/03/2017	Wet	TN = 4.10 mg/L Turbidity = 45 NTU	There is no upstream monitoring site for comparison.
B	SW5-11	6/03/2017	Wet	pH = 6.69 DO = 2.96 mg/L	Low water level, no flow. No u/s for comparison.
B	SW5-11	10/03/2017	Dry	TP = 0.1 mg/L DO = 2.78 mg/L	Very high tide. No upstream monitoring site for comparison.
B	SW5-11	6/04/2017	Wet	DO = 2.53 mg/L	Low flow. Tannin stained water. No upstream monitoring site for comparison.
B	SW5-11	6/04/2017	Wet	TN = 1.14 mg/L DO = 2.53 mg/L	Low flow. Tannin stained water. No upstream monitoring site for comparison of results.
B	SW5-11	12/04/2017	Dry	DO = 2.48 mg/L	Stagnant, no visible flow. No upstream monitoring site for comparison of results.
B	SW5-11	4/05/2017	Wet	DO = 3.08 mg/L	Low water level, low flow. Incoming tide. Drizzle. There is no upstream site for comparison.
B	SW5-11	7/06/2017	Dry	DO = 0.67 mg/L	Weather fine. Low water level. Stagnant. There is no upstream site for comparison.
B	SW5-11	13/06/2017	Wet	pH = 6.37 Turbidity = 146 NTU SS = 37 mg/L TN = 1.2 mg/L	Weather showers. Water level high, moderate flow. There is no upstream site for comparison.
B	SW6-02	5/08/2016	Wet	Turbidity = 821 NTU	
B	SW6-02	6/01/2017	Wet	Turbidity = 281 NTU	Moderate flow in channel
B	SW6-02	6/04/2017	Wet	Oil & grease = 5.6 mg/L	Minor flow. Upstream and downstream sites connected.
B	SW6-04	10/10/2016	Dry	DO = 1.71 mg/L	
B	SW6-04	1/11/2016	Dry	DO = 1.79 mg/L	
B	SW6-04	14/12/2016	Dry	DO = 0.26 mg/L	Low water level, no visible flow. Upstream and downstream sites appear disconnected
B	SW6-04	6/01/2017	Wet	DO = 2.9 mg/L	No visible flow from upstream, but inflow from other directions
B	SW6-04	17/01/2017	Dry	DO = 0.01 mg/L	No visible flow. Upstream and downstream sites are disconnected. No nearby construction works observed.
B	SW6-04	1/02/2017	Dry	DO = 0.6 mg/L	Very low water level, heavy scum layer, u/s and d/s sites not connected. No visible flow.
B	SW6-04	3/03/2017	Dry	TN = 1.04 mg/L pH = 5.95	Gentle flow visible. Upstream and downstream sites connected.
B	SW6-04	6/03/2017	Wet	DO = 4.33 mg/L	Gentle flow. Upstream and downstream sites connected.
B	SW6-04	13/06/2017	Wet	Turbidity = 86 NTU SS = 34 mg/L	Upstream and downstream sites connected. High flow. Very high water level. Sunny.
B	SW6-06	1/11/2016	Dry	Oil & grease = 5 mg/L TN = 1.53 mg/L	
B	SW6-06	10/11/2016	Wet	TN = 1.40 mg/L	
B	SW6-06	6/01/2017	Wet	Turbidity = 35.90 NTU pH = 5.94 EC = 0.10 mS/cm	Results are only marginally outside P20 & P80 range
B	SW6-06	17/01/2017	Dry	TSS = 44 mg/L TP = 0.18 mg/L DO = 0.2 mg/L Turbidity = 43 NTU	No visible flow. Upstream and downstream sites are disconnected. Heavy scum layer. u/s DO level also relatively low.
B	SW6-06	28/02/2017	Wet	Oil & grease = 4.2 mg/L SS = 25 mg/L Turbidity = 51 NTU	High water level, strong flow. U/S and D/S sites connected. Steady rain.

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B	SW6-06	21/04/2017	Dry	DO = 0.5 mg/L	No visible flow. Upstream and downstream monitoring sites were not connected.
C	SW7-02	5/04/2017	Wet	Oil & grease = 6.6 mg/L	Steady inflow. Upstream and downstream monitoring sites likely connected.
C	SW7-02	4/05/2017	Wet	pH = 6.76	Steady flow. Could not determine if upstream and downstream sites were connected. Weather fine.
C	SW7-02	13/06/2017	Wet	Oil & grease = 4 mg/L	Upstream and downstream sites connected. High flow. Moderate to high water level. Sunny.
C	SW7-04	3/08/2016	Dry	DO = 1.46 mg/L	
C	SW7-04	14/12/2016	Dry	DO = 1.80 mg/L	Upstream and downstream points appear disconnected.
C	SW7-04	3/01/2017	Wet	Turbidity = 81 NTU	Continuous connection to u/s site, but no visible flow.
C	SW7-04	27/02/2017	Wet	DO = 1.66 mg/L	u/s and d/s sites connected. Slight flow visible.
C	SW7-04	3/03/2017	Dry	TSS = 21 mg/L	Upstream and downstream sites connected but no visible flow.
C	SW7-04	15/03/2017	Wet	Turbidity = 212 NTU	Gentle rainfall, steady flow. Upstream and downstream sites connected. Observed sediment laden water discharging from construction site, both north and south of waterway.
C	SW7-06	3/08/2016	Dry	EC = 0.15 mS/cm pH = 6.75	
C	SW7-06	8/09/2016	Dry	EC = 0.15 mS/cm Turbidity = 11 NTU SS = 8 mg/L TP = 0.06 mg/L TN = 0.95 mg/L	
C	SW7-06	10/10/2016	Dry	EC = 0.17 mg/L	
C	SW7-06	2/11/2016	Dry	pH = 6.52 Oil & grease = 6 mg/L SS = 6 mg/L TN = 0.65 mg/L	
C	SW7-06	7/12/2016	Wet	DO = 2.74 mg/L pH = 6.68 SS = 10 mg/L TP = 0.05 mg/L	
C	SW7-06	14/12/2016	Dry	EC = 0.13 mg/L	
C	SW7-06	3/01/2017	Wet	DO = 3.32 mg/L EC = 0.11 mS/cm	Similar DO and EC results for recent dry and wet monitoring. No results from u/s site for comparison.
C	SW7-06	17/01/2017	Dry	TSS = 10 mg/L TP = 0.10 mg/L TN = 1.1 mg/L Oil & grease = 4 mg/L DO = 0.6 mg/L pH = 6.6	Similar EC and pH results for recent dry & wet events. No results from u/s site for comparison.
C	SW7-06	1/02/2017	Dry	DO = 1.4 mg/L pH = 6.7	No visible flow. No u/s site to compare.
C	SW7-06	27/02/2017	Wet	SS = 5.5mg/L DO = 2.93 mg/L pH = 6.4	No visible flow. No comparison can be made to upstream monitoring site due to access issues.
C	SW7-06	3/03/2017	Dry	TN = 1.17 mg/L	No visible flow. No access to upstream monitoring site for comparison.
C	SW7-06	15/03/2017	Wet	pH = 6.4	High water level. Steady flow. No access to upstream monitoring site for comparison.
C	SW7-06	21/04/2017	Dry	DO = 0.63 mg/L Turbidity = 15 NTU	Very gentle flow. No comparison can be made to upstream monitoring site, which was dry.
C	SW7-06	4/05/2017	Wet	DO = 3.77 mg/L pH = 7.02	High water level, moderate flow. Overcast. No comparison could be made with upstream monitoring site due to access issues.
C	SW7-06	23/05/2017	Dry	DO = 1.12 mg/L Turbidity = 27 NTU Oil & grease = 4 mg/L SS = 11 mg/L TP = 0.06 mg/L TN = 0.84 mg/L	Unable to determine if upstream and downstream sites were connected. No visible flow. Medium water level. Weather fine. No access to upstream site for comparison.

Portion	Site	Date	Wet or Dry Event	Results of Interest	Field Notes / Comments
C	SW7-06	9/06/2017	Dry	Turbidity = 15 NTU	Upstream and downstream sites connected. Moderate flow. Moderate water level. Drizzle. No comparison can be made to upstream site due to access issues.
C	SW8-02	2/11/2016	Dry	TN = 0.92 mg/L	
C	SW8-02	3/01/2017	Wet	Turbidity = 378 NTU	No visible inflow to canal from adjacent construction site
C	SW8-02	1/02/2017	Dry	DO = 4.7 mg/L	High tide, flowing out. Construction on northern side.
C	SW8-02	23/05/2017	Dry	SS = 281 mg/L TP = 0.52 mg/L TN = 1.03 mg/L	Upstream and downstream sites connected. Outflowing tide, medium water level. Weather fine.
C	SW8-04	4/08/2016	Wet	pH = 5.97 Turbidity = 139 NTU	
C	SW8-04	10/08/2016	Dry	Turbidity = 27 NTU	
C	SW8-04	9/09/2016	Dry	Turbidity = 114 NTU Oil & grease = 12 mg/L SS = 534 mg/L TP = 0.63 mg/L TN = 3.67 mg/L	
C	SW8-04	15/03/2017	Wet	DO = 3.43 mg/L pH = 6.01 Turbidity = 69 NTU	Steady flow, heavy rainfall.
C	SW8-04	23/05/2017	Dry	pH = 5.91 TP = 0.2 mg/L TN = 1.64 mg/L	Upstream and downstream sites connected. No visible flow. Low water level. Weather fine.
C	SW8-04	13/06/2017	Wet	pH = 5.75 Turbidity = 40 NTU	Upstream and downstream sites connected. Low to moderate flow. Very high water level. Weather fine.
C	SW8-06	9/09/2016	Dry	SS = 50 mg/L	
C	SW8-06	6/12/2016	Wet	DO = 4.30 mg/L EC = 0.34 mS/cm pH = 6.38 SS = 29 mg/L TN = 9.34 mg/L	
C	SW8-06	14/12/2016	Dry	pH = 6.38	Very low water level
C	SW8-06	15/03/2017	Wet	pH = 6.57 Turbidity = 53 NTU	Heavy rain. Strong flow. Upstream and downstream sites connected.
C	SW8-06	9/06/2017	Dry	pH = 5.35	Upstream and downstream sites connected. Low to moderate water level and flow. Weather fine.
C	SW8-08	9/09/2016	Dry	Turbidity = 63 NTU Oil & grease = 8 mg/L	
C	SW8-08	11/10/2016	Dry	Turbidity = 204 NTU	
C	SW8-08	14/12/2016	Dry	Turbidity = 22 NTU	
C	SW8-08	6/01/2017	Wet	TSS = 22 mg/L TP = 0.06 mg/L TN = 0.95 mg/L	No visible flow.
C	SW8-08	17/01/2017	Dry	TSS = 386 mg/L TP = 0.80 mg/L TN = 6.7 mg/L	Very low water level, no visible flow. Dense aquatic vegetation and scum layer. No nearby construction.
C	SW8-08	3/02/2017	Dry	Turbidity = 203 NTU	Very low water level. Thick aquatic veg. No construction observed. Turbidity likely affected by thick veg and associated suspended particles
C	SW8-08	23/05/2017	Dry	SS = 77 mg/L TN = 1.27 mg/L	Upstream and downstream sites connected. Moderate flow, medium water level. Weather fine.
C	SW9-01	4/08/2016	Wet	DO = 6.72 mg/L EC = 0.24 mS/cm pH = 4.53	
C	SW9-01	23/05/2017	Dry	pH = 3.93 Oil & grease = 3 mg/L TP = 0.09 mg/L TN = 1.78 mg/L	Gentle flow. Medium water level. Dense aquatic vegetation. No upstream monitoring site for comparison. Weather fine.
C	SW9-01	9/06/2017	Dry	Turbidity = 92 NTU	Moderate water level. Low to moderate flow. Drizzle. No upstream monitoring site for comparison.
C	SW9-01	14/06/2017	Wet	DO = 5.55 mg/L pH = 4.63	No visible flow. Very high water level. Sample point approx. 20 m SW of designated site due to high water level. Drizzle. No upstream site for comparison.
C	SW9-03	27/02/2017	Wet	pH = 4.04	No flow. Overcast.
C	SW9-03	26/04/2017	Dry	Turbidity = 30 NTU	Slight flow. Upstream and downstream sites not connected.

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C	SW9-03	4/05/2017	Wet	Turbidity = 67 NTU	Slight flow, upstream and downstream sites connected. Tannin stained water. Light drizzle.
D	GDE07	10/06/2016	Dry	EC = 0.13 mS/cm	
D	GDE07	9/09/2016	Dry	DO = 2.04 mg/L EC = 0.16 mS/cm pH = 5.92	
D	GDE07	3/11/2016	Dry	DO = 0.64 mg/L Oil & grease = 4 mg/L	
D	GDE07	10/11/2016	Wet	DO = 0.72 mg/L	
D	GDE07	7/12/2016	Wet	DO = 2.15 mg/L Turbidity = 63 NTU	
D	GDE07	15/12/2016	Dry	DO = 0.44 mg/L EC = 0.20 mS/cm	
D	GDE07	3/01/2017	Wet	DO = 1.89 mg/L	Similar DO results for recent dry and wet monitoring. No u/s site for comparison.
D	GDE07	18/01/2017	Dry	TP = 0.11 mg/L DO = 0.1 mg/L Turbidity = 41 NTU	Very low water level. No u/s site for comparison.
D	GDE07	3/02/2017	Dry	pH = 7.5	Very low water level. No u/s site for comparison.
D	GDE07	28/02/2017	Wet	Turbidity = 51 NTU	Very high water level. Light rain. No u/s site for comparison.
D	GDE07	13/03/2017	Dry	DO = 2.06 mg/L	Low to medium water level. No observed inflow. No upstream monitoring site for comparison.
D	GDE07	16/03/2017	Wet	TN = 1.48 mg/L DO = 1.54 mg/L Turbidity = 41 NTU	Strong inflow. Very high water level. No upstream monitoring site for comparison.
D	GDE07	4/04/2017	Wet	DO = 1.87 mg/L	High water level, steady inflow. No upstream monitoring site for comparison.
D	GDE07	26/04/2017	Dry	DO = 0.52 mg/L pH = 5.8	No visible flow. No upstream monitoring site for comparison of results.
D	GDE07	5/05/2017	Wet	DO = 0.77 mg/L	No visible flow, stagnant. High water level. Overcast. No upstream monitoring site for comparison.
D	GDE07	10/05/2017	Dry	pH = 5.87	No observed construction. Overcast. High water level. No upstream monitoring site for comparison.
D	GDE07	14/06/2017	Wet	DO = 1.67 mg/L Turbidity = 45 NTU	No visible flow. High water level. Overcast. No upstream monitoring site for comparison.
D	GDE07	28/06/2017	Dry	DO = 0.45 mg/L pH = 5.88	No visible flow. High water level. Weather fine. No upstream site for comparison.
D	SW10-02	4/08/2016	Wet	Turbidity = 122 NTU	
D	SW10-02	11/10/2016	Dry	Turbidity = 731 NTU	
D	SW10-02	10/11/2016	Wet	Turbidity = 216 NTU	
D	SW10-04	25/08/2016	Wet	TP = 0.60 mg/L	Adjacent quarry sediment basin discharging into waterway
D	SW10-04	3/11/2016	Dry	Oil & grease = 6 mg/L	
D	SW10-04	7/12/2016	Wet	DO = 1.71 mg/L	Adjacent quarry sediment basin discharging into waterway
D	SW10-04	8/12/2016	Wet	DO = 1.98 mg/L	
D	SW10-04	16/03/2017	Wet	TN = 3.76 mg/L DO = 3.53 mg/L	Low flow, upstream and downstream sites connected.
D	SW10-04	20/03/2017	Wet	TP = 0.46 mg/L DO = 2.93 mg/L	Water level in channel relatively high. Upstream and downstream sites connected, but no visible flow.
D	SW10-04	10/05/2017	Dry	SS = 94 mg/L TP = 0.37 mg/L	No observed construction. Light rain. Upstream and and downstream sites connected. No observed flow. Medium water level. Dirty water discharging from adjacent quarry sediment basin.
D	SW10-06	4/08/2016	Wet	DO = 5.47 mg/L EC = 0.18 mS/cm pH = 7.08	
D	SW10-06	10/08/2016	Dry	EC = 0.15 mS/cm pH = 7.03	
D	SW10-06	12/09/2016	Dry	DO = 2.06 mg/L Turbidity = 64 NTU Oil & grease = 5 mg/L TP = 0.47 mg/L	
D	SW10-06	11/10/2016	Dry	DO = 2.38 mg/L Turbidity = 146 NTU	

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D	SW10-06	10/11/2016	Wet	DO = 3.10 mg/L EC = 0.28 mS/cm Oil & grease = 10 mg/L SS = 26 mg/L TP = 0.28 mg/L	
D	SW10-06	7/12/2016	Wet	DO = 4.75 mg/L pH = 5.31	
D	SW10-06	15/12/2016	Dry	DO = 1.45 mg/L EC = 0.16 mS/cm pH = 5.62	Low water level
D	SW10-06	3/01/2017	Wet	TSS = 42 mg/L TP = 0.26 mg/L DO = 1 mg/L Turbidity = 53 NTU	Very low water level. No visible flow. u/s site was dry
D	SW10-06	18/01/2017	Dry	TP = 0.54 mg/L DO = 0.6 mg/L	Very low water level, no visible flow. U/s site dry. Tannin stain and scum layer visible.
D	SW10-06	28/02/2017	Wet	DO = 3.59 mg/L pH = 5.10	Strong flow. Overcast weather. u/s site was dry.
D	SW10-06	13/03/2017	Dry	TP = 0.26 mg/L TN = 1.94 mg/L pH = 5.79	Very low water level. No flow. Insufficient water to take reading in waterbody - reading taken from sample in bucket. No comparison can be made with upstream site, which was dry.
D	SW10-06	16/03/2017	Wet	Oil & grease = 3.6 mg/L TN = 0.71 mg/L DO = 4.04 mg/L pH = 5.49 mg/L	Very high flow, high water level. No comparison can be made to upstream monitoring site which was dry.
D	SW10-06	4/04/2017	Wet	DO = 4.45 mg/L pH = 5.84 mg/L	Steady flow. Indications of recent flooding. Gentle rain.
D	SW10-06	26/04/2017	Dry	DO = 2.34 mg/L	Medium flow. No comparison can be made with upstream monitoring site, which was dry.
D	SW10-06	5/05/2017	Wet	DO = 5.1 mg/L	Moderate flow, low water level. Upstream and downstream sites connected. Overcast.
D	SW10-06	14/06/2017	Wet	DO = 5.74 mg/L pH = 5.78	Upstream and downstream sites connected. High flow. Moderate to high water level. Overcast.
D	SW10-08	2/11/2016	Dry	TP = 0.12 mg/L	
D	SW10-08	10/11/2016	Wet	Oil & grease = 4 mg/L	
D	SW10-08	7/12/2016	Wet	DO = 3.77 mg/L	
D	SW10-08	3/01/2017	Wet	DO = 2.32 mg/L	Similar DO results for recent dry and wet monitoring
D	SW10-08	18/01/2017	Dry	TP = 0.17 mg/L	Low water level, no visible flow.
D	SW11-01	18/01/2017	Dry	Turbidity = 47 NTU	Mid tide, flowing in.
D	SW11-02	4/08/2016	Wet	EC = 28.60 mS/cm pH = 7.52	Sample taken 100m downstream due to access issues
D	SW11-02	3/01/2017	Wet	TSS = 28 mg/L	
D	SW11-02	13/03/2017	Dry	Oil & grease = 5 mg/L	Mid, outflowing tide. Steady flow
D	SW11-02	5/05/2017	Wet	TSS = 57 mg/L	Tidal - low tide, slight flow from upstream to downstream. Weather overcast.



Appendix C

Surface Water Quality: Data

SW3-06 - Unnamed tributary of Coldstream River

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW3-06	Access road blocked by flood water	4/08/2016												
SW3-06	Not flowing	25/08/2016	5.86	0.15	5.54	19.9	55	2	20	0.09	1.52	50	50	50
SW3-06		10/11/2016	6.71	0.34	7.00	28.9	33	1	18	0.07	1.57	50	50	50
SW3-06		6/12/2016	8.28	0.48	7.42	25.5	149							
SW3-06	Very low water level, no flow and very turbid water. No connection with SW3-05	7/01/2017	2.48	0.39	5.76	26.4	>800	1	212	0.17	3.93	50	170	50
SW3-06	Dry	28/02/2017												
SW3-06	Dry	7/03/2017												
SW3-06	Low flow. Turbidity reading exceeded maximum range of probe. No connection between upstream and downstream monitoring sites.	14/03/2017	3.13	0.52	6.08	22.0	>800	2	1625	0.51	3.40	50	50	50
SW3-06	Weather showers. Connected. Water level high, slight flow.	14/06/2017	5.60	0.09	6.23	17.9	143							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				0.59	6.34		55	3	228	0.18	1.70	50	50	50
P20			2.75	0.22	5.67									
St Dev				0.25	0.38									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
Section3 SW04		8/02/2013	3.20	0.56	6.48	22.2	16	3	50	0.21	2.50			
Section3 SW04		30/05/2013	6.55	0.43	6.43	17.4	17	3	10	0.02	0.70			
Section3 SW04		4/07/2013	8.06	0.30	5.89	14.4	19	3	3	0.03	0.80			
Section3 SW04		15/11/2013	3.93	0.26	5.41	24.7	19	3	6	0.03	1.10			
Upstream Monitoring														
SW3-05	Access road blocked by flood water	4/08/2016												
SW3-05	Not flowing	25/08/2016	6.27	0.19	5.81	18.1	43	1	9	0.06	1.29	50	50	50
SW3-05	Dry	10/11/2016												
SW3-05	Dry	6/12/2016												
SW3-05	Very low water level, no flow	7/01/2017	2.45	0.84	5.57	25.2		1	272	0.08	1.12	50	50	50
SW3-05	Dry	28/02/2017												
SW3-05	Dry	7/03/2017												
SW3-05	Low flow. Overnight rainfall. No connection between upstream and downstream monitoring sites.	14/03/2017	1.90	0.60	5.94	22.0	800	2	578	0.22	1.80	50	50	50
SW3-05	Weather showers. Connected. Water level high, slight flow.	14/06/2017	6.25	0.10	6.21	16.6	58							

SW3-10 - Pillar Valley Creek

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW3-10	On private property - no access to site	2/08/2016												
SW3-10	On private property - no access to site	8/09/2016												
SW3-10	Slight flow	6/10/2016	3.76	0.22	6.60	17.0	90							
SW3-10		3/11/2016	2.71	0.24	6.55	23.7	18	1	16	0.04	1.01	50	50	50
SW3-10	Accurate turbidity reading could not be obtained	8/12/2016	4.66	0.49	6.36	24.3								
SW3-10	Very low water level, no flow. Not connected with SW3-09	13/01/2017	11.09	0.18	7.27	29.0		1	27	0.05	1.56	50	50	50
SW3-10	Very low water level, no flow. Not connected with SW3-09	1/02/2017	4.97	0.25	7.18	28.8	34							
SW3-10	Visible flow	24/03/2017	1.51	0.15	5.85	24.5	5	1	7	0.03	0.96	50	50	50
SW3-10	U/s and d/s sites connected.	24/04/2017	5.32	0.16	6.63	19.8	1							
SW3-10	Upstream and downstream sites connected. Low flow, low water level. Silt curtain / hydrocarbon boom upstream of site. Nearby cattle. Weather fine.	11/05/2017	5.28	0.16	6.57	17.8	2	1	2	0.02	0.36	50	50	50
SW3-10	Weather fine. Connected. High flow. Water level low. Sample site adjacent to cattle crossing.	8/06/2017	4.05	0.16	6.50	14.5	3							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				0.47	6.86		17	3	12	0.04	0.85	50	98	50
P20			4.47	0.15	6.12									
St Dev				0.19	0.93									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
Section3 SW06		14/03/2013	6.01	0.46	6.50	23.5	20	3	10	0.06	0.80			
Section3 SW06		21/03/2013	6.16	0.52	3.11	23.6	16	3	5	0.04	0.60			
Section3 SW06		23/04/2013	8.45	0.12	6.63	19.5	16	3	10	0.01	0.60			
Section3 SW06		22/05/2013	9.82	0.26	6.98	14.8	12	3	7	0.03	0.50			
Section3 SW06		27/06/2013	9.73	0.15	6.83	15.8	11	3	3	0.03	0.33			
Section3 SW06		24/07/2013	9.64	0.18	6.28	16.3	10	3	5	0.01	0.44			
Section3 SW06		21/08/2013	9.44	0.17	7.09	14.7	7	3	6	0.04	0.02			
Section3 SW06		25/09/2013	8.63	0.18	6.40	23.1	18	3	16	0.01	0.42			
Section3 SW06		23/10/2013	8.55	0.26	6.17	29.5	20	3	14	0.02	0.72			
Section3 SW06		28/11/2013	6.08	0.20	5.68	25.7	17	3	15	0.02	0.74			
Section3 SW06		18/12/2013	8.55	0.18	5.67	27.2	27	3	11	0.25	0.60			
Upstream Monitoring														
SW3-09	On private property - no access to site	2/08/2016												
SW3-09	On private property - no access to site	8/09/2016												
SW3-09	Slight flow	6/10/2016	3.67	0.22	6.67	16.4	7	1	12	0.03	1.75	50	170	50
SW3-09	No flow	3/11/2016	7.08	0.24	6.76	21.4	2							
SW3-09		8/12/2016	2.75	0.74	6.74	24.1	11							
SW3-09	Very low, no flow. Not connected with SW3-10	13/01/2017	4.25	0.59	7.20	27.5	16	1	12	0.02	1.22	50	50	50

SW3-14 - Unnamed Creek tributary of Ellis Swamp

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW3-14	Intermittent watercourse, sample collected in small waterbody	2/08/2016	7.12	0.29	5.66	15.7	6								
SW3-14	Flowing	8/09/2016	5.28	0.24	5.85	16.3	6	2	17	0.03	0.99	50	50	50	
SW3-14	Not flowing	6/10/2016	3.15	0.24	5.77	15.3	56								
SW3-14		1/11/2016	2.52	0.27	6.07	20.1	7	1	23	0.03	1.01	50	270	50	
SW3-14		8/12/2016	0.80	0.30	6.40	22.6	61								
SW3-14	Very low water level, no flow and not connected with SW3-13	13/01/2017	1.80	0.21	6.61	27.5	34	1	29	0.04	1.29	50	370	50	
SW3-14	Very low water level, no flow and not connected with SW3-13	1/02/2017	1.22	0.28	6.86	28.2	4								
SW3-14	u/s and d/s sites not connected	24/03/2017	8.04	0.14	5.59	24.0	17	1	7	0.03	1.41	50	50	50	
SW3-14	U/s and d/s sites connected.	24/04/2017	5.25	0.18	6.17	20.3	3								
SW3-14	Dry	11/05/2017													
SW3-14	Weather fine. Upstream and downstream sites connected by a trickle of water. Water level very low. Slightly stagnant.	8/06/2017	6.02	0.18	6.12	14.7	106								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				0.30	6.48		39	3	25	0.05	1.27	50	216	50	
P20			2.50	0.14	5.46										
St Dev				0.08	0.60										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
Section3 SW22		27/02/2013	7.73	0.12	6.39	22.1	21	3	8	0.03	1.10				
Section3 SW22		21/03/2013	6.81	0.11	6.35	22.6	9	3	3	0.01	0.90				
Section3 SW22		18/04/2013	7.63	0.11	6.45	23.5	8	3	3	0.04	1.00				
Section3 SW22		22/05/2013	6.11	0.19	6.61	13.6	7	3	16	0.02	0.40				
Section3 SW22		27/06/2013	9.70	0.30	6.38	16.4	8	3	3	0.02	0.40				
Section3 SW22		24/07/2013	5.79	0.18	5.52	13.4	7	3	9	0.02	0.52				
Section3 SW22		21/08/2013	4.20	0.18	6.79	12.5	10	3	15	0.07	0.50				
Section3 SW22		25/09/2013	1.89	0.20	6.28	18.7	36	3	40	0.08	0.59				
Section3 SW22	Dry	23/10/2013													
Section3 SW22		28/11/2013	2.55	0.17	5.36	25.5	9	3	22	0.02	1.71				
Section3 SW22		18/12/2013	3.04	0.17	5.32	25.5	7	6	13	0.25	0.30				
Upstream Monitoring															
SW3-13	Intermittent watercourse, sample collected in small waterbody	2/08/2016	7.91	0.32	4.89	16.0	34								
SW3-13	Flowing	8/09/2016	5.79	0.25	6.30	16.7	24	1	18	0.03	1.12	50	50	50	
SW3-13	Not flowing	6/10/2016	6.07	0.25	6.08	16.0	145								
SW3-13		1/11/2016	3.65	0.30	5.32	22.2	32	1	47	0.02	0.88	50	270	50	
SW3-13		8/12/2016	1.36	0.37	6.17	23.2	800								
SW3-13	Very low, no flow and not connected with SW3-14	13/01/2017	6.75	0.26	6.99	28.5	49	1	30	0.03	1.49	50	180	50	
SW3-13	Very low, no flow and not connected with SW3-14	1/02/2017	2.54	0.39	6.92	32.4	206								

SW3-16 - Chaffin Creek

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW3-16	Dry	2/08/2016												
SW3-16	Intermittent watercourse	8/09/2016	4.62	0.22	6.01	15.9	3	2	10	0.03	0.60	50	50	50
SW3-16	Flowing	6/10/2016	2.16	0.26	6.35	17.6	3							
SW3-16		1/11/2016	2.32	0.28	6.57	22.5	2	1	6	0.02	1.40	50	160	50
SW3-16		8/12/2016	1.68	0.27	6.17	25.4	10							
SW3-16	Water level low, slight flow	13/01/2017	2.84	0.26	6.71	29.5	9	1	4	0.02	0.80	50	50	50
SW3-16	Water level low, no flow	1/02/2017	3.33	0.30	6.92	31.0	0							
SW3-16	U/s and d/s sites connected	24/03/2017	2.33	0.13	5.90	24.8	9	1	5	0.03	0.83	50	50	50
SW3-16	U/s and d/s sites connected.	24/04/2017	1.57	0.15	6.29	20.6	1							
SW3-16	Upstream and downstream sites connected. Low flow, water level low. Shady. Weather fine.	11/05/2017	2.61	0.17	6.32	17.9	2	1	1	0.02	0.45	50	50	50
SW3-16	Weather fine. Connected. Water level low.	8/06/2017	4.05	0.15	6.01	14.7	3							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				0.26	6.67		19	3	7	0.05	0.83	50	152	50
P20			3.64	0.15	6.11									
St Dev				0.06	0.40									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
Section3 SW08		27/02/2013	5.48	0.19	6.44	23.7	24	3	12	0.03	0.80			
Section3 SW08		21/03/2013	4.35	0.14	6.34	23.8	14	3	7	0.06	0.70			
Section3 SW08		18/04/2013	6.85	0.10	6.52	22.9	21	3	5	0.05	0.80			
Section3 SW08		22/05/2013	5.63	0.24	6.72	14.8	10	3	6	0.08	0.60			
Section3 SW08		27/06/2013	7.94	0.15	6.22	15.8	19	3	6	0.03	0.62			
Section3 SW08		24/07/2013	7.87	0.23	5.94	15.0	18	3	6	0.03	0.44			
Section3 SW08		21/08/2013	7.17	0.21	6.82	14.8	9	3	5	0.04	1.50			
Section3 SW08		25/09/2013	6.43	0.23	6.31	23.2	5	3	6	0.01	0.41			
Section3 SW08		23/10/2013	6.51	0.34	6.74	28.5	4	3	3	0.02	0.72			
Section3 SW08		28/11/2013	6.23	0.17	5.51	30.3	19	3	10	0.02	0.83			
Section3 SW08		18/12/2013	3.04	0.17	5.32	25.5	7	5	5	0.25	0.30			
Upstream Monitoring														
SW3-15	Dry	2/08/2016												
SW3-15	Intermittent watercourse	8/09/2016	5.37	0.22	6.11	16.1	0	1	7	0.03	0.62	50	50	50
SW3-15	Flowing	6/10/2016	2.70	0.26	6.19	17.5	5							
SW3-15		1/11/2016	4.33	0.28	6.55	22.4	9	1	3	0.02	0.59	50	140	50
SW3-15		8/12/2016	3.48	0.27	6.30	24.9	88							
SW3-15	Water level low, slight flow	13/01/2017	3.70	0.26	6.75	29.3	8	1	2	0.02	1.21	50	200	50
SW3-15	Water level low, not flow	1/02/2017	3.64	0.31	6.67	30.6	0							
SW3-15	U/s and d/s sites connected	24/03/2017	7.97	0.13	5.85	24.8	4	1	3	0.04	0.94	50	50	50

SW3-18 - Unnamed tributary of Chaffin Creek

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW3-18	Private property - no access	2/08/2016												
SW3-18	Private property - no access	8/09/2016												
SW3-18	Private property - no access	6/10/2016												
SW3-18	Dry	1/11/2016												
SW3-18	Dry	8/12/2016												
SW3-18	Dry	13/01/2017												
SW3-18	Dry	1/02/2017												
SW3-18	Visible flow	24/03/2017	4.28	0.12	5.40	24.1	5	1	4	0.02	0.86	50	50	50
SW3-18	Insufficient water to monitor	24/04/2017												
SW3-18	Dry	11/05/2017												
SW3-18	Dry	8/06/2017												
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				0.29	6.12		17	3	28	0.02	0.78	50	50	50
P20			3.65	0.12	5.29									
St Dev				0.10	0.86									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
Section3 SW09		27/02/2013	6.72	0.13	6.85	23.8	18	3	10	0.02	0.70			
Section3 SW09		21/03/2013	6.53	0.11	6.46	20.5	6	3	3	0.01	0.60			
Section3 SW09		18/04/2013	6.71	0.12	6.09	22.1	9	3	3	0.02	0.80			
Section3 SW09		22/05/2013	6.42	0.17	6.05	14.6	16	3	24	0.02	0.50			
Section3 SW09		27/06/2013	8.77	0.16	6.00	14.4	5	3	3	0.01	0.30			
Section3 SW09		24/07/2013	7.59	0.21	5.24	12.9	6	3	7	0.01	0.32			
Section3 SW09		21/08/2013	4.87	0.29	6.13	14.5	13	3	31	0.02	0.51			
Section3 SW09		25/09/2013	1.92	0.33	5.32	19.0	16	3	33	0.01	0.39			
Section3 SW09		23/10/2013	3.54	0.43	5.43	22.4	32	3	29	0.05	1.30			
Section3 SW09		28/11/2013	5.31	0.24	5.32	21.4	15	3	11	0.01	0.54			
Section3 SW09		18/12/2013	4.09	0.29	3.48	24.9	18	3	13	0.25	0.40			
Upstream Monitoring														
SW3-17	Private property - no access	2/08/2016												
SW3-17	Private property - no access	8/09/2016												
SW3-17	Private property - no access	6/10/2016												
SW3-17	Dry	1/11/2016												
SW3-17	Dry	8/12/2016												
SW3-17	Dry	13/01/2017												
SW3-17	Dry	1/02/2017												
SW3-17	Visible flow	24/03/2017	3.28	0.12	5.28	23.5	4	1	8	0.02	1.14	50	50	50

SW3-20 - Champions Creek

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW3-20	Fast flowing water	4/08/2016	8.15	0.06	5.24	14.0	43								
SW3-20	Low water level (0.3-0.5m), not flowing, no main channel identifiable. Photos taken.	25/08/2016	3.03	0.15	4.91	14.0	18	2	4	0.02	0.63	50	50	50	
SW3-20		10/11/2016	3.83	0.29	4.22	26.8	11	1	20	0.04	0.74	50	50	50	
SW3-20		6/12/2016	9.22	0.34	7.33	23.8	12								
SW3-20	No flow, low water level. Sample taken from isolated pool of water. Not connected to SW3-19	7/01/2017	0.76	0.46	4.27	24.5	63	1	44	0.02	1.45	50	50	50	
SW3-20	No flow, low water level. Sample taken from isolated pool of water. Not connected to SW3-19	27/01/2017	1.53	0.68	3.98	24.2	14								
SW3-20	Slight flow, low water level. Not connected to SW3-19.	28/02/2017	0.18	0.53	4.58	21.5	232								
SW3-20	No connection between upstream and downstream monitoring sites.	7/03/2017	0.00	0.47	5.19	25.6	21	2	76	0.06	1.20	50	110	50	
SW3-20	Slight visible flow. No connection to upstream monitoring site, which was dry.	14/03/2017	3.00	0.34	5.73	22.7	52	1	45	0.02	0.50	50	50	50	
SW3-20	Weather showers. Connected. Water level moderate. Steady flow.	14/06/2017	5.53	0.06	5.55	16.1	13								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				0.33	5.89		31	3	22	0.03	0.96	50	50	50	
P20			5.10	0.09	4.88										
St Dev				0.16	0.87										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
Section3 SW10		7/02/2013	5.06	0.25	5.78	23.0	9	3	27	0.12	1.30				
Section3 SW10		29/05/2013	6.00	0.50	6.10	16.2	16	3	22	0.03	0.80				
Section3 SW10		3/07/2013	6.74	0.13	5.97	16.0	41	3	6	0.03	0.90				
Section3 SW10		14/11/2013	5.75	0.38	3.40	25.0	3	3	3	0.01	0.70				
Upstream Monitoring															
SW3-19	Fast flowing water.	4/08/2016	10.00	0.06	5.33	14.0	45								
SW3-19	Sample point approx. 30 m from road (low lying water level, not flowing), no main channel identifiable. Photos taken.	25/08/2016	9.87	0.14	5.05	15.4	2	1	4	0.02	0.96	50	50	50	
SW3-19		10/11/2016	2.62	0.17	4.76	28.7	9	1	8	0.02	0.52	50	50	50	
SW3-19	Dry	6/12/2016													
SW3-19	Dry	7/01/2017													
SW3-19	Dry	27/01/2017													
SW3-19	Dry	28/02/2017													
SW3-19	Dry	7/03/2017													
SW3-19	Dry	14/03/2017													
SW3-19	Weather showers. Connected. Water level moderate. Steady flow.	14/06/2017	5.17	0.06	5.40	16.1	13								

SW3-22 - Unnamed bodies of water

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW3-22	Intermittent watercourse - test was conducted in pools	2/08/2016	3.73	0.21	4.86	14.2	4								
SW3-22	Flowing	8/09/2016	3.89	0.18	5.67	16.3	3	2	10	0.02	0.37	50	50	50	
SW3-22	Not flowing	6/10/2016	2.60	0.17	5.50	16.7	6								
SW3-22		1/11/2016	7.55	0.17	5.54	23.0	3	1	15	0.02	0.72	50	50	50	
SW3-22	Dry	8/12/2016													
SW3-22	Dry	13/01/2017													
SW3-22	Dry	1/02/2017													
SW3-22	Visible flow	24/03/2017	5.10	0.12	5.79	23.3	1	1	1	0.02	0.37	50	50	50	
SW3-22		24/04/2017	4.23	0.16	6.18	23.2	9								
SW3-22	Upstream and downstream sites not connected. Low flow. Low water level - isolated pool.	11/05/2017	5.18	0.19	5.80	17.2	4	1	4	0.02	0.17	50	50	50	
SW3-22	Dry	8/06/2017													
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				0.21	6.27		13	3	12	0.02	0.50	50	50	50	
P20			2.23	0.15	5.71										
St Dev				0.04	0.35										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
Section3 SW11		6/03/2013	6.05	0.18	5.90	22.3	25	3	3	0.02	0.60				
Section3 SW11		20/03/2013	5.73	0.13	6.30	22.3	7	3	3	0.02	0.50				
Section3 SW11		17/04/2013	7.24	0.12	6.28	20.8	6	3	3	0.02	0.50				
Section3 SW11		22/05/2013	3.55	0.14	6.26	14.2	10	3	11	0.02	0.30				
Section3 SW11		26/06/2013	7.45	0.21	6.46	14.4	7	3	3	0.01	0.24				
Section3 SW11		24/07/2013	6.44	0.20	5.66	12.6	7	3	3	0.01	0.30				
Section3 SW11		21/08/2013	6.14	0.16	6.37	11.0	10	3	8	0.01	0.15				
Section3 SW11		25/09/2013	2.34	0.19	5.79	18.9	16	3	16	0.01	0.39				
Section3 SW11		23/10/2013	4.28	0.24	6.26	21.7	5	3	3	0.02	0.52				
Section3 SW11		28/11/2013	6.07	0.25	5.65	21.5	8	3	3	0.01	0.44				
Section3 SW11		18/12/2013	3.81	0.19	5.25	21.8	9	3	9	0.25	0.50				
Upstream Monitoring															
SW3-21	Intermittent watercourse - test was conducted in pools	2/08/2016	2.59	0.25	5.22	14.9	7								
SW3-21	Not flowing	8/09/2016	3.45	0.19	5.83	17.0	55	1	19	0.02	0.41	50	50	50	
SW3-21	Not flowing	6/10/2016	1.63	0.19	5.75	17.9	30								
SW3-21		1/11/2016	2.30	0.23	5.95	23.0	4	1	4	0.04	1.25	50	50	50	
SW3-21	Dry	8/12/2016													
SW3-21	Dry	13/01/2017													
SW3-21	Dry	1/02/2017													
SW3-21	Visible flow	24/03/2017	9.03	0.12	5.74	23.4	1	1	2	0.02	0.45	50	50	50	

SW4-02 - Shark Swamp overflow

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW4-02		2/08/2016	9.08	0.00	3.04	17.0	16							
SW4-02	Flowing	8/09/2016	9.04	1.61	4.48	18.1	22	2	33	0.15	1.06	50	50	50
SW4-02		7/10/2016	4.71	1.93	7.02	19.7	102							
SW4-02	Dry	3/11/2016												
SW4-02		5/12/2016	6.93	2.50	6.86	32.7	187							
SW4-02	Very low water level, no flow and stagnant. Not connected with SW4-01	18/01/2017	7.85	4.23	7.16	37.6	119	1	39	0.08	8.09	13	50	50
SW4-02	Very low water level, no flow and stagnant. Not connected with SW4-01	1/02/2017	3.56	4.79	2.98	32.2	0							
SW4-02	Stagnant, no observable flow.	10/03/2017	4.17	1.64	5.16	24.9	7	3	22	0.03	3.90	50	120	50
SW4-02		12/04/2017	0.00	0.29	6.44	20.7	5							
SW4-02	Tidal. Low flow. U/s and d/s sites connected. Outgoing tide.	3/05/2017	0.50	2.18	3.95	20.4	31	1	42	0.05	2.12	50	330	50
SW4-02	Weather fine. Connected. Level and flow moderate.	7/06/2017	3.84	2.67	3.44	16.2	4							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				2.60	6.45		44	3	19	0.13	2.11	102	340	50
P20			2.79	0.93	3.86									
St Dev				1.22	1.28									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
Section3 SW23		27/02/2013	5.13	0.22	6.49	25.8	43	3	27	0.08	0.70			
Section3 SW23		19/03/2013	4.98	0.12	6.35	24.2	19	3	3	0.17	1.30			
Section3 SW23		17/04/2013	4.04	0.24	5.83	25.1	16	3	11	0.11	1.20			
Section3 SW23		21/05/2013	7.34	1.09	4.03	17.2	5	3	8	0.03	0.50			
Section3 SW23		26/06/2013	8.42	1.15	5.02	15.9	9	3	7	0.04	1.10			
Section3 SW23		23/07/2013	8.30	1.11	3.96	17.7	9	3	7	0.03	0.34			
Section3 SW23		20/08/2013	10.46	1.48	4.89	18.0	4	3	3	0.01	0.62			
Section3 SW23		24/09/2013	8.15	1.74	4.33	22.7	9	3	13	0.05	0.70			
Section3 SW23		22/10/2013	8.86	2.16	3.80	30.7	5	3	9	0.02	0.62			
Section3 SW23		28/11/2013	7.54	1.46	3.38	28.6	4	3	3	0.01	0.60			
Upstream Monitoring														
SW4-01		2/08/2016	8.76	2.58	3.30	14.1	32							
SW4-01	Flowing	8/09/2016	2.57	1.54	5.32	18.8	50	1	53	0.29	1.87	50	50	50
SW4-01		7/10/2016	0.00	1.90	6.92	15.9	100							
SW4-01	Dry	3/11/2016												
SW4-01		5/12/2016	7.59	2.78	6.75	29.0	10							
SW4-01	Very low, no flow and stagant. Not connected with SW4-02	18/01/2017	4.43	4.20	7.10	41.1	103	1	8	0.02	2.68	13	50	50
SW4-01	Very low, no flow and stagant. Not connected with SW4-02	1/02/2017	2.85	4.61	4.41	27.6	4							
SW4-01	Stagnant, no observable flow.	10/03/2017	4.54	1.90	5.53	25.1	7	1	14	0.03	3.20	50	140	50

SW4-04 - Shark Creek

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW4-04		2/08/2016	8.65	2.90	6.65	17.2	8								
SW4-04	Flowing	8/09/2016	3.56	0.59	5.25	18.8	5	2	19	0.03	0.67	50	50	50	
SW4-04		7/10/2016	2.42	0.91	6.19	20.2	21								
SW4-04		3/11/2016	7.49	4.61	6.86	25.6	2	1	6	0.02	0.98	50	50	50	
SW4-04		5/12/2016	8.46	8.99	6.70	28.5	98								
SW4-04	Tidal	18/01/2017	5.00	12.90	7.35	30.9	17	1	5	0.02	0.53	13	50	50	
SW4-04	Tidal	1/02/2017	3.95	14.70	7.54	29.2	0								
SW4-04	Tidal	10/03/2017	4.14	16.20	7.61	25.6	3	2	5	0.03	0.10	50	50	50	
SW4-04	Tidal	12/04/2017	0.00	0.16	6.37	21.1	7								
SW4-04	Tidal. Low flow. U/s and d/s sites connected. Outgoing tide.	3/05/2017	1.32	0.59	5.46	19.8	13	1	47	0.07	1.37	50	200	50	
SW4-04	Weather fine. Upstream and downstream sites connected. Level and flow moderate.	7/06/2017	3.00	0.81	4.72	15.9	5								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				6.32	7.16		13	3	26	0.05	0.96	50	162	50	
P20			2.02	0.36	4.92										
St Dev				5.20	1.24										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
Section3 SW13		27/02/2013	4.86	0.13	6.20	26.8	42	3	37	0.06	0.80				
Section3 SW13		20/03/2013	2.01	0.12	6.04	22.7	13	3	23	0.07	1.00				
Section3 SW13		17/04/2013	3.24	0.41	4.92	22.4	8	3	11	0.03	0.70				
Section3 SW13		21/05/2013	6.11	0.49	6.47	24.3	5	3	9	0.02	0.50				
Section3 SW13		26/06/2013	7.05	0.32	5.61	15.1	4	3	3	0.01	0.35				
Section3 SW13		23/07/2013	4.76	0.59	3.78	16.5	6	3	3	0.01	0.51				
Section3 SW13		20/08/2013	8.84	1.19	7.16	16.5	11	3	18	0.02	0.33				
Section3 SW13		24/09/2013	7.86	3.38	7.15	22.8	9	3	9	0.01	0.39				
Section3 SW13		22/10/2013	7.58	6.32	6.89	26.2	5	3	6	0.02	0.43				
Section3 SW13		27/11/2013	2.77	0.36	4.00	24.2	11	3	31	0.01	0.70				
Upstream Monitoring															
SW4-03		2/08/2016	8.82	2.99	6.61	16.1	13								
SW4-03	Flowing	8/09/2016	2.96	0.68	4.28	18.5	0	1	10	0.02	0.97	50	150	50	
SW4-03		7/10/2016	2.02	0.92	6.10	20.1	18								
SW4-03		3/11/2016	5.18	4.70	7.35	26.0	5	1	2	0.03	0.96	50	50	50	
SW4-03		5/12/2016	8.76	8.65	6.77	28.8	374								
SW4-03	Tidal	18/01/2017	5.29	13.20	7.48	30.7	4	1	10	0.02	0.40	13	50	50	
SW4-03	Tidal	1/02/2017	2.89	14.90	7.49	29.3	0								
SW4-03	Tidal	10/03/2017	4.30	16.30	7.60	25.7	2	1	25	0.05	0.10	50	50	50	
SW4-03	Tidal	12/04/2017	0.00	0.16	6.40	21.0	4								

SW4-04 - Shark Creek

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW4-04		4/08/2016	6.67	1.84	6.07	15.0	173							
SW4-04		11/11/2016	5.43	7.83	7.81	26.7	8		11	0.02	1.36	50	50	50
SW4-04		6/01/2017	3.78	13.70	7.17	27.1	40							
SW4-04		1/03/2017	4.68	15.40	7.60	27.3	8	1	8	0.01	0.40	13	50	50
SW4-04	Tidal	7/03/2017	4.90	15.80	7.40	26.5	5							
SW4-04	In-situ measurements taken from bucket sample. Heavy anoxic odour.	6/04/2017	1.77	0.17	6.40	21.8	16	1	23	0.09	1.25	50	50	50
SW4-03	Mid water level, inflowing tide therefore SW4-03 is downstream. U/s and d/s sites connected. Drizzle	4/05/2017	0.00	0.64	4.65	19.1	3							
SW4-04	Weather showers. Upstream and downstream sites connected. High water level, outgoing tide.	13/06/2017	5.53	0.19	4.73	16.6	9	1	15	0.03	0.69	13	50	50
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				11.62	7.33		36	3	27	0.11	0.85	50	50	50
P20			1.64	0.46	5.62									
St Dev				6.29	0.97									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
Section3 SW13		7/02/2013	1.30	0.35	5.52	23.7	27	3	38	0.15	0.40			
Section3 SW13		28/05/2013	9.84	1.55	7.13	18.5	13	3	16	0.06	0.60			
Section3 SW13		1/07/2013	9.84	1.55	7.13	18.5	13	3	7	0.03	0.45			
Section3 SW13		13/11/2013	7.36	7.40	6.24	25.9	62	3	31	0.02	1.20			
Section3 SW13		17/12/2013	7.36	1.03	6.54	25.7	11	3	8	0.50	0.60			
Upstream Monitoring														
SW4-03		4/08/2016	6.97	1.86	5.78	15.2	171							
SW4-03		11/11/2016	4.68	7.59	7.63	26.6	2	1	7	0.02	0.62	50	50	50
SW4-03		6/01/2017	2.15	14.30	6.96	27.3	42							
SW4-03		1/03/2017	4.28	16.40	7.50	27.1	7	1	6	0.02	0.10	13	50	50
SW4-03	Tidal	7/03/2017	5.55	15.50	7.46	26.5	5							
SW4-03	Heavy anoxic odour	6/04/2017	0.00	0.15	6.33	21.6	14	1	25	0.08	1.28	50	50	50
SW4-04	Mid water level, inflowing tide therefore SW4-04 is upstream. U/s and d/s sites connected. Drizzle	4/05/2017	0.00	0.62	5.13	19.1	13							
SW4-03	Weather showers. Upstream and downstream site connected. High water level, outgoing tide.	13/06/2017	4.38	0.18	4.58	16.8	5	1	11	0.02	0.60	13	50	50

SW4-06 - Edwards Creek

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW4-06	Murky water, medium sloping banks	2/08/2016	7.18	6.56	6.53	16.6	6								
SW4-06	Flowing	8/019/2016	5.94	0.46	6.26	19.8	5	2	12	0.06	0.73	50	50	50	
SW4-06	Tidal	7/10/2016	4.86	3.67	5.93	19.8	33								
SW4-06	Accurate turbidity reading could not be obtained	3/11/2016	5.40	9.60	7.12	26.4		1	19	0.03	0.90	50	50	50	
SW4-06		5/12/2016	8.79	13.70	6.67	30.8	2								
SW4-06	Tidal	18/01/2017	8.28	9.77	7.77	31.6	9	1	5	0.02	2.42	13	50	50	
SW4-06	Tidal	1/02/2017	3.53	12.00	7.19	27.5	1								
SW4-06	Tidal	10/03/2017	7.11	6.16	8.14	23.6	15	1	29	0.02	0.70	50	50	50	
SW4-06	Tidal	12/04/2017	1.97	0.28	6.53	23.4	14								
SW4-06	Tidal. Low flow. U/s and d/s sites connected. Outgoing tide.	3/05/2017	3.58	3.50	6.98	21.4	32	1	13	0.05	1.41	50	50	50	
SW4-06	Weather fine. Connected. Low flow. Outgoing tide.	7/06/2017	6.82	7.47	6.81		7								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				7.96	7.01		23	3	22	0.08	1.04	50	62	50	
P20			5.44	0.52	5.97										
St Dev				4.14	0.92										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
Section3 SW14		27/02/2013	9.63	0.18	6.68	25.8	31	3	34	0.15	1.20				
Section3 SW14		20/03/2013	5.81	0.16	6.72	24.2	19	3	19	0.15	1.00				
Section3 SW14		17/04/2013	2.67	0.29	5.04	21.3	7	3	10	0.03	0.70				
Section3 SW14		21/05/2013	9.01	5.11	6.94	21.0	8	3	9	0.01	0.50				
Section3 SW14		26/06/2013	9.43	1.36	7.03	16.3	13	3	14	0.03	0.55				
Section3 SW14		23/07/2013	7.12	1.82	5.80	19.3	23	3	21	0.01	0.53				
Section3 SW14		20/08/2013	9.63	7.96	7.14	18.6	9	3	13	0.01	0.14				
Section3 SW14		24/09/2013	8.63	7.28	7.18	22.4	4	3	5	0.01	0.35				
Section3 SW14		22/10/2013	8.79	11.20	6.94	26.5	4	3	3	0.14	1.00				
Section3 SW14		27/11/2013	5.44	3.82	3.71	26.2	7	3	6	0.01	0.54				
Upstream Monitoring															
SW4-05	Murky water, medium sloping banks	2/08/2016	8.04	6.57	6.20	15.7	14								
SW4-05	Flowing	8/09/2016	5.91	0.52	5.97	19.5	6	1	15	0.06	0.77	50	50	50	
SW4-05	Tidal	7/10/2016	5.47	3.64	4.49	19.3	8								
SW4-05		3/11/2016	7.01	9.66	6.47	26.6	3	1	12	0.03	0.94	50	50	50	
SW4-05		5/12/2016	9.02	15.00	6.73	33.1	3								
SW4-05	Tidal	18/01/2017	7.84	9.33	6.80	31.3	19	1	11	0.02	2.88	13	50	50	
SW4-05	Tidal	1/02/2017	6.96	6.56	7.10	28.3	37								
SW4-05	Tidal	10/03/2017	4.84	6.91	6.72	23.9	3	1	25	0.02	0.80	50	50	50	
SW4-05	Tidal	12/04/2017	0.88	0.26	6.20	26.1	27								

SW5-06 - Clarence River

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW5-06		2/08/2016	7.80	24.00	8.37	17.8	132								
SW5-06		5/09/2016	7.72	6.28	7.26	18.8	38	4	25	0.06	0.40	25	50	50	
SW5-06		10/10/2016	7.33	16.00	7.57	21.3	13								
SW5-06		1/11/2016	6.35	25.10	7.57	24.0	10	4	8	0.03	0.32	25	50	50	
SW5-06		13/12/2016	6.31	29.10	7.49	25.9	3								
SW5-06	Tidal	18/01/2017	5.49	22.60	7.65	29.3	6	1	5	0.02	0.36	13	50	50	
SW5-05	Tidal - incoming therefore SW5-05 is downstream.	1/02/2017	4.02	24.70	8.06	28.3	8								
SW5-06	Very high tide	10/03/2017	6.36	36.40	7.85	25.0	7	1	78	0.03	0.25	50	50	50	
SW5-06	High tide	12/04/2017	2.52	6.95	6.95	22.3	17								
SW5-06	Tidal. Low flow. U/s and d/s sites connected. Outgoing tide.	3/05/2017	8.62	11.60	7.59	21.3	10	1	30	0.04	1.00	50	50	50	
SW5-06	Weather fine. Upstream and downstream sites connected. Mid water level, outgoing tide.	7/06/2017	5.98	22.00	8.20		12								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				24.50	7.65		47	3	78	0.15	0.80	50	50	50	
P20			6.38	6.00	6.82										
St Dev				10.78	0.52										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
Section3 SW16		28/02/2013	6.75	0.09	6.73	25.1	87	3	70	0.10	0.80				
Section3 SW16		20/03/2013	7.46	2.76	6.92	23.3	21	3	33	0.01	0.80				
Section3 SW16		16/04/2013	8.58	0.00	6.93	24.4	25	3	25	0.07	0.50				
Section3 SW16		21/05/2013	9.08	18.18	6.71	17.4	7	3	18	0.04	0.30				
Section3 SW16		26/06/2013	10.05	4.07	6.77	15.9	24	3	30	0.06	0.51				
Section3 SW16		23/07/2013	9.05	6.85	7.02	15.7	114	3	140	0.15	0.45				
Section3 SW16		20/08/2013	8.72	19.46	7.60	16.6	203	3	210	0.28	0.96				
Section3 SW16		24/09/2013	8.34	16.36	7.12	22.0	10	3	21	0.01	0.25				
Section3 SW16		22/10/2013	8.46	19.18	6.99	22.6	16	3	78	0.01	0.42				
Section3 SW16		27/11/2013	7.49	11.18	6.44	25.9	14	3	18	0.01	0.50				
Section3 SW16		17/12/2013	7.33	16.83	6.80	24.8	8	3	11	1.25	0.10				
Upstream Monitoring															
SW5-05		2/08/2016	8.17	24.90	8.32	18.3	47								
SW5-05		5/09/2016	7.89	6.78	7.19	19.1	45	5	22	0.05	0.37	25	50	50	
SW5-05		10/10/2016	7.23	16.10	7.52	21.4	9								
SW5-05		1/11/2016	6.50	25.00	7.65	24.2	9	5	15	0.03	0.30	25	50	50	
SW5-05		13/12/2016	5.36	32.20	7.63	25.3	4								
SW5-05	Tidal	18/01/2017	6.30	22.90	7.34	29.1	16	1	5	0.02	0.44	13	50	50	
SW5-06	Tidal - incoming therefore SW5-06 is upstream.	1/02/2017	7.16	25.30	8.05	29.1	4								
SW5-05	Very high tide	10/03/2017	6.35	42.00	8.03	25.0	21	2	41	0.08	0.25	50	50	50	

SW5-08 - Serpentine Channel

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW5-08		2/08/2016	7.63	30.90	8.18	18.1	7								
SW5-08		5/09/2016	6.36	10.60	7.17	19.3	21	5	16	0.08	0.55	25	50	50	
SW5-08		10/10/2016	4.50	28.90	7.15	21.2	9								
SW5-08		1/11/2016	4.79	33.80	7.32	24.3	12	4	2	0.06	0.38	25	50	50	
SW5-08		13/12/2016	4.45	33.80	7.52	25.8	14								
SW5-08	Tidal	18/01/2017	4.29	33.00	7.01	28.4	29	1	24	0.03	0.45	13	50	50	
SW5-07	Tidal - incoming therefore SW5-07 is downstream.	1/02/2017	2.83	36.50	7.86	28.1	11								
SW5-08	Very high tide	10/03/2017	5.40	40.20	7.80	24.2	10	1	23	0.11	0.25	50	50	50	
SW5-08	High tide	12/04/2017	3.14	3.83	7.12	22.9	26								
SW5-08	Tidal. Low flow, outgoing tide. U/s and d/s sites connected.	3/05/2017	3.81	20.50	7.39	20.3	5	1	15	0.03	0.62	50	50	50	
SW5-08	Weather fine. Connected. Mid water level, outgoing tide.	7/06/2017	6.31	29.10	7.66		8								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				33.00	7.56		23	3	27	0.08	1.10	50	50	50	
P20			4.17	10.59	7.02										
St Dev				12.45	0.35										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
Section3 SW17		28/02/2013	4.15	0.14	6.44	25.3	38	3	25	0.17	1.20				
Section3 SW17		20/03/2013	6.25	2.15	6.92	22.0	24	3	14	0.03	1.10				
Section3 SW17		16/04/2013	4.42	1.16	6.67	21.0	58	3	28	0.25	1.00				
Section3 SW17		21/05/2013	8.96	24.00	6.98	17.0	7	3	31	0.05	0.40				
Section3 SW17		25/06/2013	9.44	15.78	7.14	15.4	10	3	17	0.05	0.43				
Section3 SW17		22/07/2013	9.39	11.33	7.40	16.7	13	3	19	0.06	1.10				
Section3 SW17		19/08/2013	8.74	22.30	7.43	19.1	11	3	48	0.05	5.30				
Section3 SW17		23/09/2013	6.81	27.10	7.11	22.8	9	3	23	0.04	0.33				
Section3 SW17		21/10/2013	7.00	30.30	7.58	24.5	9	3	26	0.03	0.32				
Section3 SW17		25/11/2013	6.56	14.03	7.23	28.5	10	3	25	0.04	1.70				
Section3 SW17		16/12/2013	6.15	18.89	7.02	27.5	13	3	12	1.25	0.60				
Upstream Monitoring															
SW5-07	Looked clean and healthy. Photos taken.	3/08/2016	8.76	32.60	7.63	18.1	7								
SW5-07		5/09/2016	6.36	10.40	7.21	19.7	16	12	14	0.08	0.55	25	50	50	
SW5-07		10/10/2016	4.39	28.50	7.15	21.2	8								
SW5-07		1/11/2016	4.81	33.90	7.31	24.5	17	5	3	0.07	0.40	25	50	50	
SW5-07		13/12/2016	3.65	33.90	7.50	26.1	8								
SW5-07	Tidal	18/01/2017	3.91	33.10	7.02	28.0	45	1	27	0.05	0.52	13	50	50	
SW5-08	Tidal - incoming therefore SW5-08 is upstream.	1/02/2017	3.63	36.60	7.87	28.1	15								
SW5-07	Very high tide	10/03/2017	6.03	40.10	7.84	24.7	8	1	22	0.08	0.25	50	50	50	

SW5-08 - Serpentine Channel

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW5-08	High water level, turbid water	5/08/2016	6.78	2.17	6.31	13.9	163								
SW5-08	Data not collected - technical error	10/11/2016													
SW5-08		6/01/2017	4.44	35.70	7.34	26.8	37								
SW5-08		1/03/2017	3.87	20.70	7.07	24.6	66	5	25	0.19	2.90	13	50	50	
SW5-08	Low tide, gentle outflow. Upstream and downstream sites connected.	6/03/2017	2.87	25.60	7.27	26.8	23								
SW5-08	Moderate flow. Outgoing tide.	6/04/2017	4.93	0.51	6.68	20.3	45	1	28	0.26	1.12	50	50	50	
SW5-07	Low water level, low flow. Incoming tide therefore SW5-07 is downstream. U/s and d/s sites connected. Drizzle.	4/05/2017	4.62	19.40	7.50	20.0	5								
SW5-08	Weather showers. Connected. High tide, outgoing.	13/06/2017	6.33	0.23	6.60	16.1	99	1	24	0.21	0.68	13	50	50	
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				27.70	7.32		100	3	42	0.20	1.72	50	50	50	
P20			3.47	0.65	6.63										
St Dev				14.06	0.39										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
Section3 SW17		5/02/2013	1.90	0.51	6.57	27.8	20	3	62	0.19	1.10				
Section3 SW17		28/05/2013	8.80	22.40	7.32	17.9	6	3	16	0.05	0.50				
Section3 SW17		2/07/2013	7.65	0.76	6.87	17.1	166	3	44	0.35	1.60				
Section3 SW17		12/11/2013	5.55	22.10	6.84	26.0	38	3	24	0.07	1.80				
Upstream Monitoring															
SW5-07	High water level, turbid water	5/08/2016	4.16	2.28	6.26	14.1	165								
SW5-07		11/11/2016	3.65	33.60	7.58	26.7	6	1	39	0.07	0.60	50	50	50	
SW5-07		6/01/2017	4.08	35.90	7.30	26.8	39								
SW5-07		1/03/2017	3.70	24.10	7.08	24.5	60	1	26	0.13	2.50	13	50	50	
SW5-07	Low tide, gentle outflow. Upstream and downstream sites connected.	6/03/2017	3.24	28.60	7.26	27.0	24								
SW5-07	Moderate flow. Outflow from cane drain adjacent to site. Samples taken outside of mixing zone as much as possible.	6/04/2017	3.42	0.63	6.80	20.9	55	1	40	0.19	1.09	50	50	50	
SW5-08	Low water level, low flow. Incoming tide therefore SW5-08 is upstream. U/s and d/s sites connected. Drizzle.	4/05/2017	4.54	20.40	7.33	20.1	6								
SW5-07	Weather showers. Connected. High tide, outgoing.	13/06/2017	5.69	0.22	6.59	16.3	110	1	27	0.21	0.72	13	50	50	

SW5-10 - North Arm (Clarence River)

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW5-10	Photos taken, accurate turbidity reading could not be obtained	3/08/2016	7.33	34.00	8.50	18.0								
SW5-10		5/09/2016	7.91	12.20	7.51	19.6	14	2	11	0.04	0.39	25	50	50
SW5-10		10/10/2016	7.22	23.10	7.69	21.8	4							
SW5-10		1/11/2016	6.33	32.80	7.66	24.2	2	3	5	0.01	0.44	25	50	50
SW5-10		13/12/2016	9.00	34.40	7.65	25.1	4							
SW5-10	Tidal	18/01/2017	6.14	31.80	7.26	28.4	9	1	7	0.02	0.40	13	50	50
SW5-09	Tidal - incoming therefore SW5-09 is downstream.	1/02/2017	4.60	36.30	8.11	27.9	3							
SW5-10	Very high tide	10/03/2017	6.73	41.70	8.02	24.6	6	1	22	0.08	0.25	50	50	50
SW5-10	High tide	12/04/2017	4.60	3.16	7.03	23.0	7							
SW5-10	Tidal. Low flow. Outgoing tide. U/s and d/s sites connected.	3/05/2017	9.41	19.10	7.56	21.2	2	1	18	0.02	0.71	50	50	50
SW5-10	Weather fine. Connected. Mid water level, outgoing tide.	7/06/2017	8.05	25.50	8.08		3							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				32.42	7.68		17	3	29	0.07	0.75	50	50	50
P20			6.48	9.31	7.04									
St Dev				12.70	0.45									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
Section3 SW18		28/02/2013	6.56	0.14	6.72	25.4	53	3	28	0.07	0.80			
Section3 SW18		19/03/2013	7.83	0.29	7.04	24.8	18	3	11	0.01	0.80			
Section3 SW18		16/04/2013	8.81	0.59	6.93	25.8	12	3	3	0.07	0.80			
Section3 SW18		21/05/2013	8.39	18.81	6.69	19.1	3	3	14	0.03	0.40			
Section3 SW18		25/06/2013	9.42	12.05	7.27	16.0	5	3	5	0.02	0.43			
Section3 SW18		22/07/2013	9.03	11.50	7.33	17.5	9	3	8	0.03	0.75			
Section3 SW18		19/08/2013	8.76	19.11	7.54	20.0	4	3	14	0.02	0.26			
Section3 SW18		23/09/2013	26.30	8.76	7.26	22.7	4	3	11	0.02	0.40			
Section3 SW18		21/10/2013	8.57	32.10	7.35	25.0	11	3	29	0.02	0.42			
Section3 SW18		25/11/2013	7.99	17.40	6.98	26.8	6	3	190	0.01	0.35			
Section3 SW18		16/12/2013	7.76	22.30	7.24	28.6	12	11	7	1.25	0.10			
Upstream Monitoring														
SW5-09	Photos taken	3/08/2016	7.40	33.80	8.43	17.9	0							
SW5-09		5/09/2016	8.26	12.10	7.43	19.0	20	2	29	0.04	0.40	25	50	50
SW5-09		10/10/2016	7.52	23.20	7.69	22.3	10							
SW5-09		1/11/2016	6.46	32.50	7.64	24.1	2	8	4	0.02	0.26	25	50	50
SW5-09		13/12/2016	6.05	34.50	7.56	24.8	6							
SW5-09	Tidal	18/01/2017	6.17	32.10	7.25	28.2	9	1	4	0.02	0.35	13	50	50
SW5-10	Tidal - incoming therefore SW5-10 is upstream.	1/02/2017	5.11	36.00	8.19	28.7	0							
SW5-09	Very high tide	10/03/2017	6.64	41.10	7.94	24.5	9	1	207	0.18	0.25	50	50	50

SW6-02 - Unnamed tributary of Mororo Creek (north)

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW6-02	Dry. Photo taken.	3/08/2016												
SW6-02	Dry	5/09/2016												
SW6-02	Dry	10/10/2016												
SW6-02	Dry	1/11/2016												
SW6-02	Dry	14/12/2016												
SW6-02	Dry	17/01/2017												
SW6-02	Dry	1/02/2017												
SW6-02	Dry	3/03/2017												
SW6-02	Dry	21/04/2017												
SW6-02	Dry	10/05/2017												
SW6-02	Dry	9/06/2017												
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				1.37	6.75		27	3	12	0.08	0.97	25	50	50
P20			4.52	0.31	6.30									
St Dev				0.52	0.24									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
Section3 SW20		28/02/2013	4.36	0.29	6.31	25.1	29	3	8	0.05	0.80			
Section3 SW20		19/03/2013	4.81	0.70	6.69	21.0	7	3	3	0.05	0.70			
Section3 SW20		16/04/2013	5.06	0.27	6.30	21.7	32	3	9	0.04	0.80			
Section3 SW20		20/05/2013	6.43	1.21	6.75	15.1	15	3	7	0.03	0.50			
Section3 SW20		25/06/2013	5.74	1.30	6.25	13.7	13	3	3	0.02	0.40			
Section3 SW20		22/07/2013	7.62	0.87	6.26	14.5	25	3	13	0.02	0.44			
Section3 SW20		19/08/2013	4.75	1.56	6.77	15.6	6	3	3	0.02	0.42			
Section3 SW20		23/09/2013	3.18	1.15	6.70	19.8	9	3	13	0.06	0.85			
Section3 SW20		21/10/2013	4.92	1.62	7.02	23.2	34	3	43	0.08	2.40			
Section3 SW20		25/11/2013	7.80	0.74	6.55	24.8	21	3	6	0.01	0.54			
Section3 SW20		16/12/2013	4.84	1.41	6.75	24.5	14	7	6	0.25	1.00			
Upstream Monitoring														
SW6-01	Dry. Photo taken.	3/08/2016												
SW6-01	Dry	5/09/2016												
SW6-01	Dry	10/10/2016												
SW6-01	Dry	1/11/2016												
SW6-01	Dry	14/12/2016												
SW6-01	Dry	17/01/2017												
SW6-01	Dry	1/02/2017												
SW6-01	No flow/ stagnant pool. Upstream and downstream sites not connected.	3/03/2017	2.02	0.19	6.46	22.4	15	2	3	0.08	1.15	25	50	50

SW6-04 - Tabbimoble Creek

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW6-04	Photo taken, accurated turbidity reading could not be obtained.	3/08/2016	3.88	0.19	7.41	12.7									
SW6-04		8/09/2016	8.86	0.16	6.41	14.7	8	3	8	0.02	0.31	25	50	50	
SW6-04		10/10/2016	1.71	0.19	6.22	16.0	4								
SW6-04		1/11/2016	1.79	0.19	6.56	20.6	23	6	4	0.03	0.47	25	50	50	
SW6-04	Low water level, no flow. Upstream and downstream sites are disconnected.	14/12/2016	0.26	0.21	6.22	21.2	7								
SW6-04	No visible flow. Upstream and downstream sites are disconnected.	17/01/2017	0.01	0.20	6.39	23.5	18	1	20	0.08	0.98	25	50	50	
SW6-04	Very low water level, heavy scum layer, u/s and d/s sites not connected. No visible flow.	1/02/2017	0.56	0.19	6.83	24.2	9								
SW6-04	Gentle flow. Upstream and downstream sites connected.	3/03/2017	5.73	0.15	5.95	22.1	10	4	5	0.04	1.04	25	50	50	
SW6-04	No visible flow. Upstream and downstream sites connected. Overcast.	21/04/2017	9.94	0.13	6.75	18.3	20								
SW6-04	Overcast weather. u/s and d/s connected. Low flow with low water level. Brown colour.	10/05/2017	8.05	0.14	6.69	16.4	16	3	4	0.02	0.22	25	50	50	
SW6-04	Unable to determine if upstream and downstream sites were connected due to access issues relating to works occuring between sites. No visible flow. Moderate water level. Weather fine.	9/06/2017	9.71	0.15	6.58	13.3	9								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				0.28	7.05		24	3	26	0.05	0.60	25	50	50	
P20			3.39	0.14	6.30										
St Dev				0.10	0.46										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
Section3 SW21		28/02/2013	7.54	0.09	6.22	25.6	12	3	7	0.03	0.60				
Section3 SW21		19/03/2013	7.97	0.13	7.03	20.3	14	3	24	0.01	0.60				
Section3 SW21		16/04/2013	7.71	0.20	6.38	20.4	21	3	13	0.02	0.60				
Section3 SW21		20/05/2013	9.57	0.14	7.33	14.5	13	3	6	0.02	0.40				
Section3 SW21		25/06/2013	10.30	0.23	7.05	12.7	17	3	3	0.03	0.33				
Section3 SW21		22/07/2013	9.56	0.51	6.57	14.5	13	3	9	0.01	0.54				
Section3 SW21		19/08/2013	9.09	0.33	7.32	17.0	13	3	3	0.05	0.13				
Section3 SW21		23/09/2013	7.20	0.28	7.32	19.8	25	3	20	0.01	0.33				
Section3 SW21		21/10/2013	3.41	0.39	6.69	23.3	29	3	29	0.02	0.40				
Section3 SW21		25/11/2013	7.38	0.35	6.02	24.7	13	3	50	0.01	0.54				
Section3 SW21		16/12/2013	6.93	0.18	6.35	22.9	14	5	4	0.25	0.30				
Upstream Monitoring															
SW6-03	Photo taken	3/08/2016	10.61	0.19	7.65	13.7	0								
SW6-03		8/09/2016	9.37	0.16	6.46	14.8	8	5	5	0.02	0.31	25	50	50	
SW6-03		10/10/2016	3.96	0.20	6.21	19.4	10								
SW6-03		1/11/2016	3.15	0.21	6.60	22.2	49	8	31	0.05	0.66	25	50	50	

SW6-06 - Tabbimoble Overflow

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW6-06	Photo taken	3/08/2016	0.00	0.18	6.88	13.7	15								
SW6-06		8/09/2016	1.58	0.15	6.03	15.0	23	2	21	0.05	1.28	25	50	50	
SW6-06		10/10/2016	0.76	0.17	6.13	16.5	8								
SW6-06		1/11/2016	0.71	0.18	6.46	20.3	13	5	10	0.06	1.53	25	50	50	
SW6-06	Upstream and downstream points are disconnected.	14/12/2016	0.05	0.19	6.04	21.3	24								
SW6-06	No visible flow. Upstream and downstream sites are disconnected. Heavy scum layer.	17/01/2017	0.16	0.16	6.29	23.3	43	1	44	0.18	1.56	25	50	50	
SW6-06	Very low water level, heavy scum layer, u/s and d/s sites not connected. No visible flow.	1/02/2017	0.69	0.13	6.46	24.2	12								
SW6-06	Medium water level. Upstream and downstream sites connected by very gentle flow.	3/03/2017	2.37	0.12	5.61	23.3	26	5	15	0.05	1.40	25	50	50	
SW6-06	No visible flow. U/s and d/s sites not connected. Drizzle	21/04/2017	0.50	0.15	5.92	18.5	33								
SW6-06	Overcast weather. u/s and d/s not connected. No visible flow. Low water level.	10/05/2017	0.88	0.15	6.20	16.8	21	3	23	0.04	0.89	25	50	50	
SW6-06	Upstream and downstream sites not connected. No visible flow. Water level low to moderate. Weather fine.	9/06/2017	1.36	0.16	6.05	13.5	20								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				0.19	6.59		25	3	37	0.06	1.30	25	50	50	
P20			0.28	0.14	5.94										
St Dev				0.07	0.47										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
Section3 SW25		28/02/2013	6.46	0.10	6.12	24.9	16	3	12	0.02	1.10				
Section3 SW25		19/03/2013	3.13	0.14	6.60	20.4	19	3	47	0.01	1.30				
Section3 SW25		16/04/2013	6.48	0.10	5.91	21.3	21	3	11	0.03	1.20				
Section3 SW25		20/05/2013	4.85	0.16	6.42	20.6	24	3	8	0.03	1.80				
Section3 SW25		25/06/2013	5.47	0.13	6.55	11.2	24	3	8	0.02	0.80				
Section3 SW25		22/07/2013	6.38	0.32	5.75	14.7	33	3	180	0.03	0.72				
Section3 SW25		19/08/2013	4.47	0.42	6.92	16.0	19	3	8	0.36	1.10				
Section3 SW25		23/09/2013	3.31	0.16	7.04	20.2	14	3	14	0.03	0.73				
Section3 SW25		21/10/2013	2.09	0.20	6.56	23.9	15	3	11	0.04	0.91				
Section3 SW25		25/11/2013	4.64	0.25	5.76	24.5	31	3	15	0.02	0.80				
Section3 SW25		16/12/2013	1.94	0.16	5.32	23.2	18	5	9	0.25	0.30				
Upstream Monitoring															
SW6-05	Photo taken	3/08/2016	0.00	0.18	6.99	13.3	10								
SW6-05		8/09/2016	1.18	0.16	6.25	14.4	53	2	53	0.06	1.24	25	50	50	
SW6-05		10/10/2016	2.98	0.18	6.41	16.1	10								
SW6-05		1/11/2016	0.57	0.19	7.07	20.3	4	1	7	0.05	1.25	25	50	50	
SW6-05	Low water level. Upstream and downstream points are disconnected.	14/12/2016	0.05	0.18	6.04	21.4	15								

SW6-06 - Tabbimoble Overflow

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW6-06	Photo taken	5/08/2016	5.71	0.13	6.05	13.9	19							
SW6-06		10/11/2016	0.29	0.19	6.44	21.1	8	3	11	0.07	1.40	25	50	50
SW6-06	No flow from u/s. Moderate flow from other directions	6/01/2017	4.29	0.10	5.94	23.1	35							
SW6-06	High water level, strong flow. U/S and D/S sites connected. Steady rain	28/02/2017	5.79	0.07	5.80	20.7	51	4	25	0.05	1.10	25	50	50
SW6-06	No flow/ stagnant. Upstream and downstream sites not connected	6/03/2017	0.00	0.14	5.88	23.0	24							
SW6-06	No visible flow, moderate water level. U/s and d/s sites connected.	6/04/2017	5.97	0.10	5.75	18.9	33	1	10	0.04	1.40	25	50	50
SW6-06	Low flow. U/s and d/s sites not connected. Weather fine.	4/05/2017	2.42	0.15	6.43	17.7	19							
SW6-06	Not safe to access due to high water level.	13/06/2017												
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				0.18	6.58		32	3	25	0.06	1.11	25	50	50
P20			1.78	0.11	5.84									
St Dev				0.06	0.36									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
Section3 SW25		5/02/2013	3.52	0.28	5.87	24.2	18	3	31	0.01	0.80			
Section3 SW25		27/05/2013	5.02	0.16	6.63	16.6	30	3	17	0.03	0.70			
Section3 SW25		2/07/2013	9.23	0.18	6.37	15.7	37	3	3	0.03	0.81			
Section3 SW25		12/11/2013	4.74	0.17	6.20	22.7	13	3	3	0.02	1.00			
Upstream Monitoring														
SW6-05	Photo taken	5/08/2016	6.50	0.14	6.10	13.6	16							
SW6-05		10/11/2016	0.56	0.19	6.75	21.2	5	1	9	0.07	1.17	25	50	50
SW6-05	No flow to d/s. Raining.	6/01/2017	4.87	0.14	6.65	23.6	21							
SW6-05	High water level, strong flow. U/S and D/S sites connected. Steady rain	28/02/2017	6.26	0.10	5.83	20.7	32	2	14	0.04	1.02	25	50	50
SW6-05	No flow/ stagnant. Upstream and downstream sites not connected	6/03/2017	0.00	0.14	5.89	23.3	22							
SW6-05	Moderate water level, moderate flow. U/s and d/s sites connected	6/04/2017	6.34	0.10	5.70	18.8	31	1	11	0.04	1.34	25	50	50
SW6-05	No visible flow. U/s and d/s sites not connected. Floating organic debris. Weather fine.	4/05/2017	1.35	0.15	6.20	17.5	20							
SW6-05	Upstream and downstream sites connected. High flow. High water level. Partly cloudy.	13/06/2017	9.43	0.04	5.81	16.0	102	2	43	0.08	0.75	25	50	50

SW7-02 - Unnamed tributary of Tabbimoble Swamp

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW7-02	Dry. Photo taken.	3/08/2016												
SW7-02	Dry	8/09/2016												
SW7-02	Dry	10/10/2016												
SW7-02	Dry	2/11/2016												
SW7-02	Dry	14/12/2016												
SW7-02	Dry	17/01/2017												
SW7-02	Dry	1/02/2017												
SW7-02	No flow. No connection between upstream and downstream sites. Sample taken from small puddle.	3/03/2017	1.31	0.14	5.89	22.9	9	3	4	0.03	0.42	25	50	50
SW7-02	Dry	21/04/2017												
SW7-02	Dry	10/05/2017												
SW7-02	Dry	9/06/2017												
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				0.16	6.43		24	4	24	0.06	1.34	25	50	50
P20			0.85	0.10	5.70									
St Dev				1.51	2.97									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
SW01-GDE01		3/04/2013	5.92	0.21	5.70	21.7	64	3	24	0.04	3.70	50	50	50
SW01-GDE01		29/04/2013	10.00	0.08	6.40	18.1	24	3	12	0.04	0.70	N/A	N/A	N/A
SW01-GDE01	Dry	27/08/2013												
SW01-GDE01	Dry	23/09/2013												
SW01-GDE01	Dry	28/10/2013												
SW01-GDE01		16/12/2013	7.90	0.37	5.70	23.6	11	3	3	0.01	1.50	N/A	N/A	N/A
Upstream Monitoring														
SW7-01	Photo taken	3/08/2016	1.72	0.11	6.52	14.0	11							
SW7-01		8/09/2016	2.94	0.12	5.30	15.1	9	1	7	0.03	0.46	25	50	50
SW7-01		10/10/2016	2.73	0.12	5.77	18.3	7							
SW7-01		2/11/2016	1.26	0.13	6.28	19.6	11	7	24	0.07	0.95	25	50	50
SW7-01	Low water level. No flow	14/12/2016	2.34	0.13	6.21	24.3	13							
SW7-01	No flow. Stagnant pool, water stained black.	17/01/2017	0.51	0.10	6.27	23.6	8	1	8	0.05	0.58	25	50	50
SW7-01	Low water level, sample taken in isolated pool, no visible flow, dark stain.	1/02/2017	1.47	0.11	6.47	24.4	7							
SW7-01	Low water level, isolated pool. Upstream and downstream sites disconnected. No visible flow, dark stained.	3/03/2017	0.17	0.10	6.31	22.4	25	5	29	0.07	1.11	25	50	50
SW7-01	No visible flow. Stagnant water. Overcast.	21/04/2017	1.07	0.11	5.70	18.8	14							
SW7-01	Rain. No visible flow. Medium to high water level.	10/05/2017	0.10	5.78	17.04	19.2		1	13	0.03	0.49	25	50	50
SW7-01	No visible flow. Water level moderate. Dark, tannin stained water. Weather fine.	9/06/2017	1.90	0.11	5.65	13.7	23							

SW7-04 - Tabbimoble Floodway

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW7-04	Photo taken. Accurate turbidity reading could not be obtained.	3/08/2016	1.46	0.10	6.30	13.0									
SW7-04		8/09/2016	5.44	0.10	5.52	14.6	21	1	21	0.06	0.91	25	50	50	
SW7-04		10/10/2016	3.23	0.11	5.90	17.0	12								
SW7-04		2/11/2016	3.84	0.12	6.45	19.9	9	5	12	0.07	0.94	25	50	50	
SW7-04	Upstream and downstream points are disconnected.	14/12/2016	1.80	0.13	6.13	22.3	8								
SW7-04	No flow.	17/01/2017	1.73	0.16	6.43	24.3	14	3	18	0.06	0.50	25	50	50	
SW7-04	U/s and d/s sites are connected, very slight flow. No upstream inflow.	1/02/2017	2.36	0.17	6.62	25.4	6								
SW7-04	Upstream and downstream sites connected. No visible flow.	3/03/2017	3.48	0.17	6.34	23.1	36	2	21	0.04	0.77	25	50	50	
SW7-04	Very gentle flow. U/s and d/s sites connected. Overcast.	21/04/2017	4.27	0.09	5.69	19.0	24								
SW7-04	Upstream and downstream sites connected. Low water level, no visible flow. Weather fine.	23/05/2017	6.73	0.09	5.60	16.9	30	3	9	0.05	0.88	25	50	50	
SW7-04	Upstream and downstream sites connected. Very slight flow. Water level moderate. Weather fine.	9/06/2017	5.72	0.10	5.66	13.6	16								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				0.15	6.61		47	3	18	0.05	1.01	25	50	50	
P20			2.64	0.09	5.62										
St Dev				0.04	0.79										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
SW02-GDE02		3/04/2013	1.25	0.08	5.10	21.4	19	3	11	0.04	1.00	50	50	50	
SW02-GDE02		29/04/2013	2.50	0.10	7.20	16.4	52	3	10	0.03	2.00	N/A	N/A	N/A	
SW02-GDE02		27/08/2013	8.10	0.08	3.70	13.6	97	3	17	0.07	1.00	N/A	N/A	N/A	
SW02-GDE02		23/09/2013	7.70	0.10	5.90	17.4	71	3	10	0.04	0.90	N/A	N/A	N/A	
SW02-GDE02		28/10/2013	7.80	0.14	5.80	18.9	54	3	26	0.02	0.70	N/A	N/A	N/A	
SW02-GDE02		16/12/2013	7.10	0.09	5.50	25.9	23	3	18	0.03	0.80	N/A	N/A	N/A	
Upstream Monitoring															
SW7-03	Suggest move site to other side of track. Photo taken.	3/08/2016	6.51	0.09	6.63	13.4	4								
SW7-03		8/09/2016	4.06	0.11	5.62	14.9	29	1	15	0.05	0.56	25	50	50	
SW7-03		10/10/2016	6.49	0.11	5.93	16.6	21								
SW7-03		2/11/2016	3.72	0.13	6.70	19.1	27	6	32	0.09	1.01	25	50	50	
SW7-03	Upstream and downstream points are disconnected. Low water level.	14/12/2016	6.79	0.15	6.18	24.2	3								
SW7-03	No flow, water stained black.	17/01/2017	1.71	0.17	6.55	25.1	7	2	13	0.05	0.58	25	50	50	
SW7-03	U/s and d/s sites are connected, very slight flow. Black stain. No upstream inflow.	1/02/2017	1.44	0.18	6.72	25.6	6								
SW7-03	Upstream and downstream sites connected. No visible flow. Black stain.	3/03/2017	3.20	0.18	6.43	24.1	8	4	5	0.03	1.74	25	50	50	
SW7-03	Very gentle flow (no upstream inflow). U/s and d/s sites connected. Overcast.	21/04/2017	5.38	0.09	5.87	18.9	24								

SW7-04 - Tabbimoble Floodway

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW7-04	Flowing very fast. Photo taken.	4/08/2016	7.76	0.08	6.28	14.7	11								
SW7-04	Upstream and downstream points are disconnected.	6/12/2016	4.10	0.12	6.60	24.9	13	1	11	0.05	0.84	25	50	50	
SW7-04	Continuous connection to u/s site. No visible flow.	3/01/2017	3.38	0.16	6.35	24.8	81								
SW7-04	U/S and D/S connected. Slight flow visible.	27/02/2017	1.66	0.18	6.71	22.2	16	3	9	0.02	0.63	25	50	50	
SW7-04	Gentle rainfall, steady flow. Upstream and downstream sites connected. Observed sediment laden water discharging from construction site, both north and south of waterway.	15/03/2017	6.65	0.09	6.48	22.7	212								
SW7-04	Steady Inflow. Indications of recent flood event. U/s and d/s sites connected.	5/04/2017	6.39	0.07	5.59	18.8	23	2	8	0.03	1.03	25	50	50	
SW7-04	No visible flow. U/s and d/s sites connected. Weather fine.	4/05/2017	5.03	0.09	5.75	17.6	23								
SW7-04	Not safe to access due to very high, fast flowing water.	13/06/2017													
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				0.14	6.36		44	3	17	0.06	0.90	30	50	50	
P20			3.18	0.04	5.40										
St Dev				0.06	0.67										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
SW02-GDE02		31/01/2013	N/A		N/A	N/A	N/A	3	3	0.01	0.60	50	50	50	
SW02-GDE02		28/02/2013	6.37	0.04	4.41	22.4	N/A	3	3	0.13	0.90	N/A	N/A	N/A	
SW02-GDE02		27/05/2013	3.20	0.04	4.90	12.8	36	3	17	0.05	0.80	N/A	N/A	N/A	
SW02-GDE02		4/07/2013	7.90	0.01	5.60	n/a	40	5	19	0.05	0.60	N/A	N/A	N/A	
SW02-GDE02		29/07/2013	6.80		6.20	18.2	39	3	36	0.07	0.80	N/A	N/A	N/A	
SW02-GDE02		19/11/2013	6.30	0.13	5.90	19.2	42	3	14	0.04	0.90	N/A	N/A	N/A	
SW02-GDE02		25/11/2013	N/A		5.40	23.7	35	3	16	0.06	1.00	N/A	N/A	N/A	
Upstream Monitoring															
SW7-03	Flowing very fast. Photo taken.	4/08/2016	8.15	0.09	6.52	14.7	10								
SW7-03	Upstream and downstream points are disconnected.	6/12/2016	3.16	0.14	6.33	25.6	15	1	10	0.05	0.83	25	50	50	
SW7-03	Stagnant pool. Connected to d/s site but no inflow from further upstream. Black colour. No visible flow	3/01/2017	2.21	0.15	6.40	24.4	22								
SW7-03	U/S and D/S connected. Slight flow visible. Black stain.	27/02/2017	2.81	0.20	6.83	21.6	5	3	6	0.03	0.83	25	50	50	
SW7-03	Gentle rainfall, steady flow. Upstream and downstream sites connected.	15/03/2017	7.64	0.09	6.34	22.6	115								
SW7-03	Steady Inflow. Indications of recent flood event. U/s and d/s sites connected.	5/04/2017	6.14	0.07	5.65	18.9	23	3	7	0.03	1.03	25	50	50	
SW7-03	No visible flow. U/s and d/s sites connected. Weather fine.	4/05/2017	5.98	0.09	5.89	18.2	49								
SW7-03	Upstream and downstream sites connected. High flow. Very high water level. Drizzle.	13/06/2017	9.05	0.04	5.40	16.4	45	2	13	0.05	0.55	25	50	50	

SW8-02 - Tuckombil Canal (becomes Evans River)

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW8-02	Photo taken	10/08/2016	6.57	15.90	6.98	20.6	47							
SW8-02		9/09/2016	7.93	7.94	7.01	21.5	101	5	24	0.07	0.54	25	50	50
SW8-02		10/10/2016	6.73	32.70	7.21	25.7	38							
SW8-02		2/11/2016	4.70	42.20	6.83	25.2	59	6	21	0.12	0.92	25	50	50
SW8-02	High tide	14/12/2016	6.09	44.70	7.51	28.7	31							
SW8-02	High tide, low flow.	17/01/2017	7.64	44.10	7.79	32.6	51	2	22	0.19	0.50	25	50	50
SW8-02	High tide, flowing out.	1/02/2017	4.69	44.70	7.72	29.8	116							
SW8-01	Mid tide, flowing in therefore SW8-01 is downstream.	3/03/2017	10.13	35.60	7.69	29.8	117	1	33	0.11	0.65	25	50	50
SW8-01	Low tide. Low, incoming flow therefore SW8-01 is downstream. U/s and d/s sites connected. Overcast. Unable to obtain accurate turbidity reading.	21/04/2017	6.13	1.58	6.56	24.6								
SW8-02	Upstream and downstream sites connected. Outflowing tide, medium water level. Weather fine.	23/05/2017	8.60	21.40	6.68	21.9	47	2	281	0.52	1.03	25	50	50
SW8-02	Upstream and downstream sites connected. Outflowing tide. Can't determine flow rate due to high winds. Water level moderate to high. Weather fine.	9/06/2017	9.05	29.80	6.91	18.8	88							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				41.04	7.48		88	4	57	0.21	0.90	25	50	50
P20			6.31	16.18	6.64									
St Dev				13.91	0.47									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
SW05		3/04/2013	6.52	17.30	6.80	27.0	35	3	32	0.15	0.90	50	50	50
SW05		29/04/2013	6.80	5.44	7.40	23.3	24	3	19	0.14	1.10	N/A	N/A	N/A
SW05		27/08/2013	8.40	24.80	6.60	19.1	17	3	22	1.07	0.80	N/A	N/A	N/A
SW05		23/09/2013	10.80	24.70	7.50	25.9	17	3	32	0.01	0.05	N/A	N/A	N/A
SW05		28/10/2013	8.70	33.90	7.20	22.4	13	3	40	0.21	0.60	N/A	N/A	N/A
SW05		16/12/2013	7.60	36.80	6.10	27.1	10	3	57	0.15	1.60	N/A	N/A	N/A
Upstream Monitoring														
SW8-01	Photo taken	10/08/2016	6.84	15.90	6.79	20.9	69							
SW8-01		9/09/2016	8.00	7.88	6.85	21.9	758	3	44	0.09	0.55	25	50	50
SW8-01		10/10/2016	7.09	32.00	7.01	25.9	54							
SW8-01		2/11/2016	5.03	42.10	7.07	25.2	59	6	19	0.13	0.66	25	50	50
SW8-01	High tide	14/12/2016	6.02	45.10	7.33	28.5	35							
SW8-01	High tide, low flow.	17/01/2017	6.93	43.90	7.65	31.9	120	8	34	0.22	0.59	25	50	50
SW8-01	High tide, flowing out.	1/02/2017	6.18	44.20	7.65	31.3	144							
SW8-02	Mid tide, flowing in therefore SW8-02 is upstream.	3/03/2017	9.76	34.50	7.67	29.3	33	2	58	0.13	0.67	25	50	50

SW8-06 - Unnamed tributary of McDonald's Creek CH 136450

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW8-06	Photo taken. Accurate turbidity reading could not be obtained	10/08/2016	9.52	0.19	5.17	22.4								
SW8-06	Accurate turbidity reading could not be obtained	9/09/2016	8.20	0.18	4.75	20.6		4	50	0.08	0.54	25	50	50
SW8-06	Dry	10/10/2016												
SW8-06	Water depth insufficient for sampling and monitoring	2/11/2016												
SW8-06	Very low water level.	14/12/2016	5.80	0.35	6.38	32.5	23							
SW8-06	Dry	17/01/2017												
SW8-06	Insufficient water for sampling and monitoring	3/02/2017												
SW8-06	Insufficient water for sampling and monitoring	13/03/2017												
SW8-06	Low flow. U/s and d/s sites connected. Overcast.	21/04/2017	5.71	0.13	5.09	23.5	23							
SW8-06	Upstream and downstream sites connected. Steady flow, high water level. Weather fine.	23/05/2017	7.01	0.14	4.69	20.9	16	2	1	0.01	0.51	25	50	50
SW8-06	Upstream and downstream sites connected. Low to moderate water level and flow. Weather fine.	9/06/2017	8.49	0.15	5.35	19.3	7							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				0.30	4.98		42	4	38	0.14	1.68	40	50	50
P20			5.30	0.16	4.39									
St Dev				0.08	1.31									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
SW07		2/04/2013	5.55	0.17	3.80	26.4	12	6	3	0.01	0.40	50	50	50
SW07		29/04/2013	8.70	0.14	8.90	21.8	2	3	3	0.01	0.40	N/A	N/A	N/A
SW07		27/08/2013	5.30	0.20	4.50	17.6	N/A	3	16	0.01	0.50	N/A	N/A	N/A
SW07		23/09/2013	6.10	0.19	4.30	22.3	7	3	35	0.02	0.50	N/A	N/A	N/A
SW07		28/10/2013	1.90	0.35	4.50	19.9	42	3	56	0.21	2.10	N/A	N/A	N/A
SW07		16/12/2013	3.10	0.32	5.30	26.0	138	3	40	0.18	3.40	N/A	N/A	N/A
Upstream Monitoring														
SW8-05	Photo taken	10/08/2016	8.82	0.19	5.07	22.0	0							
SW8-05		9/09/2016	9.18	0.19	4.62	19.7	4	4	4	0.03	0.32	25	50	50
SW8-05	Dry	10/10/2016												
SW8-05	Water depth insufficient for sample.	2/11/2016												
SW8-05	Very low water level.	14/12/2016	6.93	0.37	4.53	35.5	59							
SW8-05	Dry	17/01/2017												
SW8-05	Insufficient water for sampling and monitoring	3/02/2017												
SW8-05	Insufficient water for sampling and monitoring	13/03/2017												
SW8-05	Low flow, mid water level. U/s and d/s sites connected. Overcast.	21/04/2017	5.86	0.15	4.39	23.8	31							
SW8-05	Upstream and downstream sites connected. Steady flow, high water level. Weather fine.	23/05/2017	7.74	0.16	4.40	20.4	4	4	31	0.09	1.06	25	50	50
SW8-05	Upstream and downstream sites connected. Low to moderate water level and flow. Weather fine.	9/06/2017		0.17	4.51	18.2	11							

SW8-08 - McDonald's Creek

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW8-08	Photo taken. Accurate turbidity reading could not be obtained	10/08/2016	2.96	0.25	4.84	14.0									
SW8-08		9/09/2016	2.88	0.29	4.33	16.5	63	8	7	0.03	0.58	25	50	50	
SW8-08		11/10/2016	0.81	0.34	4.92	16.9	204								
SW8-08	Insufficient water to enable accurate DO reading.	2/11/2016		0.36	5.02	22.8	7	6	27	0.08	0.87	25	50	50	
SW8-08	Insufficient water to enable accurate DO reading.	14/12/2016		0.55	4.04	26.5	22								
SW8-08	Very low water level, no visible flow. Dense aquatic vegetation and scum layer visible.	17/01/2017	1.50	0.44	5.17	25.9	8	5	386	0.80	6.70	25	50	50	
SW8-08	Very low water level. Thick aquatic veg.	3/02/2017	1.19	0.40	5.87	25.7	203								
SW8-08	Low water level. No observed flow. Upstream and downstream sites connected.	13/03/2017	0.27	0.46	4.40	20.8	0	1	1	0.02	0.39	25	50	50	
SW8-08	Slight flow. U/s and d/s sites connected. Drizzle.	26/04/2017	2.52	0.23	4.20	18.5	10								
SW8-08	Upstream and downstream sites connected. Moderate flow, medium water level. Weather fine.	23/05/2017	3.83	0.18	4.18	18.5	5	2	77	0.08	1.27	25	50	50	
SW8-08	Upstream and downstream sites connected. Slight flow. Moderate to high water level. Weather fine.	9/06/2017	2.78	0.27	4.21	14.6	8								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				0.45	4.94		10	4	19	0.21	0.97	25	50	50	
P20			1.52	0.25	4.01										
St Dev				0.11	0.70										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
SW08		2/04/2013	2.40	0.22	3.60	21.6	7	3	3	0.01	0.70	50	50	50	
SW08		30/04/2013	2.17	0.23	6.25	16.7	1	3	3	0.04	0.60	N/A	N/A	N/A	
SW08		27/08/2013	7.50	0.36	4.00	17.5	2	3	3	1.15	0.60	N/A	N/A	N/A	
SW08		23/09/2013	3.60	0.35	3.90	22.3	2	3	3	0.01	0.60	N/A	N/A	N/A	
SW08		28/10/2013	6.70	0.43	4.40	21.8	5	3	3	0.04	0.80	N/A	N/A	N/A	
SW08		16/12/2013	2.00	0.56	3.40	23.0	1	3	6	0.03	0.70	N/A	N/A	N/A	
Upstream Monitoring															
SW8-07	Photo taken	10/08/2016	3.32	0.25	4.88	14.4	0								
SW8-07		9/09/2016	2.92	0.29	4.35	17.1	27	4	25	0.07	0.97	25	50	50	
SW8-07		11/10/2016	0.69	0.35	4.78	17.7	130								
SW8-07	Insufficient water to enable accurate DO reading.	2/11/2016		0.51	5.35	21.9	11	6	19	0.21	2.17	25	50	50	
SW8-07	Insufficient water to enable accurate DO reading.	14/12/2016		0.52	4.05	26.1	8								
SW8-07	Very low water level, no visible flow. Dense aquatic vegetation and scum layer visible.	17/01/2017	0.38	0.39	5.25	25.5	7	4	166	0.66	3.00	25	50	50	
SW8-07	Very low water level. Thick aquatic veg.	3/02/2017	1.73	0.38	4.95	25.0	14								
SW8-07	Low water level. No observed flow. Upstream and downstream sites connected.	13/03/2017	0.48	0.46	4.42	20.7	1	1	1	0.02	0.40	25	50	50	
SW8-07	Slight flow. U/s and d/s sites connected. Drizzle.	26/04/2017	2.28	0.25	4.32	18.6	8								
SW8-07	Upstream and downstream sites connected. Moderate flow, medium water level. Weather fine.	23/05/2017	4.12	0.18	4.20	18.7	6	4	2	0.01	0.63	25	50	50	

SW8-08 - McDonald's Creek

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW8-08	Photo taken. Accurate turbidity reading could not be obtained	4/08/2016	5.07	0.22	4.95	14.2									
SW8-08		25/08/2016	3.63	0.16	4.33	16.3	3	14	2	0.03	0.68	25	50	50	
SW8-08		6/12/2016	6.01	0.66	4.06	28.2	15	1	8	0.05	0.79	25	50	50	
SW8-08		8/12/2016	2.29	0.59	4.14	22.8	2								
SW8-08	Continuous waterway but no visible flow.	3/01/2017	0.34	0.40	4.85	25.2	19								
SW8-08	No visible flow.	6/01/2017	2.80	0.61	4.12	24.4	5	2	22	0.06	0.95	25	50	50	
SW8-08	Very low water level. Thick aquatic veg. Accurate turbidity and DO readings could not be obtained due to insufficient water.	27/02/2017		0.41	5.71	22.5		2	42	0.25	3.28	25	50	50	
SW8-08	Steady flow. Upstream and downstream sites connected.	16/03/2017	1.93	0.19	4.31	22.2	3								
SW8-08	Channel full of water with slight flow. Channel has overtopped banks. Tannin stained water.	20/03/2017	2.23	0.14	4.32	24.1	0								
SW8-08	Very high water level. U/s and d/s sites connected. Steady flow.	5/04/2017	0.00	0.08	5.38	19.6	30	2	6	0.20	2.13	25	50	50	
SW8-08	No access - demolition in progress	4/05/2017													
SW8-08	Fine weather. U/s and d/s connected. Steady flow with a high water level.	11/05/2017	3.68	0.19	4.24	17.3	5	3	4	0.02	0.66	25	50	50	
SW8-08	Upstream and downstream sites connected. Sample point approx. 10 m N of designated site due to high water level. Slight flow. Water level very high. Sample taken amongst aquatic vegetation.	14/06/2017	3.32	0.06	4.69	16.8	2	1	1	0.02	0.60	25	50	50	
SW8-08	Upstream and downstream sites connected. Moderate flow. High water level. Rain.	17/06/2017	3.10	0.26	4.45	17.6	0								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				0.60	5.04		14	3	13	0.13	1.51	25	50	50	
P20			1.74	0.12	4.32										
St Dev				0.23	0.53										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
SW08		1/02/2013	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
SW08		28/02/2013	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
SW08		28/05/2013	1.70	0.11	4.60	14.9	1	3	6	0.04	0.60	50	50	50	
SW08		5/06/2013	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
SW08		29/07/2013	8.10	0.25	4.70	19.6	4	3	6	0.04	0.70	N/A	N/A	N/A	
SW08		19/11/2013	5.10	0.53	4.30	22.7	14	3	11	0.02	0.70	N/A	N/A	N/A	
SW08		25/11/2013	6.50	0.65	5.10	25.6	6	3	13	0.06	0.70	N/A	N/A	N/A	
Upstream Monitoring															
SW8-07	Photo taken	4/08/2016	4.55	0.23	5.05	14.2	0								
SW8-07		25/08/2016	3.34	0.18	4.69	16.2	4	14	1	0.03	0.70	25	50	50	
SW8-07		6/12/2016	3.06	0.72	4.10	27.7	23	1	11	0.06	1.00	25	50	50	
SW8-07		8/12/2016	3.05	0.62	4.09	23.3	4								
SW8-07		3/01/2017	0.44	0.51	5.01	24.4	47								

SW9-03 - Everson's Creek

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW9-03	No access	10/08/2016												
SW9-03	No access	9/09/2016												
SW9-03	No access	10/10/2016												
SW9-03	No access	2/11/2016												
SW9-03	No access	14/12/2016												
SW9-03	No access	17/01/2017												
SW9-03	No access	3/02/2017												
SW9-03	No access	13/03/2017												
SW9-03	Slight flow. U/s and d/s sites not connected. Overcast.	26/04/2017	0.95	0.23	4.58	19.1	30							
SW9-03	Could not determine if upstream and downstream sites were connected. No visible flow, low water level. Weather fine.	23/05/2017	2.66	0.19	4.60	19.6	8	4	8	0.62	1.86	25	50	50
SW9-03	Upstream and downstream sites not connected. No visible flow. Water level low. Drizzle.	9/06/2017	4.75	0.19	4.64	16.2	9							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				0.21	5.18		20	3	30	0.74	2.16	25	50	50
P20			1.09	0.15	4.39									
St Dev				0.03	0.52									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
SW10		3/04/2013	2.90	0.20	4.40	24.2	4	3	8	0.72	1.40			
SW10		30/04/2013	4.90	0.15	4.8 (lab)	17.6	24	3	40	0.74	1.90			
SW10		27/08/2013	7.20	0.15	4.00	19.9	5	3	24	0.62	2.00			
SW10		23/09/2013	6.30	0.15	5.10	24.8	4	3	7	0.66	1.50			
SW10	Dry	28/10/2013												
SW10		16/12/2013	6.40	0.23	5.50	27.4	63	3	31	0.65	2.40			
Upstream Monitoring														
SW9-02	Sample taken approx. 100 m upstream due to access issues. Photo taken.	10/08/2016	1.09	0.21	5.65	15.3	0							
SW9-02	Sample taken approx. 100 m upstream due to access issues	9/09/2016	0.58	0.20	4.69	17.9	3	4	14	0.74	2.20	25	50	50
SW9-02	Sample taken approx. 100 m upstream due to access issues	11/10/2016	0.39	0.21	4.59	17.9	4							
SW9-02	No access	2/11/2016												
SW9-02	No access	14/12/2016												
SW9-02	No access	17/01/2017												
SW9-02	No access	3/02/2017												
SW9-02	No access	13/03/2017												
SW9-02	Slight flow. U/s and d/s sites not connected. Overcast.	26/04/2017	1.24	0.19	4.58	18.8	20							

SW10-02 - Richmond River

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW10-02	Low tide. Photo taken.	10/08/2016	5.32	0.36	7.27	16.2	8							
SW10-02		12/09/2016	6.47	4.15	6.76	21.4	58	5	74	0.25	0.85	25	50	50
SW10-02		11/10/2016	6.88	17.10	7.03	21.9	731							
SW10-02		2/11/2016	6.01	21.60	6.91	24.0	34	5	35	0.12	0.32	25	50	50
SW10-02	High tide	15/12/2016	6.56	11.50	7.27	27.0	47							
SW10-02	Low tide, outflowing tide.	18/01/2017	7.72	0.69	8.19	29.5	72	1	25	0.22	0.42	25	50	50
SW10-01	Mid tide, gentle flow. Incoming tide therefore SW10-01 is downstream.	3/02/2017	7.95	8.10	7.77	31.1	35							
SW10-02	Very high, outflowing tide.	13/03/2017	5.08	23.30	7.22	25.5	16	1	7	0.08	0.42	25	50	50
SW10-02	Low water level, outflowing tide. U/s and d/s sites connected. Overcast.	26/04/2017	4.42	0.29	6.69	21.5	41							
SW10-02	Light rain. U/s and d/s connected, tidal waterway with outgoing tide. Accurate turbidity reading could not be obtained because sediment is stirred up when accessing water to sample.	10/05/2017	6.35	3.40	6.96	19.8		1	45	0.16	0.48	25	50	50
SW10-01	Upstream and downstream sites connected. Mid water level. Incoming tide, therefore SW10-01 is downstream. Weather fine.	28/06/2017	7.34	0.16	7.15	17.3	31							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				16.42	7.36		90	3	117	0.27	0.80	25	50	50
P20			5.99	0.33	6.75									
St Dev				8.10	0.47									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
SW11		3/04/2013	6.89	0.27	6.80	25.1	107	3	35	0.12	0.60			
SW11		30/04/2013	6.80	0.23	7.90	20.4	83	3	117	0.27	0.80			
SW11		27/08/2013	9.00	3.69	7.40	20.8	69	3	46	0.15	0.60			
SW11		23/09/2013	7.80	11.40	7.00	23.3	51	3	115	0.12	0.30			
SW11		28/10/2013	8.80	19.80	6.90	24.3	8	3	24	0.07	0.30			
SW11		16/12/2013	8.20	13.30	6.90	29.0	49	3	35	0.17	0.05			
Upstream Monitoring														
SW10-01	Low tide. Photo taken.	10/08/2016	5.34	0.33	7.20	16.3	7							
SW10-01		12/09/2016	5.91	4.08	6.93	20.9	97	4	216	0.54	0.87	25	50	50
SW10-01		11/10/2016	7.32	17.20	6.74	21.9	664							
SW10-01		2/11/2016	6.32	19.80	6.43	23.4	34	4	152	0.36	0.81	25	50	50
SW10-01	High tide	15/12/2016	6.63	11.60	7.14	27.2	66							
SW10-01	Low tide, outflowing tide.	18/01/2016	6.86	0.71	7.90	29.3	88	1	20	0.19	0.40	25	50	50
SW10-02	Mid tide, gentle flow. Tide inflowing therefore SW10-02 is upstream site.	3/02/2017	8.00	8.43	7.98	31.1	15							
SW10-01	Very high, outflowing tide.	13/03/2017	4.75	23.00	6.86	25.4	31	1	5	0.08	0.42	25	50	50

SW10-02 - Richmond River

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW10-02	Photo taken	4/08/2016	6.87	11.90	7.20	16.5	122								
SW10-02		10/11/2016	6.30	23.80	7.22	29.1	56	2	28	0.12	0.31	25	50	50	
SW10-02		7/12/2016	8.65	19.30	7.28	28.3	216								
SW10-02	High tide	3/01/2017	5.12	24.20	7.13	27.9	40	1	21	0.09	0.29	25	50	50	
SW10-01	Inflowing tide therefore SW10-01 is downstream. Near high.	28/02/2017	4.44	28.90	6.80	25.0	58								
SW10-02	Low, outflowing tide. Still conditions.	16/03/2017	5.00	0.34	6.97	25.1	41	1	27	0.20	0.81	25	50	50	
SW10-02	Debris present and indications of recent flooding. Very high water level. U/s and d/s monitoring sites connected.	4/04/2017	2.64	0.11	6.38	20.2	51								
SW10-02	Low flow. Outgoing, almost low tide. U/s and d/s sites connected. Overcast.	5/05/2017	6.09	5.76	7.16	20.6	32	3	34	0.15	0.54	25	50	50	
SW10-01	Upstream and downstream sites connected. Moderate flow. High water level. Incoming tide, therefore SW10-01 is downstream. Drizzle.	14/06/2017	6.54	0.10	6.18	16.4	77								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				19.30	7.12		108	3	141	0.31	0.80	25	50	50	
P20			5.06	0.14	6.46										
St Dev				9.95	0.51										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
SW11		31/01/2013	N/A	0.12	N/A	N/A	N/A	3	32	0.02	0.80				
SW11		1/03/2013	1.70	0.14	5.78	23.3	N/A	3	38	0.34	0.70				
SW11		28/05/2013	9.90	0.55	7.11	16.6	52	3	28	0.15	0.60				
SW11		5/07/2013	5.70	0.15	5.70	16.3	107	3	158	0.31	0.90				
SW11		30/07/2013	9.90	0.65	6.70	19.4	130	3	150	0.38	0.90				
SW11		19/11/2013	7.20	19.30	6.50	25.1	24	3	24	0.06	0.05				
SW11		25/11/2013	9.10	4.20	7.20	26.2	12	3	16	0.10	0.40				
Upstream Monitoring															
SW10-01	Photo taken	4/08/2016	7.11	11.90	7.48	16.9	110								
SW10-01		10/11/2016	6.10	23.00	7.05	28.1	45	2	48	0.15	0.34	25	50	50	
SW10-01		7/12/2016	6.59	18.40	7.01	28.1	65								
SW10-01	High tide	3/01/2017	5.90	20.10	6.88	27.5	300	2	141	0.21	0.36	25	50	50	
SW10-02	Incoming tide therefore SW10-02 is upstream. Near high.	28/02/2017	5.08	27.10	7.09	25.3	38								
SW10-01	Low, outflowing tide. Still conditions.	16/03/2017	4.96	0.28	6.66	25.2	55	1	22	0.20	0.80	25	50	50	
SW10-01	Debris suggests recent flooding, very high water level. U/s and d/s monitoring sites connected.	4/04/2017	2.80	0.12	6.50	19.9	41								
SW10-01	Low flow. Outgoing, almost low tide. U/s and d/s sites connected. Overcast.	5/05/2017	6.32	5.64	7.14	20.7	31	3	15	0.11	0.52	25	50	50	
SW10-02	Upstream and downstream sites connected. Moderate flow. Incoming tide, therefore SW10-02 is upstream. High water level. Drizzle.	14/06/2017	6.67	0.11	6.29	16.4	84								

SW10-04 - Unnamed tributary of Bingal Creek

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW10-04	Water too shallow to take readings in waterway. Readings taken from sample collected in jug. DO reading not possible. Photo taken.	10/08/2016		0.66	7.03	16.1	66							
SW10-04		9/09/2016	1.74	0.96	6.23	15.1	89	1	32	0.35	0.46	25	50	50
SW10-04	Significant drain augmentation works have been undertaken	12/10/2016	6.93	0.92	6.91	21.4	146							
SW10-04		3/11/2016	7.15	0.99	6.93	22.8	129	6	10	0.11	0.66	25	50	50
SW10-04	Adjacent sediment basin was discharging into waterway	15/12/2016	6.17	0.56	6.52	24.4	162							
SW10-04	No flow, low water level.	18/01/2017	5.93	1.01	7.32	28.4	109	3	24	0.17	0.66	25	50	50
SW10-04	Green stain due to high algae concentration. Medium water level. No observed flow.	3/02/2017	9.53	1.04	9.51	29.8	150							
SW10-04	Low to medium water level. Upstream and downstream sites connected.	13/03/2017	6.05	0.83	6.96	25.6	32	2	9	0.05	0.67	25	50	50
SW10-04	No visible flow. U/s and d/s sites connected. Overcast.	26/04/2017	6.05	0.69	6.41	20.4	65							
SW10-04	Light rain. U/s and d/s connected. No observed flow. Medium water level. Dirty water discharging from adjacent quarry sediment basin.	10/05/2017	2.74	0.50	6.27	18.5	108	1	94	0.37	0.81	25	50	50
SW10-04	Upstream and downstream sites connected. Low flow. Medium water level. Sediment laden water from quarry basin entering waterway. Weather fine.	28/06/2017	6.83	0.58	6.18	18.3	17							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				1.05	7.29		292	3	77	0.23	0.90	25	50	50
P20			5.24	0.20	6.40									
St Dev				0.52	0.77									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
SW12		3/04/2013	7.90	0.09	7.60	29.3	355	3	77	0.27	0.80			
SW12		30/04/2013	7.10	0.13	7.90	19.7	668	3	202	0.23	0.20			
SW12		27/08/2013	9.60	0.18	7.10	23.6	292	3	94	0.15	0.90			
SW12		23/09/2013	8.90	0.19	7.30	29.1	147	3	42	0.07	0.60			
SW12		28/10/2013	9.30	0.24	7.20	25.2	130	3	64	0.02	1.00			
SW12		16/12/2013	8.70	0.38	7.10	32.7	63	3	33	0.06	0.80			
Upstream Monitoring														
SW10-03	Photo taken	10/08/2016	0.95	1.13	7.17	14.9	0							
SW10-03		9/09/2016	2.12	2.02	6.34	16.1	84	2	57	1.40	0.70	25	50	50
SW10-03	Significant drain works have been undertaken	12/10/2016	7.05	0.97	7.04	26.5	966							
SW10-03		3/11/2016	7.85	0.99	6.99	24.3	113	1	11	0.10	0.60	25	50	50
SW10-03		15/12/2016	5.69	0.64	6.55	26.4	149							
SW10-03	Low water level, no flow. Turbidity data error.	18/01/2017	5.46	1.03	7.23	27.9		1	50	0.22	0.91	25	50	50
SW10-03	Green stain due to high algae concentration. Algae scum layer. Medium water level. No observed flow.	3/02/2017	9.71	1.06	9.51	34.6	275							

SW10-04 - Unnamed tributary of Bingal Creek

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW10-04	Private property - no access	4/08/2016												
SW10-04	Adjacent quarry sediment basin discharging into waterway.	25/08/2016	1.62	0.19	5.74	16.4	12	12	9	0.60	0.79	25	50	50
SW10-04		10/11/2016	6.92	1.05	7.36	33.9	459	10	42	0.17	0.92	25	50	50
SW10-04	Adjacent quarry sediment basin discharging into waterway.	7/12/2016	1.71	0.53	6.09	25.0	414							
SW10-04		8/12/2016	1.98	0.73	6.09	24.4	180							
SW10-04	No visible flow	3/01/2017	9.05	0.72	7.78	28.6	207	1	51	0.26	0.97	25	50	50
SW10-04	High water level. Activity in the quarry. Adjacent sediment basin discharging highly turbid water into waterway. Sample taken upstream of discharge point.	28/02/2017	4.91	0.37	6.35	24.4	623							
SW10-04	Low flow, upstream and downstream sites connected.	16/03/2017	3.53	0.32	6.12	23.9	99	1	39	0.33	3.76	25	50	50
SW10-04	Water level in channel relatively high. Upstream and downstream sites connected, but no visible flow.	20/03/2017	2.93	0.23	6.04	24.7	44	1	11	0.46	1.92	25	50	50
SW10-04	Steady flow. Sediment basin from adjacent quarry was discharging into waterbody. Measurement taken upstream from discharge plume.	4/04/2017	5.52	0.28	6.25	19.9	124							
SW10-04	No visible flow. Moderate water level. U/s and d/s sites connected. Brown colour to water. Overcast.	5/05/2017	2.24	0.75	6.53		62	2	46	0.39	1.18	25	50	50
SW10-04	Fine weather. U/s and d/s connected. No visible flow. Medium water level. Adjacent quarry sediment basin discharging dirty water. Sample taken away from dirty water plume.	15/05/2017	4.78	0.37	6.60	21.3	57	1	10	0.25	0.63	25	50	50
SW10-04	Upstream and downstream sites connected. Slight flow. Water level moderate to high. Sediment laden water from quarry sediment basin discharging into waterway 10 m upstream of sample point. Overcast.	14/06/2017	6.41	0.25	6.09	17.1	103							
SW10-04	Upstream and downstream sites connected. Slight flow. Very high water level. Rain. Sediment laden water from quarry sediment basin discharging into waterway upstream of sample point. Overcast.	17/06/2017	6.01	0.16	5.97	18.1	154	1	38	0.31	0.68	25	50	50
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				0.67	6.88			429	3	133	0.38	2.19	25	50
P20			4.31	0.16	6.14									
St Dev				0.32	0.76									
Threshold			0.50					10	2	10	0.02	0.20		
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
SW12		1/02/2013	N/A	0.14	N/A	N/A	N/A	3	37	0.04	0.60			
SW12		2/03/2013	4.50	0.03	5.88	22.6	N/A	3	66	0.41	0.90			
SW12		28/05/2013	9.40	0.16	5.50	16.2	671	3	230	0.37	2.00			
SW12		5/07/2013	10.20	0.15	5.10	19.9	697	3	298	0.27	2.00			
SW12		30/07/2013	8.40	0.16	6.20	18.8	449	3	109	0.20	0.80			
SW12		19/11/2013	8.80	0.26	7.40	29.3	254	3	334	0.33	3.60			

SW10-06 - Saltwater Creek

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW10-06	Photo taken	4/08/2016	5.47	0.18	7.08	14.7	9							
SW10-06		10/11/2016	3.10	0.28	6.12	32.0	23	10	26	0.28	0.44	25	50	50
SW10-06		7/12/2016	4.75	0.17	5.31	26.0	5							
SW10-06	Very low water level. No visible flow.	3/01/2017	1.00	0.16	5.96	23.2	53	3	42	0.26	0.48	25	50	50
SW10-06	Strong flow. Overcast weather.	28/02/2017	3.59	0.32	5.10	23.5	15							
SW10-06	Very high flow, high water level.	16/03/2017	4.04	0.13	5.49	23.2	12	4	6	0.07	0.71	25	50	50
SW10-06	Steady flow. Gentle rain. Indications of recent flood event.	4/04/2017	4.45	0.13	5.84	20.1	9							
SW10-06	Moderate flow, low water level. U/s and d/s sites connected. Overcast.	5/05/2017	5.10	0.13	6.54	18.6	13	1	3	0.05	0.31	25	50	50
SW10-06	Upstream and downstream sites connected. High flow. Moderate to high water level. Overcast.	14/06/2017	5.74	0.11	5.78	17.5	14							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				0.18	6.68		64	3	20	0.12	0.79	25	50	50
P20			7.26	0.14	6.02									
St Dev				0.03	0.56									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
SW13		31/01/2013	N/A	0.14	N/A	N/A	N/A	3	15	0.02	0.40			
SW13		1/03/2013	3.27	0.12	5.34	21.8	N/A	3	3	0.30	1.30			
SW13		28/05/2013	7.50	0.15	6.10	18.3	26	3	7	0.06	0.40			
SW13		5/07/2013	7.40	0.14	5.90	22.7	23	3	3	0.03	0.30			
SW13		30/07/2013	8.40	0.17	6.30	22.1	23	3	3	0.02	0.30			
SW13		19/11/2013	8.60	0.18	6.70	28.9	51	3	57	0.04	0.60			
SW13		25/11/2013	9.30	0.18	7.30	30.5	16	3	19	0.07	0.60			
Upstream Monitoring														
SW10-05	Dry	4/08/2016												
SW10-05	Dry	10/11/2016												
SW10-05	Dry	7/12/2016												
SW10-05	Dry	3/01/2017												
SW10-05	Dry	28/02/2017												
SW10-05	Dry	16/03/2017												
SW10-05	Low flow. Steady rain. Indications of recent flood event.	4/04/2017	7.06	0.18	6.55	20.5	41							
SW10-05	Moderate flow, low water level. U/s and d/s sites connected. Light brown/ grey colour to water. Monitoring undertaken at alternate location on the north side of Coolgardie Rd at Chainage 157500. Cloudy weather.	5/05/2017	7.75	0.20	6.66	18.9	73	4	21	0.15	0.92	25	50	50
SW10-05	Upstream and downstream sites connected. Moderate flow. Moderate to high water level. Overcast.	14/06/2017	9.83	0.13	6.55	17.7	82							

SW10-08 - Randles Creek

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW10-08	Photo taken.	10/08/2016	6.67	0.14	7.51	14.1	13							
SW10-08		12/09/2016	6.01	0.14	6.94	16.8	19	4	12	0.11	0.22	25	50	50
SW10-08		11/10/2016	1.34	0.17	6.48	18.1	14							
SW10-08		2/11/2016	0.66	0.19	7.06	21.0	21	6	15	0.12	0.45	25	50	50
SW10-08		15/12/2016	0.59	0.17	6.28	22.0	10							
SW10-08	Low water level, no visible flow.	18/01/2017	0.67	0.20	6.63	25.0	7	2	11	0.17	0.36	25	50	50
SW10-08	Dry	3/02/2017												
SW10-08	Dry	13/03/2017												
SW10-08	Medium flow, u/s and d/s sites connected. Overcast.	26/04/2017	4.99	0.13	6.37	18.6	24							
SW10-08	Fine weather. U/s and d/s connected. Moderate flow. Moderate water level.	11/05/2017	5.62	0.14	6.32	16.9	30	1	9	0.05	0.14	25	50	50
SW10-08	Upstream and downstream sites connected. Moderate flow, medium water level. Weather fine.	28/06/2017	8.34	0.13	6.44	16.0	26							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				0.19	6.85		28	3	21	0.09	0.40	25	50	50
P20			0.67	0.14	5.80									
St Dev				0.04	0.80									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
SW14		4/04/2013	0.17	0.09	4.30	22.2	16	3	36	0.19	1.20			
SW14	pH result from lab sample	30/04/2013	6.70	0.15	6.90	18.0	19	3	12	0.03	0.40			
SW14		27/08/2013	7.60	0.20	4.70	19.8	20	3	16	0.02	0.40			
SW14		23/09/2013	7.50	0.18	5.80	23.6	18	3	8	0.02	0.20			
SW14		28/10/2013	2.20	0.19	5.60	18.7	15	3	21	0.04	0.20			
SW14		16/12/2013	6.20	0.19	6.10	24.7	51	3	217	0.08	0.40			
Upstream Monitoring														
SW10-07	Photo taken	10/08/2016	7.48	0.14	7.40	14.1	8							
SW10-07		12/09/2016	6.61	0.14	6.85	16.8	28	5	9	0.09	0.26	25	50	50
SW10-07		11/10/2016	2.37	0.16	6.51	17.9	17							
SW10-07		2/11/2016	0.69	0.19	6.85	19.8	10	8	8	0.09	0.34	25	50	50
SW10-07		15/12/2016	0.58	0.16	6.19	21.5	53							
SW10-07	Low water level, no visible flow.	18/01/2017	0.43	0.20	6.58	24.2	13	3	8	0.11	0.20	25	50	50
SW10-07	Insufficient water for sampling	3/02/2017												
SW10-07	Very low water level. No flow. Insufficient water to take reading in waterbody - reading taken from sample in bucket. Could not obtain accurate DO or turbidity measurement.	13/03/2017		0.24	5.89	22.1		1	2	0.08	0.49	25	50	50
SW10-07	Slight flow. U/s and d/s sites connected. Overcast.	26/04/2017	6.74	0.13	6.49	18.7	28							
SW10-07	Fine weather. U/s and d/s connected. Slight flow. Moderate water level.	11/05/2017	7.00	0.14	6.36	17.2	28	1	6	0.04	0.13	25	50	50

SW10-08 - Randles Creek

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW10-08	Photo taken	4/08/2016	8.38	0.15	8.07	14.5	43								
SW10-08		10/11/2016	2.09	0.18	6.43	22.3	11	4	9	0.08	0.46	25	50	50	
SW10-08		7/12/2016	3.77	0.13	6.11	23.3	23								
SW10-08		3/01/2017	2.32	0.19	6.32	23.2	13	3	7	0.07	0.46	25	50	50	
SW10-08		28/02/2017	4.29	0.18	5.76	21.5	33								
SW10-08	Very high water level. Steady flow. Upstream and downstream sites connected.	16/03/2017	5.90	0.12	5.99	22.2	20	3	8	0.04	0.46	25	50	50	
SW10-08	No access - house demolition exclusion zone fencing	4/04/2017													
SW10-08	Moderate flow, moderate water level. U/s and d/s sites connected. Weather cloudy	5/05/2017	6.38	0.12	6.40	17.7	39	1	16	0.05	0.24	25	50	50	
SW10-08	Upstream and downstream sites connected. Moderate flow. Moderate water level. Overcast.	14/06/2017	8.64	0.12	6.08	17.3	35								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				0.18	6.72		42	3	33	0.08	0.54	25	50	50	
P20			4.35	0.13	5.88										
St Dev				0.02	0.60										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
SW14		1/02/2013	N/A	0.13	N/A	N/A	N/A	3	3	0.01	0.30				
SW14		1/03/2013	6.49	0.12	5.21	23.3	N/A	3	134	0.09	1.00				
SW14		28/05/2013	8.70	0.16	5.70	15.3	23	3	13	0.05	0.30				
SW14		5/07/2013	7.70	0.14	6.10	17.7	23	3	10	0.08	0.20				
SW14		30/07/2013	8.70	0.16	6.50	18.2	17	3	10	0.01	0.05				
SW14		19/11/2013	5.50	0.18	6.80	23.0	20	3	6	0.03	0.40				
SW14		25/11/2013	6.00	0.16	7.00	24.7	14	3	27	0.08	0.70				
Upstream Monitoring															
SW10-07	Photo taken	4/08/2016	8.54	0.13	7.64	14.4	45								
SW10-07		10/11/2016	2.19	0.18	6.37	22.9	116	1	8	0.07	0.54	25	50	50	
SW10-07		7/12/2016	4.46	0.13	6.22	23.4	23								
SW10-07		3/01/2017	3.06	0.18	6.33	23.2	19	3	5	0.06	0.38	25	50	50	
SW10-07		28/02/2017	4.19	0.18	5.83	21.7	30								
SW10-07	Steady flow. Very high water level. Upstream and downstream sites connected.	16/03/2017	5.58	0.13	5.92	22.3	28	4	49	0.04	0.50	25	50	50	
SW10-07	No access - house demolition exclusion zone fencing	4/04/2017													
SW10-07	Slight flow, moderate water level. U/s and d/s sites connected. Weather cloudy.	5/05/2017	7.58	0.12	6.67	17.8	38	2	33	0.05	0.29	25	50	50	
SW10-07	Upstream and downstream sites connected. Low flow. Moderate water level. Overcast.	14/06/2017	9.10	0.12	6.11	17.3	58								

SW11-02 - Duck Creek

Dry Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters							
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
Downstream Monitoring															
SW11-02	Low tide. Photo taken.	10/08/2016	5.77	0.75	7.57	15.4	14								
SW11-02		9/09/2016	7.80	5.93	6.67	19.6	11	2	11	0.08	0.67	25	50	50	
SW11-02		11/10/2016	6.34	21.30	7.05	21.3	20								
SW11-02		3/11/2016	5.93	36.70	7.40	23.8	11	4	17	0.07	0.25	25	50	50	
SW11-02	High tide.	15/12/2016	6.62	38.30	7.61	25.6	26								
SW11-01	Mid tide, flowing in - therefore SW11-01 is downstream.	18/01/2017	6.41	29.00	7.64	29.5	47	2	15	0.10	0.30	25	50	50	
SW11-02	High tide. Minimal flow.	3/02/2017	6.08	33.00	7.87	30.1	11								
SW11-02	Mid, outflowing tide. Steady flow.	13/03/2017	4.29	32.80	7.19	25.8	32	5	28	0.07	0.51	25	50	50	
SW11-02	Low, outflowing tide. U/s and d/s sites connected. Overcast.	26/04/2017	5.60	3.33	6.67	20.3	34								
SW11-02	Fine weather. U/s and d/s connected. Low tide flowing out. Low-medium water level.	11/05/2017	5.99	5.52	6.34	19.0	25	1	11	0.06	0.48	25	50	50	
SW11-02	Upstream and downstream sites connected. Outflowing tide, moderate flow. Medium water level. Weather fine.	28/06/2017	8.62	0.23	6.74	16.9	14								
P80 & P20 Values (calculated from baseline and upstream data below)															
P80				31.90	7.49		26	3	26	0.11	0.59	25	50	50	
P20			5.63	2.24	6.54										
St Dev				14.01	0.55										
Threshold			0.50				10	2	10	0.02	0.20				
Baseline (pre-construction) Monitoring (identifier from pre-construction)															
SW15		4/04/2013	0.50	0.15	6.00	21.6	22	3	3	0.01	0.20				
SW15		30/04/2013	6.90	3.94	7.30	20.7	13	3	107	0.07	0.50				
SW15		27/08/2013	8.60	16.50	7.00	22.8	7	3	25	0.81	0.60				
SW15		23/09/2013	8.30	21.50	7.50	26.7	13	3	26	0.01	0.05				
SW15		28/10/2013	8.60	29.50	7.20	24.3	7	3	58	0.22	0.40				
SW15		16/12/2013	5.90	23.00	7.70	24.3	12	3	12	0.08	0.80				
Upstream Monitoring															
SW11-01	Photo taken	10/08/2016	5.64	0.67	7.29	15.4	4								
SW11-01		9/09/2016	7.33	6.28	6.37	19.5	14	1	14	0.07	0.59	25	50	50	
SW11-01		11/10/2016	6.15	16.60	6.64	20.8	11								
SW11-01		3/11/2016	5.63	36.20	7.27	23.7	12	7	12	0.08	0.31	25	50	50	
SW11-01	High tide.	15/12/2016	6.39	37.60	7.44	25.5	36								
SW11-02	Mid tide, flowing in therefore SW11-02 is upstream.	18/01/2017	6.95	28.10	7.82	29.6	26	6	24	0.11	0.31	25	50	50	
SW11-01	High tide. Minimal flow.	3/02/2017	6.18	32.50	7.87	30.4	12								
SW11-01	Mid, outflowing tide. Steady flow.	13/03/2017	4.06	32.60	6.94	25.8	66	3	16	0.07	0.53	25	50	50	
SW11-01	Low, outflowing tide. U/s and d/s sites connected. Overcast.	26/04/2017	5.56	2.58	6.53	20.2	44								
SW11-01	Fine weather. U/s and d/s connected. Low tide flowing out. Low-medium water level.	11/05/2017	6.00	2.15	6.54	18.3	25	1	10	0.06	0.48	25	50	50	

SW11-02 - Duck Creek

Wet Event Monitoring

			In-situ (Type A) Parameters					Laboratory (Type B) Parameters						
Monitoring Location	Field Notes	Date	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Turbidity	Oil & Grease	Suspended Solids	Total Phosphorus	Total Nitrogen	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mg/L	mS/cm	pH unit	°C	NTU	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downstream Monitoring														
SW11-02	Sample taken 100m downstream due to access issues	4/08/2016	6.42	28.60	7.52	17.3	2							
SW11-02		10/11/2016	5.65	35.00	7.27	27.2	18	5	3	0.07	0.37	25	50	50
SW11-02		7/12/2016	5.19	30.10	6.96	27.4	67							
SW11-02		3/01/2017	4.66	36.40	7.19	27.4	30	3	28	0.08	0.41	25	50	50
SW11-02	Low tide. Flowing out.	28/02/2017	2.81	26.80	6.83	24.3	26							
SW11-02	Very high water level. High, outflowing tide. Upstream and downstream sites connected.	16/03/2017	4.11	1.53	6.35	23.5	63	2	35	0.16	3.35	25	50	50
SW11-02	Mid tide. Steady flow out. U/s and d/s sites connected.	4/04/2017	5.25	0.31	6.43	19.9	31							
SW11-02	Tidal - low tide, slight flow from u/s to d/s. Weather overcast.	5/05/2017	5.89	1.81	6.54	19.3	61	1	57	0.15	0.79	25	50	50
SW11-02	Upstream and downstream sites connected. Low flow, outgoing tide. High water level. Partly cloudy.	14/06/2017	6.15	0.20	6.11	17.0	34							
P80 & P20 Values (calculated from baseline and upstream data below)														
P80				27.80	6.91		59	3	19	0.15	0.80	25	50	50
P20			4.56	0.35	6.25									
St Dev				14.02	0.43									
Threshold			0.50				10	2	10	0.02	0.20			
Baseline (pre-construction) Monitoring (identifier from pre-construction)														
SW15		1/02/2013	N/A	0.50	N/A	N/A	N/A	3	19	0.05	0.80			
SW15		1/03/2013	4.00	0.31	5.99	23.3	N/A	3	8	0.15	0.70			
SW15		28/05/2013	8.40	6.60	6.50	16.2	18	3	11	0.06	0.70			
SW15		5/07/2013	6.80	0.25	5.60	20.6	39	3	16	0.10	0.70			
SW15		30/07/2013	8.90	8.38	6.60	20.6	11	3	8	0.04	0.40			
SW15		19/11/2013	6.40	27.80	6.90	29.2	7	3	12	0.03	0.70			
SW15		25/11/2013	8.30	23.20	7.30	27.6	6	3	3	0.46	0.05			
Upstream Monitoring														
SW11-01	Photo taken	5/08/2016	6.33	5.48	6.97	15.8	39							
SW11-01		10/11/2016	5.43	35.20	7.00	27.0	24	5	17	0.06	0.28	25	50	50
SW11-01		7/12/2016	4.89	28.60	6.70	27.6	77							
SW11-01		3/01/2017	4.69	35.80	6.86	27.3	55	3	14	0.08	0.43	25	50	50
SW11-01	Low tide. Flowing out.	28/02/2017	3.15	25.60	6.46	24.2	29							
SW11-01	Very high water level. High, outflowing tide. Upstream and downstream sites connected.	16/03/2017	4.04	1.29	6.25	23.6	66	3	31	0.15	3.56	25	50	50
SW11-01	Mid tide. Steady flow out. U/s and d/s sites connected.	4/04/2017	4.85	0.35	6.34	20.0	26							
SW11-01	Tidal - low tide, slight flow from u/s to d/s. Monitoring undertaken 200 m u/s from standard location due to access restrictions with new contractor on site. Weather overcast.	5/05/2017	5.65	0.56	6.57	18.8	63	2	33	0.10	0.83	25	50	50



Appendix D

Groundwater Quality: Results of Interest

Groundwater Quality Table of Results of Interest

Portion	Bore	Date	Results of Interest
A	GWB3-06	31/08/2016	pH = 6.57 Aluminium = 0.05 mg/L >C16 - C34 Fraction = 280 µg/L
A	GWB3-06	30/11/2016	pH = 5.24
A	GWB3-06	6/02/2016	pH = 7.03 TN = 3.44 mg/L TP = 0.9 mg/L Potassium = 27 mg/L Calcium = 262 mg/L
A	GWB3-07	31/08/2016	Bicarbonate = 91 mg/L
A	GWB3-07	30/11/2016	pH = 5.53
A	GWB3-07	6/02/2017	EC = 7.74 mS/cm pH = 5.73 Chloride = 2230 mg/L Sodium = 1220 mg/L Calcium = 135 mg/L Magnesium = 180 mg/L Aluminium = 0.17 mg/L
A	GWB3-07	15/05/2017	EC = 8.01 mS/cm pH = 5.65
A	GWB3-14	3/11/2016	EC = 0.34 mS/cm Magnesium = 10.8 mg/L Aluminium = 0.016 mg/L Copper = 0.2 mg/L
A	GWB3-14	30/11/2016	EC = 0.38 mS/cm pH = 6.05
A	GWB3-14	7/02/2017	pH = 6.78 Chloride = 78 mg/L Sulfate = 52 mg/L Magnesium = 11.7 mg/L
A	GWB3-18	3/11/2016	EC = 0.12 mS/cm Chloride = 110 mg/L Sulfate = 68 mg/L Sodium = 82 mg/L Calcium = 1.7 mg/L Magnesium = 5.8 mg/L Aluminium = 0.03 mg/L Copper = 0.73 mg/L
A	GWB3-21	30/08/2016	Aluminium = 0.15 mg/L
A	GWB3-21	1/12/2017	EC = 0.25 mS/cm pH = 6.54
A	GWB3-21	6/02/2017	EC = 0.28 mS/cm Chloride = 78 mg/L Potassium = 4.4 mg/L Magnesium = 7.5 mg/L Aluminium = 0.4 mg/L Copper = 2.24 mg/L
A	GWB3-31	1/12/2016	EC = 2.99 mS/cm
A	GWB3-31	16/05/2017	EC = 6.57 mS/cm pH = 6.99
A	GWB3-32	29/08/2016	pH = 4.79
A	GWB3-32	1/12/2016	EC = 0.3 mS/cm pH = 6.11
A	GWB3-32	7/02/2017	EC = 0.31 mS/cm pH 4.84
A	GWB3-32	16/05/2017	pH = 4.92

Portion	Bore	Date	Results of Interest
A	GWB3-34	29/08/2016	EC = 0.46 mS/cm
A	GWB3-34	1/12/2016	EC = 0.44 mS/cm
A	GWB3-34	8/02/2017	EC = 0.5 mS/cm pH = 6.82
A	GWB3-34	18/05/2017	EC = 0.52 mS/cm
A	GWB3-36	29/08/2016	EC = 0.12 mS/cm pH = 5.46 Bicarbonate = 9 mg/L
A	GWB3-36	1/12/2016	EC = 0.14 mS/cm pH = 6.45
A	GWB3-36	8/02/2017	pH = 6.51 Bicarbonate = 30 mg/L Potassium = 7.6 mg/L Calcium = 3.7 mg/L
A	GWB3-36	18/05/2017	pH = 6.31
A	GWB3-38	29/08/2016	pH = 6.13 Potassium = 10 mg/L Magnesium = 4.9 mg/L
A	GWB3-38	1/12/2016	pH = 6.66
A	GWB3-38	8/02/2017	pH = 6.09 Chloride = 75 mg/L Sulfate = 69 mg/L Sodium = 44 mg/L Calcium = 2.2 mg/L Aluminium = 0.14 mg/L
A	GWB3-38	18/05/2017	EC = 0.32 mS/cm pH = 6.14
A	GWB3-40	26/08/2016	Bicarbonate = 105 mg/L Sodium = 38 mg/L Potassium = 4.5 mg/L Calcium = 21.8 mg/L Magnesium = 6 mg/L Zinc = 0.21 mg/L
A	GWB3-40	1/12/2016	pH = 6.67
A	GWB3-40	8/02/2017	Bicarbonate = 57 mg/L TN = 1.84 mg/L TP = 0.3 mg/L Chloride = 151 mg/L Sulfate = 96 mg/L Sodium = 79 mg/L Potassium = 5.6 mg/L Calcium = 36.4 mg/L Magnesium = 13.6 mg/L
A	GWB3-41	26/08/2016	EC = 0.46 mS/cm
A	GWB3-41	2/12/2016	EC = 0.88 mS/cm
A	GWB3-41	9/02/2017	EC = 0.55 mS/cm pH = 3.39
A	GWB3-41	19/05/2017	pH = 6.77
A	GWB3-42a	26/08/2016	EC = 0.23 mS/cm pH = 4.32
A	GWB3-45	26/08/2016	EC = 0.96 mS/cm
A	GWB3-45	2/12/2016	EC = 0.89 mS/cm pH = 6.49
A	GWB3-45	9/02/2017	EC = 0.95 mS/cm pH = 7.25
A	GWB3-45	25/05/2017	EC = 1 mS/cm
A	GWB3-47	26/08/2016	EC = 0.19 mS/cm pH = 5.38

Portion	Bore	Date	Results of Interest
A	GWB3-47	2/12/2016	EC = 0.25 mS/cm pH = 6.7
A	GWB3-47	9/02/2017	EC = 0.65 mS/cm pH = 3.74
A	GWB3-47	25/05/2017	pH = 6.16
A	GWB3-51	23/08/2016	EC = 0.16 mS/cm Aluminium = 0.012 mg/L >C16 - C34 Fraction = 170 µg/L
A	GWB3-51	2/12/2016	pH = 6.67
A	GWB3-51	25/05/2017	EC = 0.15 mS/cm
A	GWB4-02	22/08/2016	EC = 0.1 mS/cm Aluminium = 0.12 mg/L Zinc = 0.14 mg/L
A	GWB4-02	10/02/2017	Calcium = 37.3 mg/L Magnesium = 14.7 mg/L
A	GWB4-06	22/08/2016	EC = 9.45 mS/cm TN = 1.97 mg/L Sulfate = 4180 mg/L Sodium = 1636 mg/L Potassium = 94 mg/L Calcium = 351 mg/L Magnesium = 538 mg/L Copper 0.047 mg/L Zinc = 0.14 mg/L >C16 - C34 Fraction = 130 µg/L
A	GWB4-06	5/12/2016	EC = 8.74 mS/cm
A	GWB4-06	10/02/2017	EC = 11.2 mS/cm TN = 2.45 mg/L Chloride = 2280 mg/L Sulfate = 4620 mg/L Sodium = 1820 mg/L Potassium = 88 mg/L Calcium = 347 mg/L Magnesium = 576 mg/L
A	GWB4-06	22/05/2017	EC = 9.21 mS/cm
A	GWB4-09	26/08/2016	EC = 1.63 mS/cm pH = 6.79
A	GWB4-21	22/08/2016	EC = 4.68 mS/cm pH = 6.97
A	GWB4-21	5/12/2016	EC = 4.72 mS/cm pH = 6.75
A	GWB4-21	13/02/2017	EC = 5.34 mS/cm pH = 6.97
A	GWB4-21	22/05/2017	EC = 5.91 mS/cm pH = 6.95
B	GWB5-01	19/08/2016	pH = 7.9 Sulfate = 2094 mg/L Calcium = 385 mg/L Magnesium = 1186 mg/L Aluminium = 0.016 mg/L
B	GWB5-01	30/11/2016	pH = 7
B	GWB5-01	14/02/2017	pH = 7.01 Sulfate = 2097 mg/L Calcium = 351 mg/L Magnesium = 1116 mg/L
B	GWB5-01	26/05/2017	pH = 7.11
B	GWB5-03	30/11/2016	EC = 39.3mS/cm pH = 6.73

Portion	Bore	Date	Results of Interest
B	GWB5-03	16/02/2017	EC = 39.5 mS/cm pH = 6.77 Bicarbonate = 960 mg/L TP = 3.1 mg/L Sulfate = 1572 mg/L
B	GWB5-03	26/05/2017	EC = 38.5 mS/cm pH = 6.87
C	GWB8-07	23/08/2016	pH = 5.54
C	GWB8-14	23/08/2016	EC = 1.94 mS/cm pH = 6.11 TP = 0.1 mg/L Chloride = 652 mg/L Sulfate = 90 mg/L Potassium = 13 mg/L Calcium = 5.8 mg/L Magnesium = 42.8 mg/L Zinc = 0.012 mg/L
C	GWB8-14	1/12/2016	EC = 1.98 mS/cm
C	GWB8-14	17/02/2017	EC = 2.04 mS/cm TP = 0.3 mg/L Chloride = 580 mg/L Sulfate = 123 mg/L Sodium = 342 mg/L Potassium = 15 mg/L Calcium = 4 mg/L Magnesium = 36.3 Zinc = 0.019 mg/L
C	GWB8-14	30/05/2017	EC = 2.22 mg/L pH = 5.6
C	GWB8-16	26/08/2016	pH = 5.93 Sulfate = 32 mg/L Potassium = 3.6 mg/L Copper 0.12 mg/L Zinc = 0.02 mg/L
C	GWB8-16	1/12/2016	pH = 6.09
C	GWB8-16	17/02/2017	pH = 6.02 Sulfate = 31 mg/L Potassium = 5.6 mg/L
C	GWB8-22	26/08/2016	pH = 6.69 TN = 3.4 mg/L Sulfate = 32 mg/L Sodium = 436 mg/L Calcium = 76.7 mg/L Aluminium = 0.032 mg/L Zinc = 0.016 mg/L >C16 - C34 Fraction = 140 µg/L
C	GWB8-22	1/12/2016	EC = 2.56 mS/cm pH = 6.66
C	GWB8-22	17/02/2017	EC = 2.38 mS/cm pH = 6.71 Bicarbonate = 280 mg/L TP = 0.5 mg/L Sulfate = 39 mg/L Sodium = 464 mg/L Calcium = 68.9 mg/L Zinc = 0.005 mg/L
C	GWB8-22	24/05/2017	EC = 2.82 mS/cm pH = 6.84

Portion	Bore	Date	Results of Interest
C	GWB8-26	1/12/2016	pH = 5.82
C	GWB8-26	17/02/2017	pH = 6.77
C	GWB8-26	24/05/2017	pH = 6.91
C	GWB9-08	29/05/2017	EC = 1.18 mS/cm pH = 6.41
D	GWB10-02	25/08/2016	EC = 0.27 mS/cm pH = 5.08 Sodium = 34 mg/L Magnesium = 6.1 mg/L Zinc = 0.023 mg/L >C10 - C16 Fraction = 260 µg/L >C16 - C34 Fraction = 290 µg/L
D	GWB10-02	2/12/2016	EC = 0.26 mS/cm pH = 5.2
D	GWB10-02	22/02/2017	EC = 0.27 mS/cm pH = 5.02 TP = 0.4 mg/L Chloride = 119 mg/L Sulfate = 34 mg/L Sodium = 33 mg/L Potassium = 3.1 mg/L Magnesium = 6.2 mg/L Zinc = 0.031 mg/L
D	GWB10-02	24/05/2017	EC = 0.28 mS/cm pH = 5.13
D	GWB11-03	27/10/2016	pH = 6.77
D	GWB11-03	2/12/2016	pH = 6.86
D	GWB11-03	23/02/2017	pH = 6.95
D	GWB11-03	24/05/2017	pH = 6.73



Appendix E

Groundwater Quality: Data

GWB3-06

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCO3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
Downgradient Monitoring																						
GWB3-06		31/08/2016	9.84	6.57	19.63	767	2.07	0.10	3330	183	1640	9.2	217.0	236.0	0.051	0.001	0.028	0.005	0.110	50	280	50
GWB3-06		30/11/2016	9.72	5.24	23.58																	
GWB3-06		6/02/2017	12.30	7.03	28.33	747	3.44	0.90	3830	246	1890	27.0	262.0	279.0	0.005	0.002	0.014	0.005	0.047	13	50	50
GWB3-06		15/05/2017	9.65	6.84	21.23																	
P80 & P20 Values (calculated from baseline and upgradient data below)																						
P80			12.78	6.99		864	2.98	0.26	4524	428	2408	12.0	222.6	284.6	0.027	0.0018	0.075	0.005	0.182	43	50	50
P20			8.67	6.68																		
Downgradient Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
PZ10		13/02/2013	7.59	6.80																		
PZ10		7/05/2013	8.22	6.65																		
PZ10		27/08/2013	9.42	7.01																		
PZ10		6/01/2014	9.17	6.76																		
Upgradient (construction) Monitoring																						
GWB3-05		31/08/2016	13.70	6.66	19.76	880	1.39	0.10	4640	345	2460	12.0	227.0	292.0	0.032	0.001	0.053	0.005	0.150	50	50	50
GWB3-05		30/11/2016	12.70	5.23	24.71																	
GWB3-05		6/02/2017	12.80	7.13	25.36	800	3.38	0.30	4060	449	2200	12.0	205.0	255.0	0.005	0.002	0.080	0.005	0.190	13	50	50
GWB3-05		15/05/2017	14.10	6.87	21.06																	
Upgradient Baseline (pre-construction) Monitoring (identifier from pre-construction)																						

GWB3-32

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCO3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB3-32		29/08/2016	0.27	4.79	20.39	1	1.37	0.10	77	3	37	3.3	0.6	5.5	0.170	0.001	0.069	0.005	0.410	50	210	50
GWB3-32		1/12/2016	0.30	6.11	22.09																	
GWB3-32		7/02/2017	0.31	4.84	25.04	1	2.07	0.20	83	55	41	2.5	4.7	6.1	0.270	0.001	0.400	0.005	0.200	13	50	50
GWB3-32		16/05/2017	0.28	4.92	21.28																	
P80 & P20 Values (calculated from baseline data)																						
P80			0.29	4.07																		
P20			0.16	3.60																		
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
PZ39		15/02/2013	0.28	4.15																		
PZ39		9/05/2013	0.27	3.91																		
PZ39		30/08/2013	0.30	4.01																		
PZ39		9/01/2014	0.00	3.13																		

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB3-33

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB3-33	Dry	29/08/2016																					
GWB3-33	Dry	1/12/2016																					
GWB3-33	Dry	7/02/2017																					
GWB3-33	Dry	18/05/2017																					
P80 & P20 Values (calculated from baseline data)																							
P80			0.84	5.37																			
P20			0.49	5.08																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
PZ40		15/02/2013	0.37	5.47																			
PZ40		9/05/2013	0.95	4.98																			
PZ40	Dry	30/08/2013																					
PZ40	Dry	9/01/2014																					

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB3-34

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB3-34		29/08/2016	0.46	6.34	18.69	169.00	4.19	0.70	38.00	18.80	59.90	9.10	13.80	16.30	0.09	0.00	0.01	0.01	0.16	50.00	280.00	160.00
GWB3-34		1/12/2016	0.44	6.40	21.77																	
GWB3-34		8/02/2017	0.50	6.82	24.31	134	3.52	0.50	44	82	64	9.6	12.9	18.0	0.052	0.001	0.002	0.005	0.030	13	50	50
GWB3-34		18/05/2017	0.52	6.50	20.59																	
P80 & P20 Values (calculated from baseline data)																						
P80			0.41	6.66																		
P20			0.32	6.01																		
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
PZ41		15/02/2013	0.41	6.22																		
PZ41		10/05/2013	0.20	6.85																		
PZ41		30/08/2013	0.41	6.53																		
PZ41		9/01/2014	0.42	5.70																		

Note: This bore is not part of a bore pair

GWB3-41

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB3-41		26/08/2016	0.46	6.47	20.73	99	1.28	0.00	77	16	52	3.8	20.0	13.5	0.150	0.001	0.008	0.005	0.270	50	50	50
GWB3-41		2/12/2016	0.88	6.42	20.67																	
GWB3-41		9/02/2017	0.55	3.39	23.66	251	2.23	0.10	162	50	91	6.8	76.1	26.5	0.005	0.001	0.002	0.005	0.027	13	50	50
GWB3-41		19/05/2017	0.80	6.77	19.62																	
P80 & P20 Values (calculated from baseline data)																						
P80			0.82	6.75																		
P20			0.59	6.16																		
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
PZ48		15/02/2013	0.81	6.68																		
PZ48		10/05/2013	0.85	6.39																		
PZ48		2/09/2013	0.72	6.85																		
PZ48		10/01/2014	0.41	5.82																		

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB3-42b

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCO ₃	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB3-42a	Could not locate GWB3-42b	26/08/2016	0.23	4.32	20.53	1	1.04	0.03	43	21	22	7.5	1.6	3.6	0.620	0.001	0.058	0.005	0.530	50	360	50
GWB3-42b	Unable to locate.	2/12/2016																				
GWB3-42b	Unable to locate.	9/02/2017																				
GWB3-42b	Unable to locate.	19/05/2017																				
P80 & P20 Values (calculated from baseline data)																						
P80			0.19	4.30																		
P20			0.18	3.73																		
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
PZ49		15/02/2013	0.19	4.14																		
PZ49		10/05/2013	0.18	3.98																		
PZ49		2/09/2013	0.19	4.55																		
PZ49		10/01/2014	0.19	3.36																		

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB3-43

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCO3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB3-43	Bore has been capped - unable to measure/ sample	26/08/2016																					
GWB3-43	Unable to locate. PC representative confirmed	2/12/2016																					
GWB3-43	Cannot locate	9/02/2017																					
GWB3-43	Cannot locate	19/05/2017																					
P80 & P20 Values (calculated from baseline data)																							
P80			0.19	4.30																			
P20			0.18	3.73																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
PZ49		15/02/2013	0.19	4.14																			
PZ49		10/05/2013	0.18	3.98																			
PZ49		2/09/2013	0.19	4.55																			
PZ49		10/01/2014	0.19	3.36																			

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB3-45

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB3-45		26/08/2016	0.96	6.76	21.58	248	1.99	0.00	157	8	85	8.8	86.9	18.3	0.014	0.001	0.008	0.005	0.190	50	200	50
GWB3-45		2/12/2016	0.89	6.49	22.47																	
GWB3-45		9/02/2017	0.95	7.25	24.13	199	1.67	0.20	174	54	86	7.9	82.3	18.4	0.005	0.001	0.002	0.005	0.068	13	50	50
GWB3-45		25/05/2017	1.00	6.88	20.78																	
P80 & P20 Values (calculated from baseline data)																						
P80			0.86	6.93																		
P20			0.75	6.68																		
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
PZ50		18/02/2013	0.65	7.04																		
PZ50		13/05/2013	0.82	6.83																		
PZ50		2/09/2013	0.84	6.85																		
PZ50		10/01/2014	0.88	6.46																		

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB3-46

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB3-46	Dry	26/08/2016																					
GWB3-46	Dry	2/12/2016																					
GWB3-46	Dry	9/02/2017																					
GWB3-46	Insufficient water to sample	25/05/2017																					
P80 & P20 Values (calculated from baseline data)																							
P80			1.09	5.79																			
P20			0.74	5.65																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
PZ51		18/02/2013	0.60	5.87																			
PZ51		13/05/2013	1.17	5.65																			
PZ51	Dry	2/09/2013																					
PZ51		10/01/2014	0.96	5.66																			

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB3-47

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB3-47		26/08/2016	0.19	5.38	19.25	13	2.06	0.10	55	4	29	5.6	4.3	4.3	0.054	0.001	0.019	0.005	0.170	50	240	50
GWB3-47		2/12/2016	0.25	6.70	24.74																	
GWB3-47		9/02/2017	0.65	3.74	23.88	1	1.00	1.14	0	150	46	67.0	5.5	6.8	12.800	0.140	0.001	0.023	0.005	13	13	50
GWB3-47		25/05/2017	0.51	6.16	20.15																	
P80 & P20 Values (calculated from baseline data)																						
P80			0.54	5.22																		
P20			0.42	4.64																		
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
BH1187		18/02/2013	0.41	5.49																		
BH1187		13/05/2013	0.68	5.04																		
BH1187		2/09/2013	0.45	4.96																		
BH1187		10/01/2015	0.43	4.15																		

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB4-09

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB4-09		26/08/2016	1.63	6.79	18.52	830	2.18	0.10	646	94	585	6.6	107.0	64.6	0.016	0.001	0.005	0.005	0.120	50	140	50
GWB4-09	Destroyed - within major cut (Greenhill)	5/12/2016																				
GWB4-09	Destroyed - within major cut (Greenhill)	10/02/2017																				
GWB4-09	Destroyed - within major cut (Greenhill)	22/05/2017																				
P80 & P20 Values (calculated from baseline data)																						
P80			0.32	7.32																		
P20			0.28	6.91																		
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
BH1251		20/02/2013	0.33	7.24																		
BH1251		15/05/2013	0.32	7.07																		
BH1251		4/09/2013	0.27	7.43																		
BH1251		15/01/2014	0.30	6.68																		

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB4-10

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB4-10	Dry	26/08/2016																					
GWB4-10	Dry	5/12/2016																					
GWB4-10	Dry	10/02/2017																					
GWB4-10	Dry	22/05/2017																					
P80 & P20 Values (calculated from baseline data)																							
P80			2.35	6.79																			
P20			1.78	6.66																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
BH1259		20/02/2013	1.60	6.61																			
BH1259		15/05/2013	2.54	6.84																			
BH1259	Dry	4/09/2013																					
BH1259	Dry	15/01/2014																					

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB4-11

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB4-11	unable to locate bore	26/08/2016																					
GWB4-11	No bore - confirmed with PC	5/12/2016																					
GWB4-11	No bore - confirmed with PC	10/02/2017																					
GWB4-11	No bore - confirmed with PC	22/05/2017																					
P80 & P20 Values (calculated from baseline data)																							
P80			3.56	7.53																			
P20			0.13	7.14																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
BH1261		20/02/2013	0.13	7.32																			
BH1261		15/05/2013	0.14	7.52																			
BH1261		4/09/2013	4.11	7.55																			
BH1261		15/01/2014	3.19	6.86																			

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB4-12

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB4-12	Dry	26/08/2016																					
GWB4-12	Dry	5/12/2016																					
GWB4-12	Dry	10/02/2017																					
GWB4-12	Dry	22/05/2017																					
P80 & P20 Values (calculated from baseline data)																							
P80			3.56	7.53																			
P20			0.13	7.14																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
BH1261		20/02/2013	0.13	7.32																			
BH1261		15/05/2013	0.14	7.52																			
BH1261		4/09/2013	4.11	7.55																			
BH1261		15/01/2014	3.19	6.86																			

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB4-17

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCO ₃	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB4-17	Unable to locate	26/08/2016																					
GWB4-17	Unable to locate	2/01/1900																					
GWB4-17	Unable to locate	10/02/2017																					
GWB4-07	Unable to locate bore - confirmed with PC	22/05/2017																					
P80 & P20 Values (calculated from baseline data)																							
P80																							
P20																							
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
PZ66	Dry	20/02/2013																					
PZ66	No access																						
PZ66	Dry	29/07/2013																					
PZ66	Dry	15/01/2014																					

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB4-18

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCO ₃	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB4-18	Bore has been capped - unable to sample	22/08/2016																					
GWB4-18	Unable to locate bore - confirmed with PC	5/12/2016																					
GWB4-18	Unable to locate bore - confirmed with PC	10/02/2017																					
GWB4-18	Unable to locate bore - confirmed with PC	22/05/2017																					
P80 & P20 Values (calculated from baseline data)																							
P80			0.64	6.98																			
P20			0.25	6.33																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
BH1359		20/02/2013	0.15	7.18																			
BH1359	No access																						
BH1359		29/07/2013	0.80	6.68																			
BH1359		15/01/2014	0.40	6.10																			

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB4-21

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB4-21		22/08/2016	4.68	6.97	18.93	651	2.57	0.50	1320	31	783	82.0	64.9	120.0	0.011	0.001	0.044	0.005	0.035	50	50	50
GWB4-21		5/12/2016	4.72	6.75	24.97																	
GWB4-21		13/02/2017	5.34	6.97	24.70	689	7.15	1.50	1490	59	879	49.0	68.9	134.0	0.005	0.001	0.002	0.005	0.011	13	50	50
GWB4-21		22/05/2017	5.91	6.95	21.35																	
P80 & P20 Values (calculated from baseline data)																						
P80			4.56	8.13																		
P20			0.88	7.10																		
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
PZ69		19/02/2013	0.32	9.07																		
PZ69		15/05/2013	1.25	7.51																		
PZ69		3/09/2013	4.75	7.41																		
PZ69		14/01/2014	4.44	6.63																		

Note: This bore is not part of a bore pair

GWB8-04

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB8-04		23/08/2016	0.45	5.72	19.46	5	0.42	0.10	146	47	75	0.7	1.2	4.5	0.082	0.001	0.001	0.001	0.011	25	50	50
GWB8-04		30/11/2016	1.00	5.61	24.83																	
GWB8-04		16/02/2017	0.91	5.67	25.01	50	1.39	0.30	366	36	133	3.3	5.2	11.1	0.021	0.001	0.001	0.001	0.054	25	50	50
GWB8-04		29/05/2017	0.92	5.72	21.97																	
P80 & P20 Values (calculated from baseline data)																						
P80				5.76																		
P20				5.12																		
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
BH1231		26/02/2013		5.0																		
BH1231		2/07/2013		5.6																		
BH1231		18/09/2013		5.2																		
BH1231		Dec-13		6.0																		

Note: This bore is not part of a bore pair

GWB8-07

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB8-07	Sample disturbed due to double dipping HydraSleeve	23/08/2016	4.05	5.54	20.10	3	0.42	0.10	966	981	636	14.0	83.7	143.0	1.659	0.001	0.110	0.001	0.175	25	50	50
GWB8-07		30/11/2016	12.10	4.58	23.37																	
GWB8-07		16/02/2017	11.60	5.08	26.52	45	2.81	4.80	3221	2670	2230	32.0	159.0	407.0	0.196	0.001	0.001	0.001	0.077	25	50	50
GWB8-07		29/05/2017	7.46	5.33	21.02																	
P80 & P20 Values (calculated from baseline data)																						
P80				5.48																		
P20				4.52																		
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
BH1234		28/02/2013		5.6																		
BH1234		4/07/2013		4.1																		
BH1234		18/09/2013		5.4																		
BH1234		Dec-13		4.8																		

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB8-08

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCO3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB8-08	Bore could not be located at the provided GPS point																						
GWB8-08		30/11/2016	11.30	5.61	23.74																		
GWB8-08		16/02/2017	10.50	5.70	28.24	120	1.66	0.20	1625	6084	1811	44.0	293.0	718.0	0.030	0.001	0.001	0.001	0.213	850	50	50	
GWB8-08		29/05/2017	10.10	5.87	20.96																		
P80 & P20 Values (calculated from baseline data)																							
P80				6.02																			
P20				5.00																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
BH1235		28/02/2013		5.4																			
BH1235		4/07/2013		6.2																			
BH1235		18/09/2013		4.4																			
BH1235		Dec-13		5.9																			

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB8-26

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB8-26	Could not locate; need to slash long grass	26/08/2016																					
GWB8-26		1/12/2016	0.24	5.82	22.84																		
GWB8-26		17/02/2017	0.17	6.77	32.60	28	5.68	0.80	89	12	32	3.4	2.8	1.9	0.326	0.001	0.001	0.001	0.005	25	50	50	
GWB8-26		24/05/2017	1.79	6.91	21.19																		
P80 & P20 Values (calculated from baseline data)																							
P80				5.62																			
P20				5.02																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
BH1253		27/03/2013		4.6																			
BH1253		3/07/2013		5.8																			
BH1253		18/09/2013		5.3																			
BH1253		Dec-13		5.5																			

Note: This bore is not part of a bore pair

GWB9-01

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB9-01	Can't access - residents	26/08/2016																					
GWB9-01	No access	1/12/2016																					
GWB9-01	No access	17/02/2017																					
GWB9-01	No access	24/05/2017																					
P80 & P20 Values (calculated from baseline data)																							
P80				5.64																			
P20				4.62																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
BH1254		26/02/2013		3.6																			
BH1254		3/07/2013		5.3																			
BH1254		18/09/2013		5.6																			
BH1254		Dec-13		5.7																			

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB9-02

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB9-02	Not safe to access	26/08/2016																					
GWB9-02	Not safe to access	1/12/2016																					
GWB9-02	Not safe to access	17/02/2017																					
GWB9-02	First monitoring round	30/05/2017	0.33	5.45	19.17																		
P80 & P20 Values (calculated from baseline data)																							
P80				6.82																			
P20				5.06																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
BH1255		27/02/2013		4.1																			
BH1255		3/07/2013		5.9																			
BH1255		18/09/2013		5.7																			
BH1255		Dec-13		8.2																			

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB9-03

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB9-03		26/08/2016	0.16	4.94	21.98	1	1.35	0.10	20	5	15	1.3	0.4	2.3	1.198	0.001	0.004	0.001	0.017	25	50	50
GWB9-03		2/12/2016	0.12	4.62	25.47																	
GWB9-03		22/02/2017	0.14	4.61	23.10	1	1.88	0.07	80	25	15	6.1	0.5	2.1	1.211	0.001	0.005	0.001	0.010	25	50	50
GWB9-03		30/05/2017	0.13	4.64	20.49																	
P80 & P20 Values (calculated from baseline data)																						
P80																						
P20																						
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
BH1256																						
BH1256																						
BH1256																						
BH1256																						

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB9-04a

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB9-04a	Could not locate bore	26/08/2016																					
GWB9-04a	Could not locate bore	2/12/2016																					
GWB9-04a	Could not locate bore	22/07/2017																					
GWB9-04a	Could not locate bore	30/05/2017																					
P80 & P20 Values (calculated from baseline data)																							
P80																							
P20																							
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB9-04b

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB9-04b	Could not locate bore	26/08/2016																					
GWB9-04b	Could not locate bore	2/12/2016																					
GWB9-04b	Could not locate bore	22/07/2017																					
GWB9-04b	Could not locate bore	30/05/2017																					
P80 & P20 Values (calculated from baseline data)																							
P80																							
P20																							
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							

Note: This bore is not part of a bore pair

GWB10-04

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB10-04	Could not access bore in August due to padlock; revisited and accessed on 27/10/2016	27/10/2016	0.30	5.11	24.66	1	0.34	0.20	82	15	48	3.5	1.5	4.6	0.099	0.001	0.006	0.001	0.044	25	50	50
GWB10-04		2/12/2016	0.28	5.01	24.19																	
GWB10-04		22/02/2017	0.28	4.72	22.73	8	0.16	0.18	112	44	42	3.2	0.5	4.2	0.025	0.001	0.005	0.001	0.010	25	50	50
GWB10-04		24/05/2017	0.29	5.09	20.87																	
P80 & P20 Values (calculated from baseline data)																						
P80																						
P20																						
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
BH1273																						

Note: This bore is not part of a bore pair

GWB10-09

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
GWB10-09	cant locate; perhaps under grass-need to slash	26/08/2016																					
GWB10-09	Cannot locate	2/12/2016																					
GWB10-09		23/02/2017	0.99	6.17	23.67	92	0.15	0.17	276	59	202	4.9	6.6	8.7	0.025	0.001	0.005	0.001	0.011	25	50	50	
GWB10-09		24/05/2017	1.04	6.33	21.54																		
P80 & P20 Values (calculated from baseline data)																							
P80																							
P20																							
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
BH1278																							

Note: This bore is not part of a bore pair

GWB10-11

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB10-11		26/08/2016	0.32	5.92	21.66	40	1.55	0.70	31	45	58	1.0	0.9	1.6	0.163	0.001	0.001	0.001	0.006	160	410	170
GWB10-11		2/12/2016	0.36	5.88	25.57																	
GWB10-11		23/02/2017	0.39	6.04	23.49	68	2.23	1.70	95	73	68	3.9	1.4	2.0	0.025	0.001	0.005	0.001	0.001	25	50	50
GWB10-11		24/05/2017	0.55	6.34	20.63																	
P80 & P20 Values (calculated from baseline data)																						
P80																						
P20																						
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
BH1280																						

Note: This bore is not part of a bore pair

GWB11-03

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L
GWB11-03	Couldn't access in August; revisited and accessed on 27/10/2016	27/10/2016	9.32	6.77	23.88	860	2.49	0.60	2642	771	1594	68.0	198.0	291.0	0.008	0.001	0.001	0.001	0.013	25	50	50
GWB11-03		2/12/2016	9.06	6.86	25.30																	
GWB11-03		23/02/2017	9.14	6.95	23.82	970	2.72	0.52	2410	675	1666	63.6	191.0	289.0	0.025	0.001	0.005	0.001	0.003	25	50	50
GWB11-03		24/05/2017	16.10	6.73	20.04																	
P80 & P20 Values (calculated from baseline data)																						
P80				7.72																		
P20				7.04																		
Baseline (pre-construction) Monitoring (identifier from pre-construction)																						
BH1285		27/02/2013		6.8																		
BH1285		1/07/2013		7.2																		
BH1285		19/09/2013		8.2																		
BH1285		Dec-13		7.4																		

Note: Yet to be determined whether this is an up-gradient or down-gradient bore

GWB11-04

			In-situ (Type A) Parameters			Laboratory (Type B) Parameters																	
Monitoring Location	Field Notes	Date	Electrical Conductivity	pH	Temperature	Bicarbonate as CaCo3	Total Nitrogen	Total Phosphorus	Chloride	Sulfate	Sodium	Potassium	Calcium	Magnesium	Aluminium - Filtered	Cadmium - Filtered	Copper - Filtered	Lead - Filtered	Zinc - Filtered	>C10 - C16 Fraction	>C16 - C34 Fraction	>C34 - C40 Fraction	
			mS/cm	pH unit	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	
26/08/2016	No access																						
2/12/2016	No access																						
23/02/2017	No access																						
P80 & P20 Values (calculated from baseline data)																							
P80				7.52																			
P20				6.96																			
Baseline (pre-construction) Monitoring (identifier from pre-construction)																							
BH1286		1/03/2013		7.0																			
BH1286		1/07/2013		8.0																			
BH1286		19/09/2013		7.2																			
BH1286		Dec-13		6.9																			

Note: Yet to be determined whether this is an up-gradient or down-gradient bore



Appendix F

Groundwater Levels: Results of Interest

Groundwater Levels Table of Results of Interest

Portion	Bore	P80 Level Difference	Results of Interest
A	GWB3-06	1.68 m	1/07/16 - 31/08/16 (approx. 2 months) (max. level difference approx. 1.9 m) 30/11/16 - 20/04/17 (approx. 4.75 months) (max level difference approx. 2.7 m)
A	GWB3-10	0.12 m	1/07/16 - 9/07/16 (approx. 1 week) (max. level difference approx. 0.1 m) 4/8/16 - 16/10/16 (approx. 2.5 months) (max. level difference approx. 0.3 m)
A	GWB3-14	0.73 m	6/07/16 - 3/08/16 (approx. 1 month) (max. level difference approx. 0.8 m) 27/08/16 - 22/11/16 (approx. 2.75 months) (max. level difference approx. 0.9 m)
A	GWB3-18	1.13 m	15/03/17 - 16/05/17 (approx. 2 months) (max. level difference approx. 1.6 m)
A	GWB3-20	0.15 m	1/07/16 - 30/08/16 (approx. 2 months) (max. level difference approx. 0.3 m) 19/03/17 - 28/03/17 (approx. 1 week) (max. level difference approx. 0.2 m)
A	GWB3-21	2.04 m	8/08/16 - 7/09/17 (approx. 1 month) (max. level difference approx. 4.5 m) 18/03/17 - 8/04/17 (approx. 3 weeks) (max. level difference approx. 10.6 m) 21/04/17 - 5/05/17 (approx. 2 weeks) (max. level difference approx. 5.2 m)
A	GWB3-31	4.72 m	5/11/16 - 29/11/16 (approx. 3 weeks) (max. level difference approx. 4.9 m) 11/02/17 - 7/05/17 (approx. 3 months) (max. level difference approx. 19.7 m)
A	GWB3-36	2.98 m	1/07/16 - 4/08/16 (approx. 1 month) (max. level difference approx. 4.6 m) 1/12/16 - 6/01/17 (approx. 1.25 months) (max. level difference approx. 3.4 m) 7/01/17 - 8/02/17 (approx. 1 month) (max. level difference approx. 3.6 m)
A	GWB3-40	1.39 m	1/07/16 - 18/05/17 (approx. 10.5 months) (max. level difference approx. 2.9 m)
A	GWB3-51	27.91 m	17/11/16 - 29/11/16 (approx. 2 weeks) (max. level difference approx. 28 m)
A	GWB4-02	5.61 m	1/07/16 - 22/08/16 (approx. 1.75 months) (max. level difference approx. 8.2 m) 7/09/16 - 13/03/17 (approx. 6.25 months) (max. level difference approx. 7.3 m)
B	GWB5-02	0.17 m	1/03/17 - 18/03/17 (approx. 2.5 weeks) (max. level difference approx. 0.5 m) 27/04/17 - 26/05/17 (approx. 1 month) (max. level difference approx. 0.4 m)
B	GWB5-03	0.28 m	1/07/16 - 9/07/16 (approx. 1 week) (max. level difference approx. 0.4 m) 4/08/16 - 7/09/16 (approx. 1 month) (max. level difference approx. 0.8 m) 30/11/16 - 16/02/17 (approx. 2.5 months) (max level difference approx. 1.3 m)

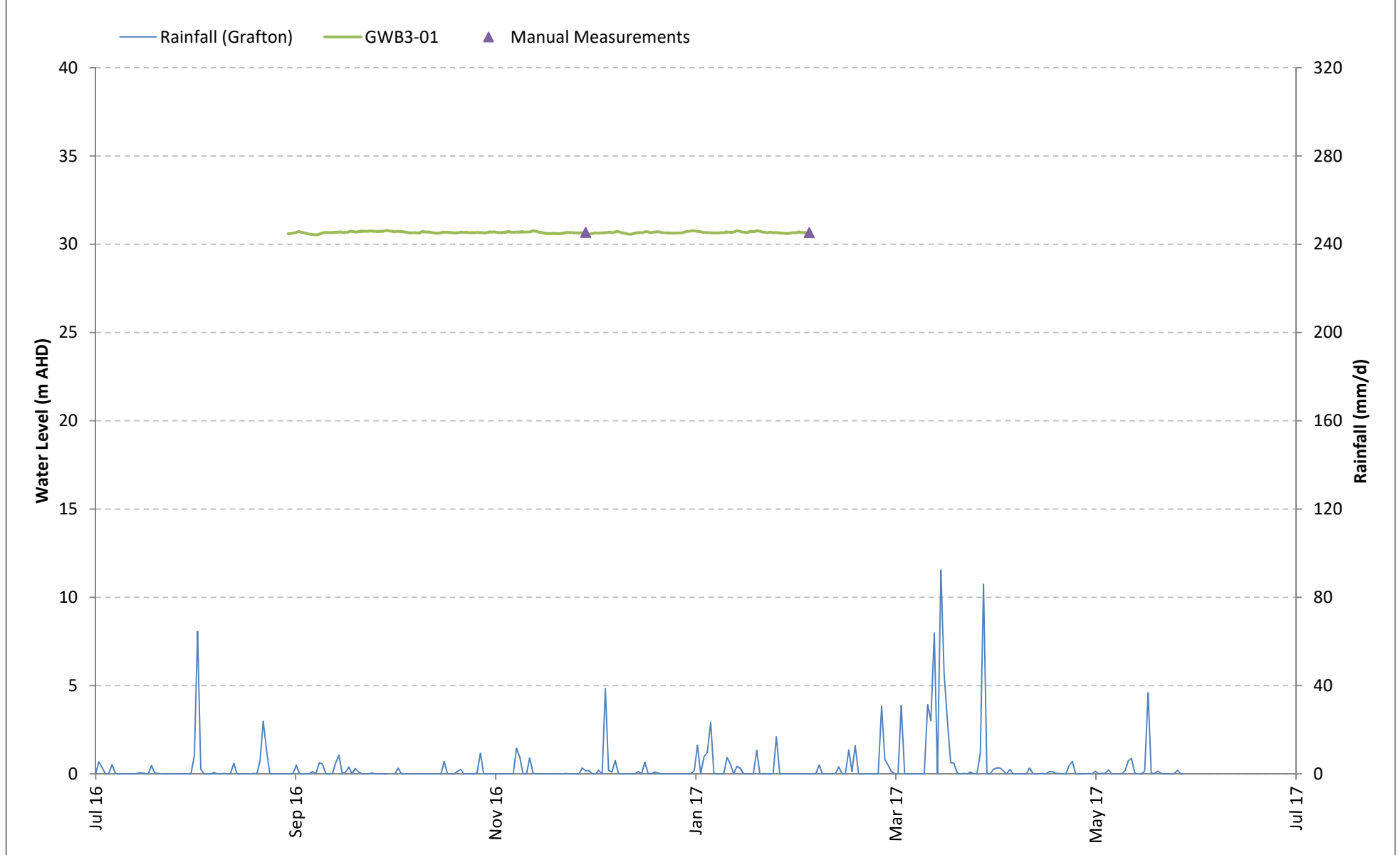
Portion	Bore	P80 Level Difference	Results of Interest
C	GWB8-05	0.19 m	26/09/16 - 3/10/16 (approx. 1 week) (max. level difference approx. 0.2 m) 4/10/16 - 27/10/16 (approx. 3 weeks) (max. level difference approx 0.2 m) 31/10/16 - 16/02/17 (approx. 3.5 months) (max. level difference approx. 1.4 m) 10/04/17 - 29/04/17 (approx. 3 weeks) (max. level difference approx. 0.2 m)
C	GWB8-08	0.13 m	16/02/17 - 29/05/17 (approx. 3.5 months) (max. level difference approx. 1.1 m)
C	GWB8-16	0.17 m	1/07/16 - 14/09/16 (approx. 2.5 months) (max. level difference approx. 1.2 m) 14/03/17 - 23/04/17 (approx. 1.25 months) (max. level difference approx. 1.3 m)
C	GWB8-17	0.64 m	1/07/16 - 23/08/16 (approx. 1.75 months) (max. level difference approx. 1.46 m)
C	GWB8-20	0.14 m	17/02/17 - 24/05/17 (approx. 3.25 months) (max. level difference approx. 0.8 m)
C	GWB8-22	0.75 m	4/08/16 - 13/08/16 (approx. 1 week) (max. level difference approx. 1.1 m) 24/08/16 - 4/09/16 (approx. 1.5 weeks) (max. level difference approx. 1.1 m) 28/02/17 - 24/05/17 (approx. 3 months) (max level difference approx. 1.5 m)
C	GWB8-25	0.12 m	27/02/17 - 15/03/17 (approx. 2 weeks) (max. level difference approx. 0.25 m) 13/04/17 - 24/05/17 (approx. 1.25 months) (max. level difference approx. 0.2 m)
C	GWB9-10	2.13 m	4/07/16 - 14/07/17 (approx. 1 week) (max. level difference approx. 2.2 m) 9/08/16 - 24/08/16 (approx. 2 weeks) (max. level difference approx. 2.2 m) 28/08/16 - 16/09/16 (approx. 3 weeks) (max. level difference approx. 2.2 m)
C	GWB9-12	0.41 m	31/03/17 - 13/05/17 (approx. 2 months) (max. level difference approx. 0.7 m)
C	GWB9-14	1.23 m	18/03/17 - 27/04/17 (approx. 1.25 months) (max. level difference approx. 1.8 m)
D	GWB10-06	0.23 m	1/07/16 - 24/05/16 (approx. 11 months) (max. level difference approx. 5.2 m)



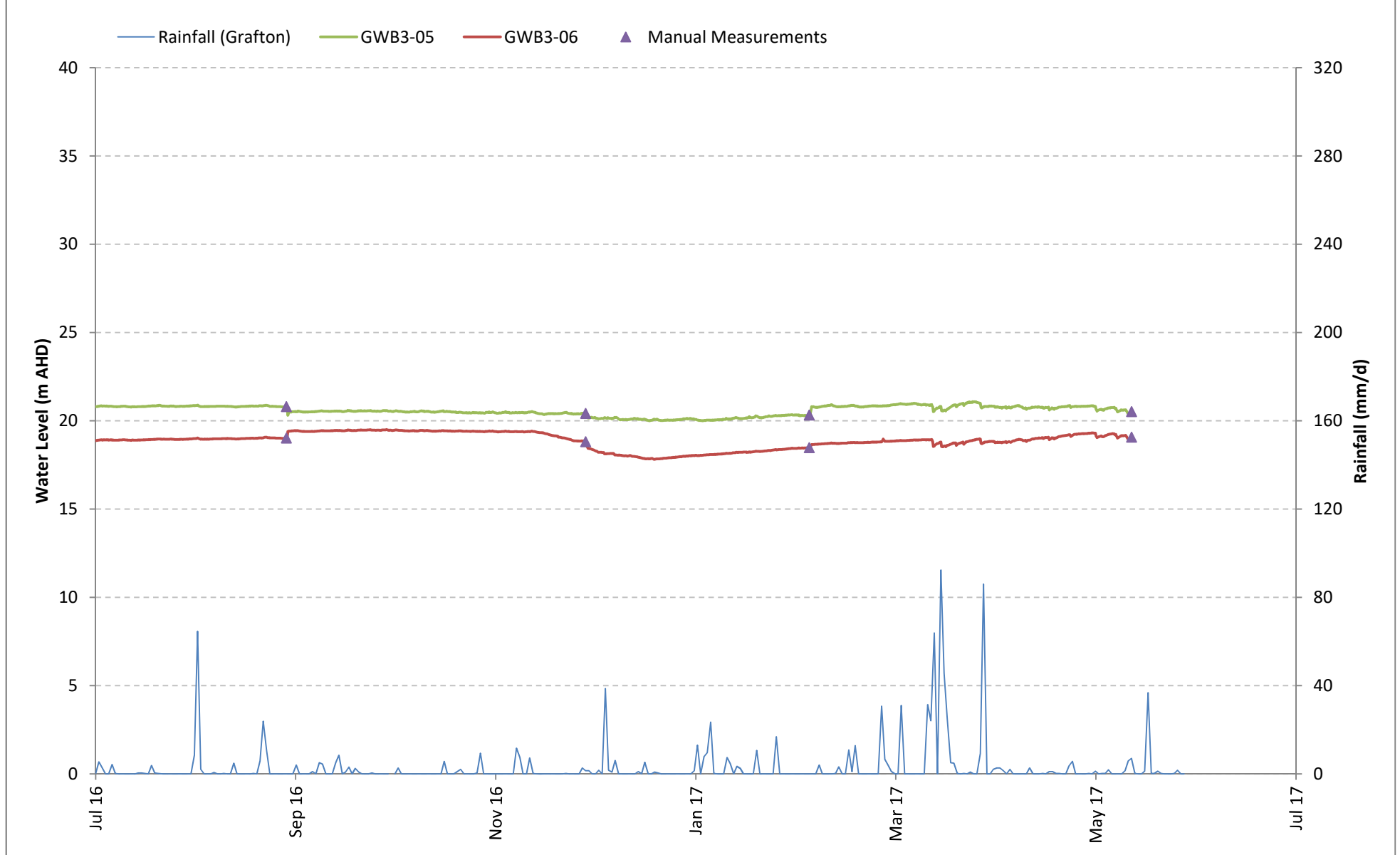
Appendix G

Groundwater Levels: Charts

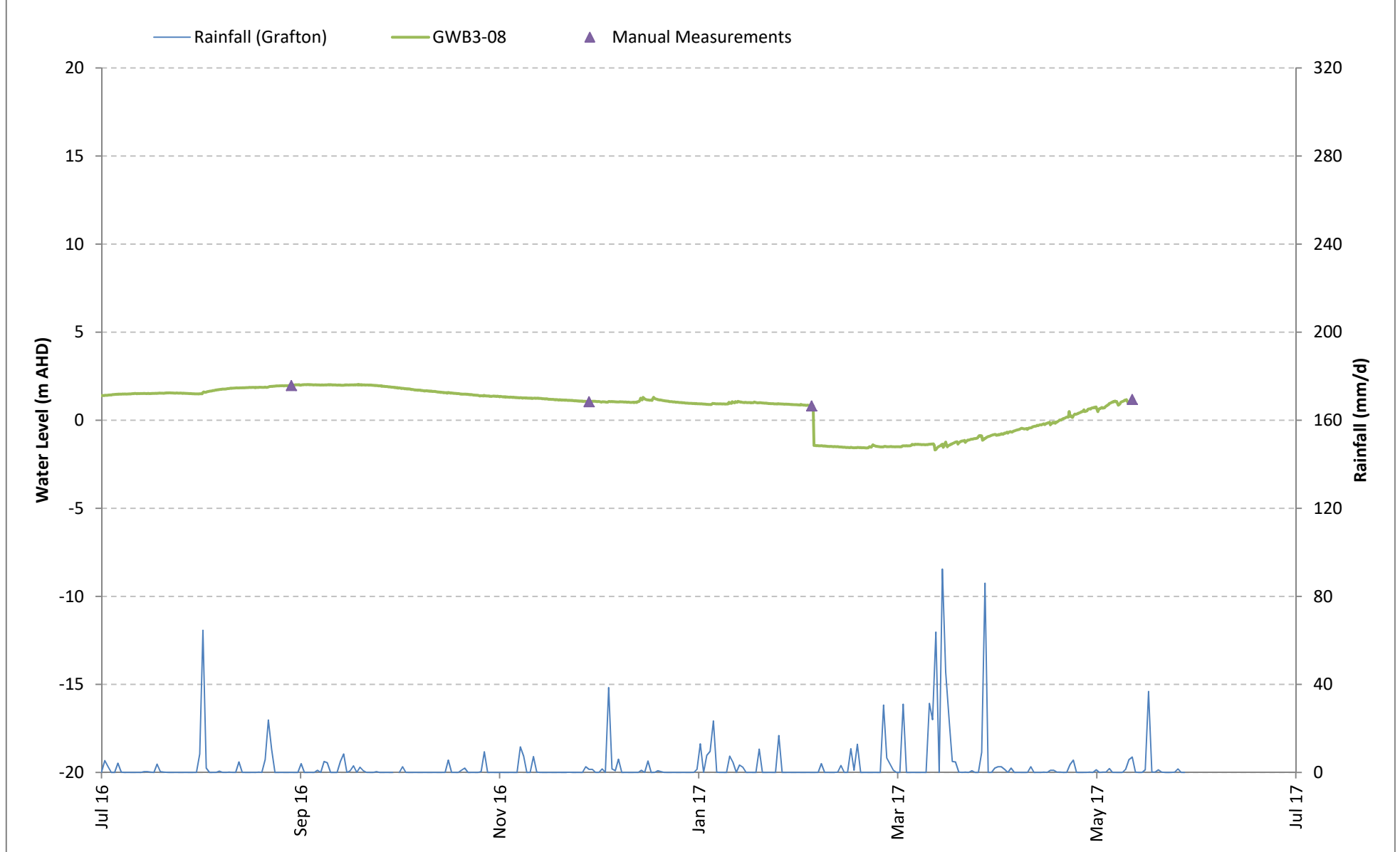
GWB3-01 Water Level



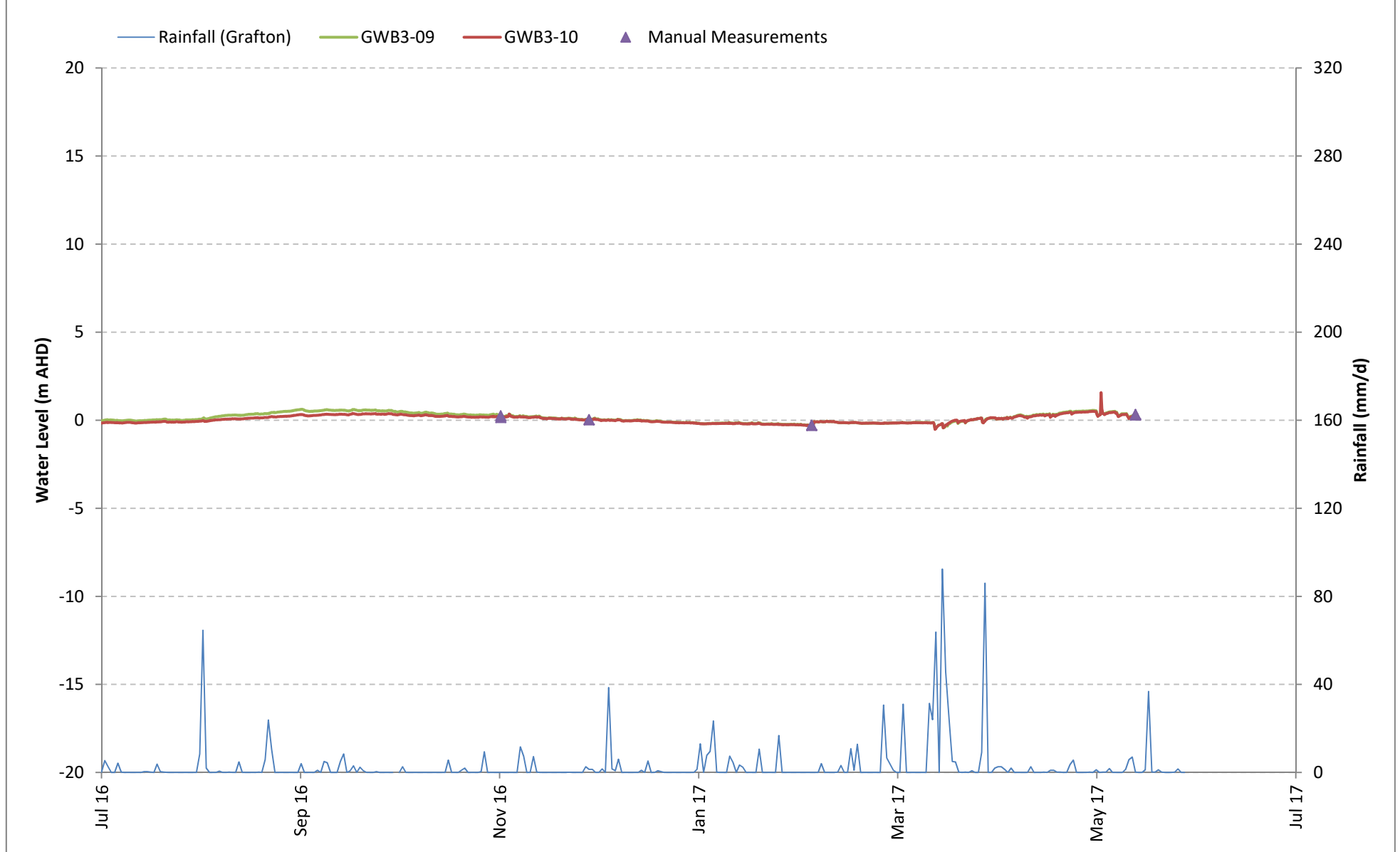
GWB3-05 & GWB3-06 Water Levels



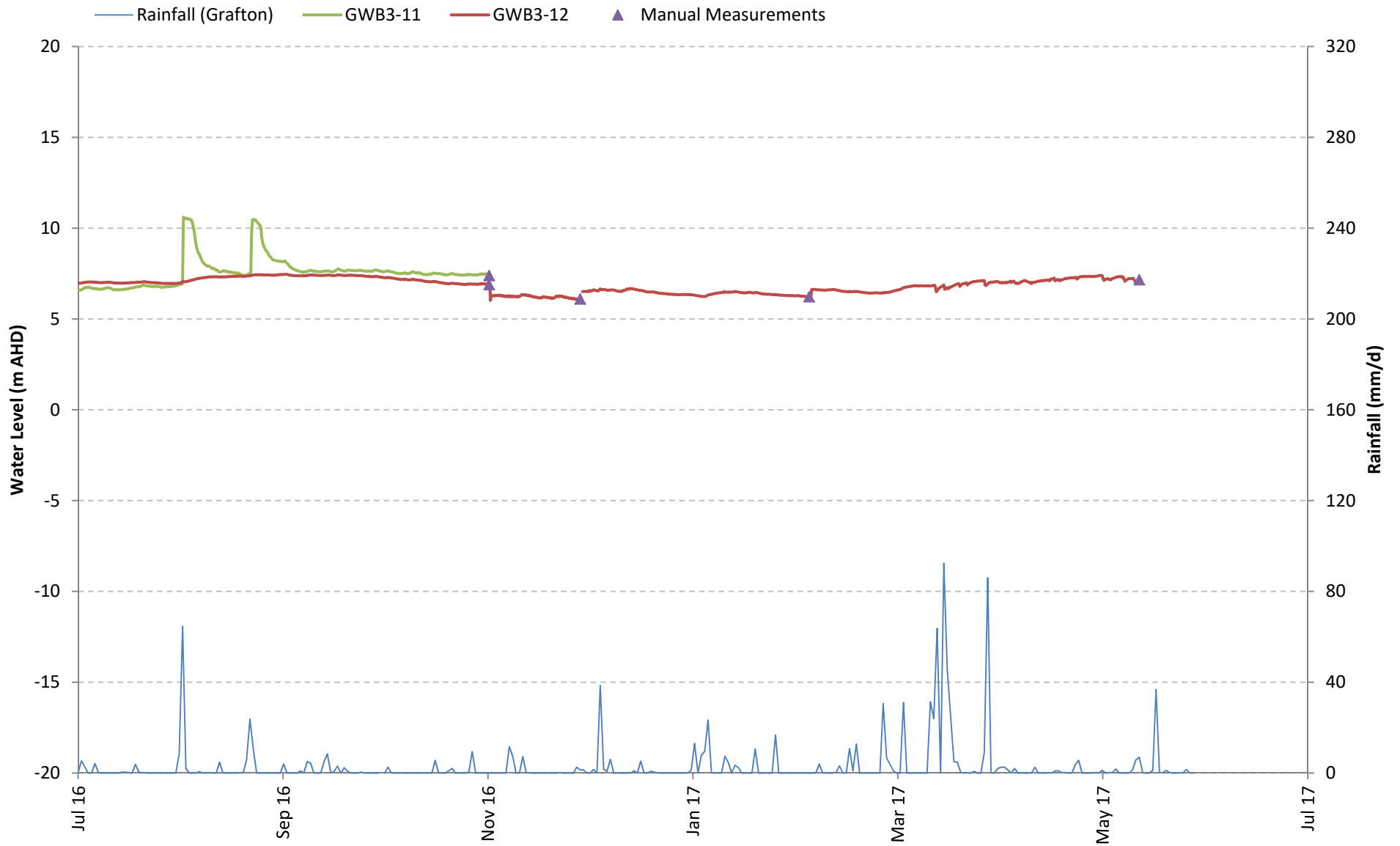
GWB3-08 Water Level



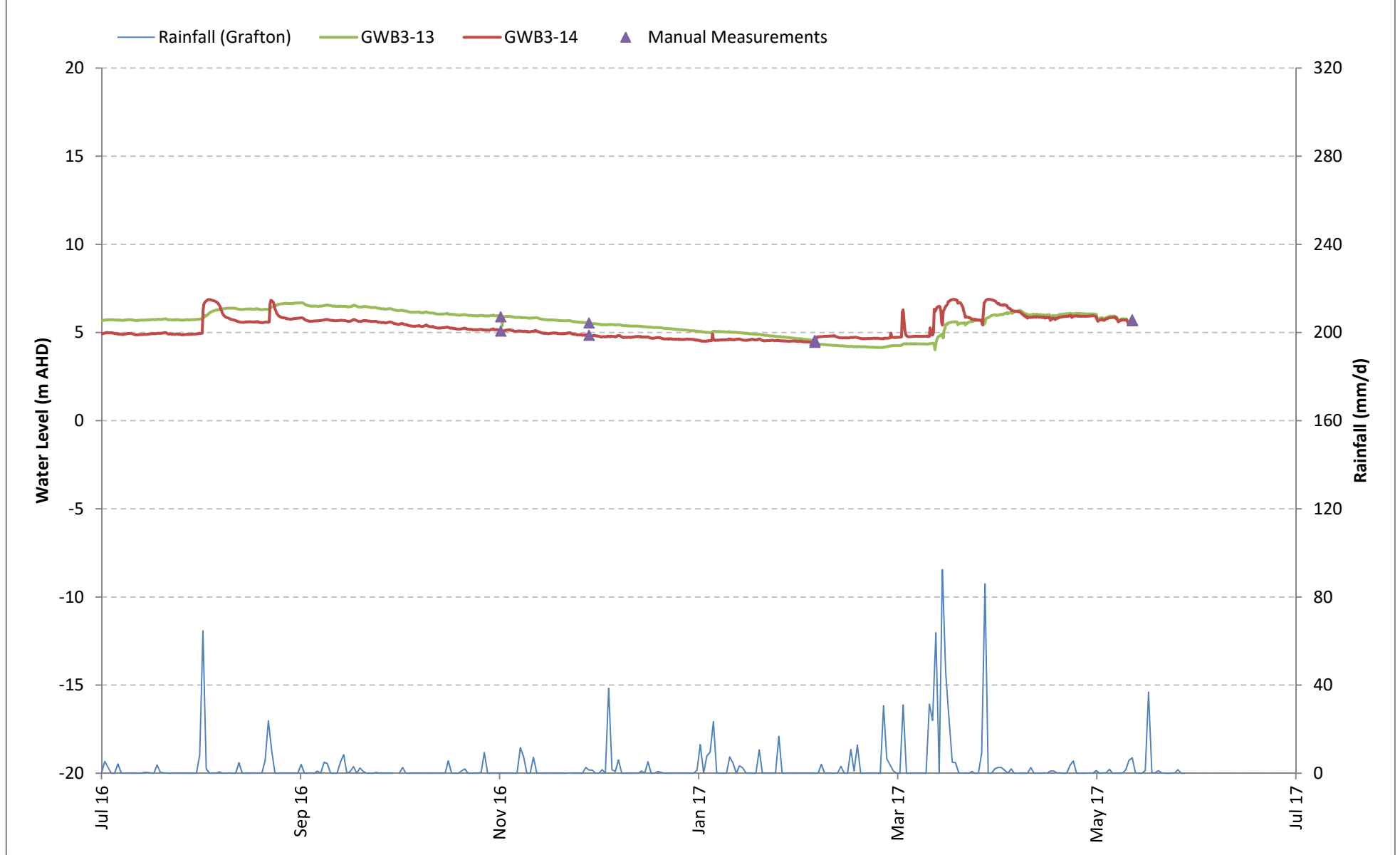
GWB3-09 & GWB3-10 Water Levels



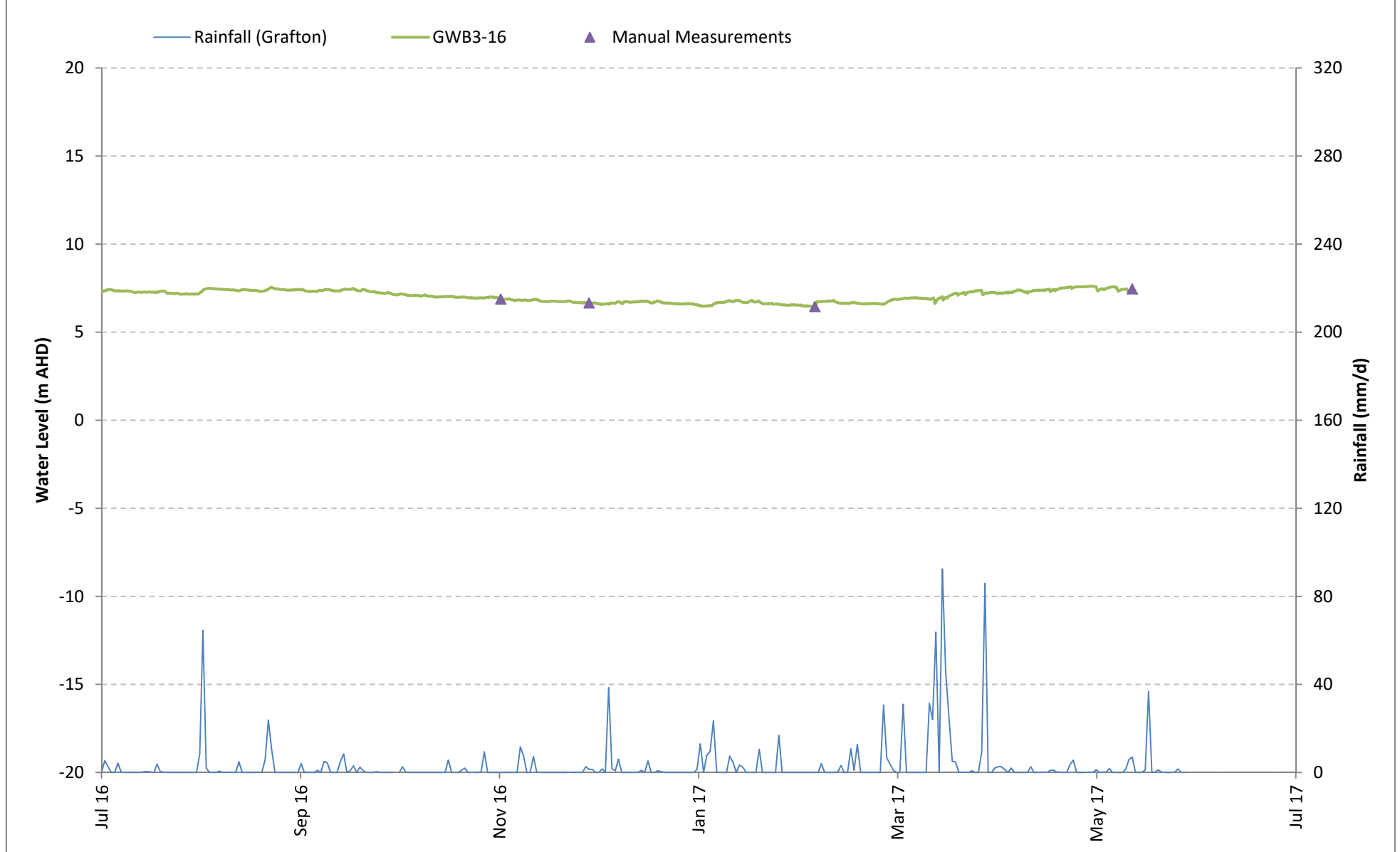
GWB3-11 & GWB3-12 Water Levels



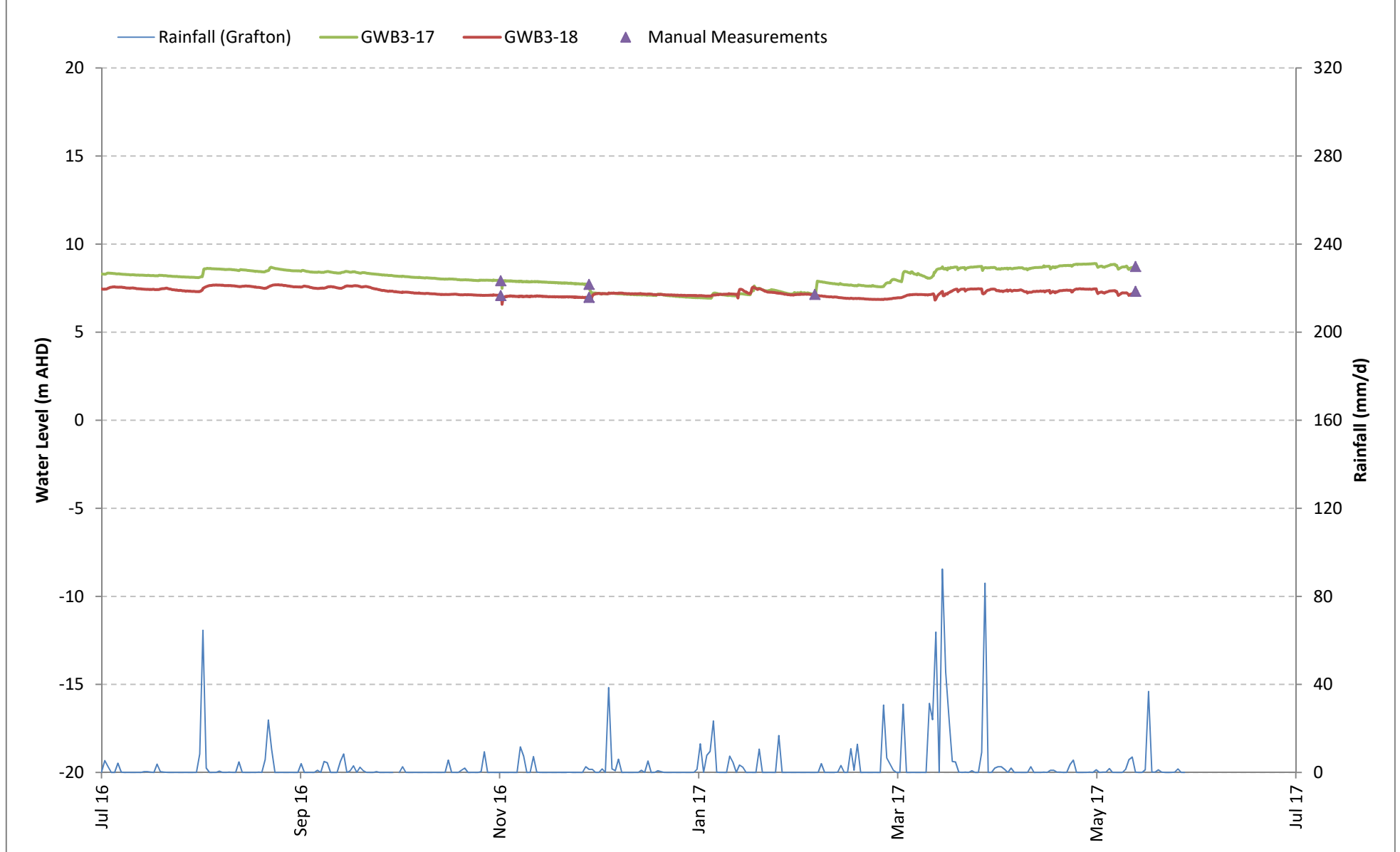
GWB3-13 & GWB3-14 Water Levels



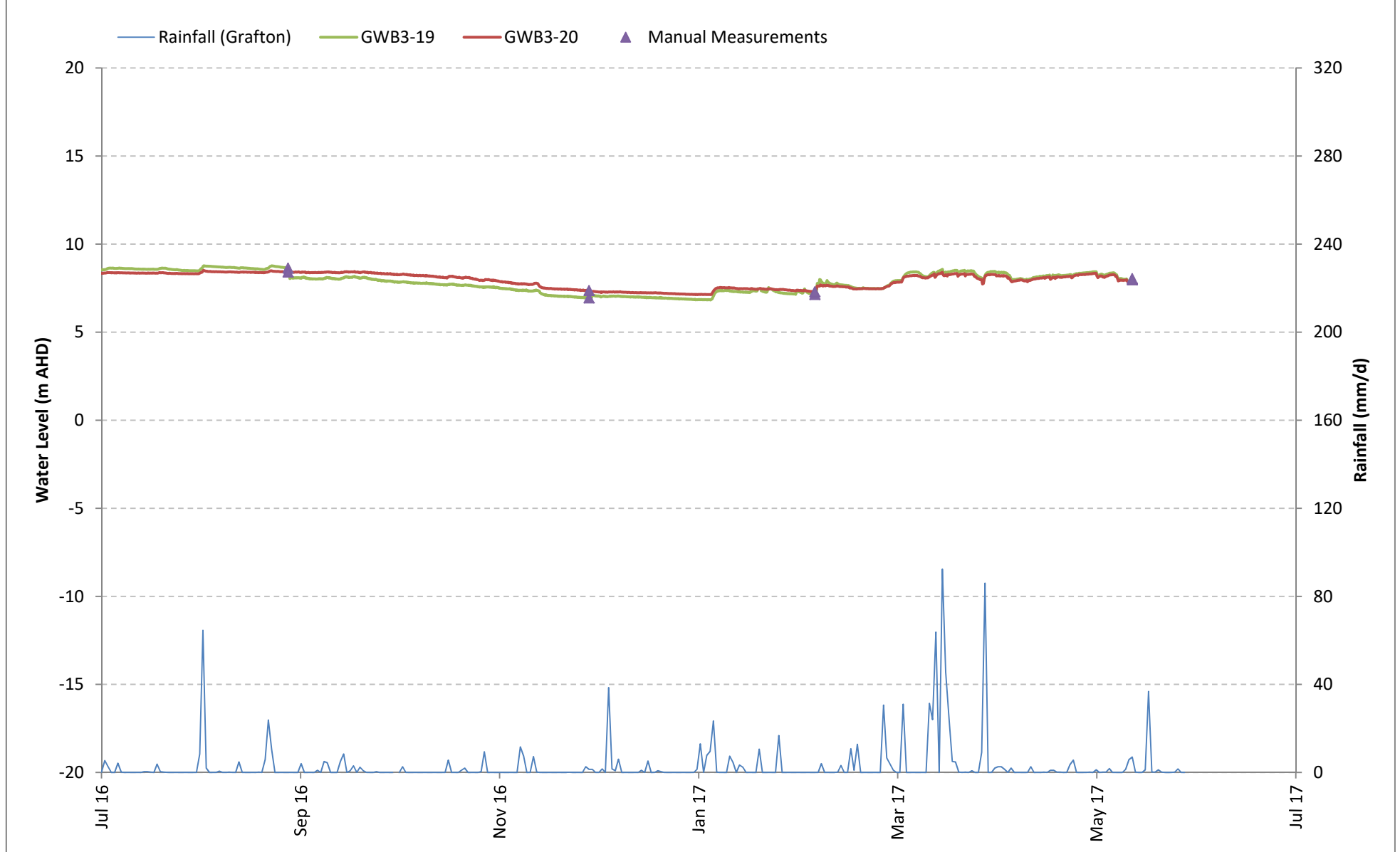
GWB3-16 Water Level



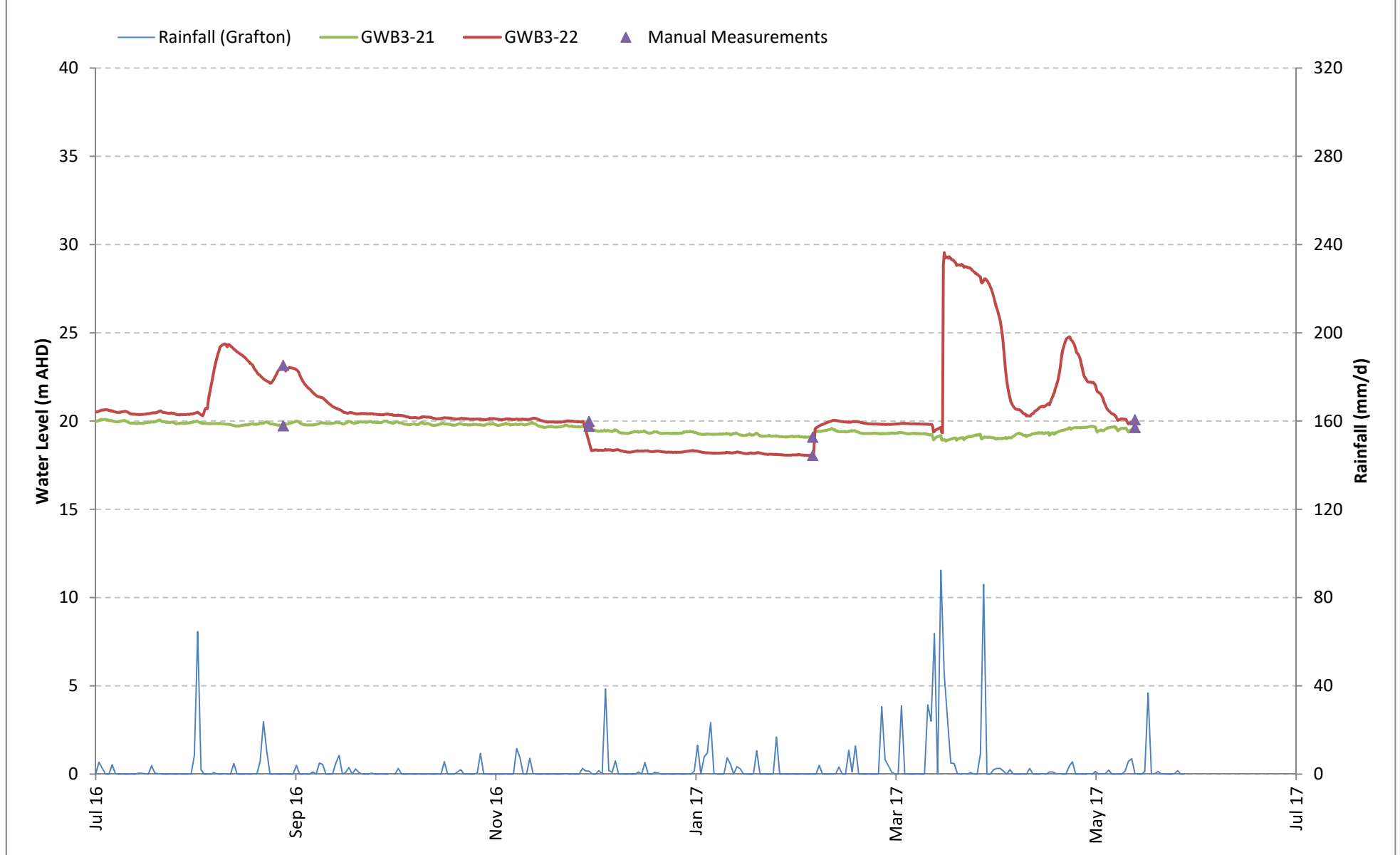
GWB3-17 & GWB3-18 Water Levels



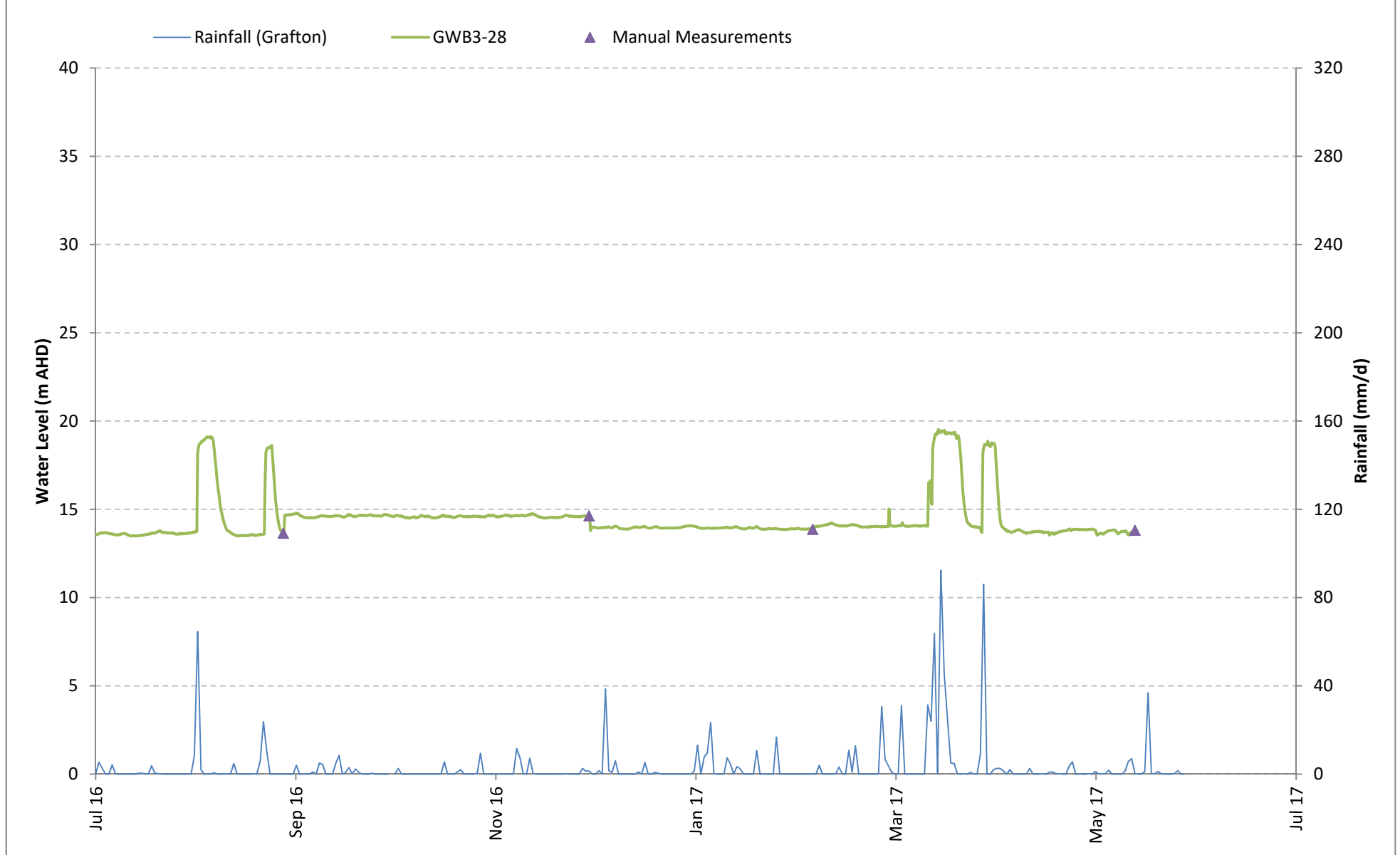
GWB3-19 & GWB3-20 Water Levels



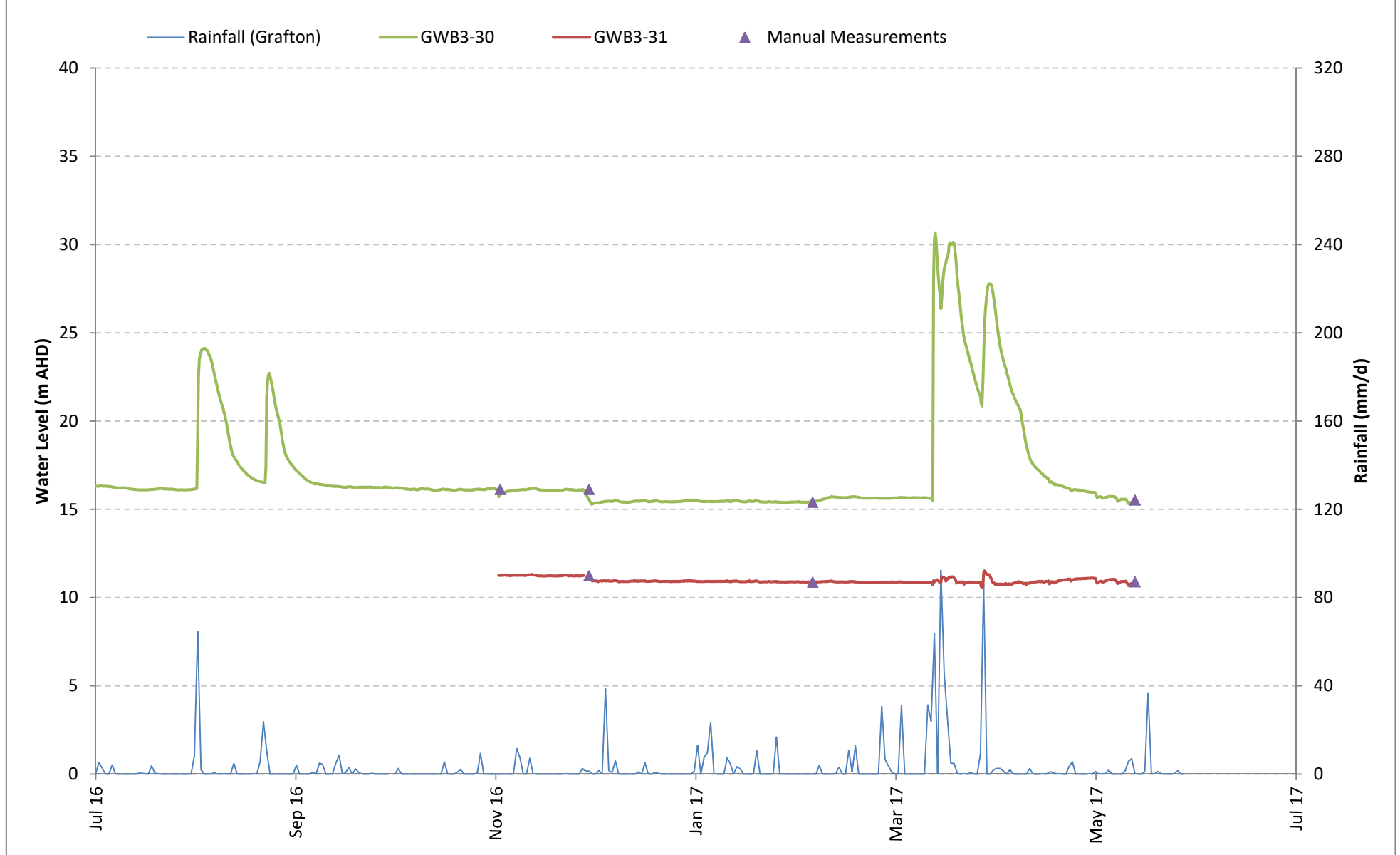
GWB3-21 & GWB3-22 Water Levels



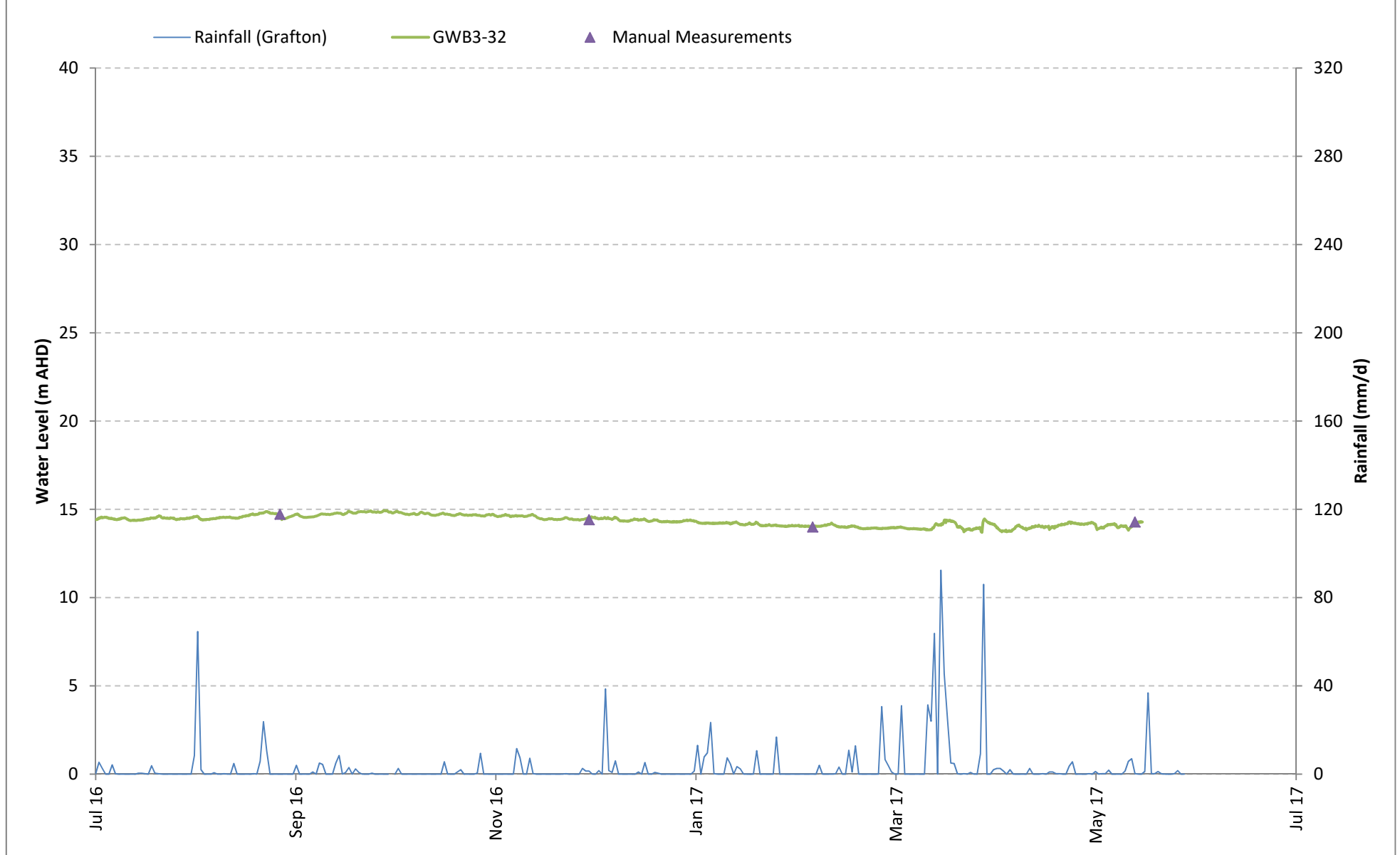
GWB3-28 Water Level



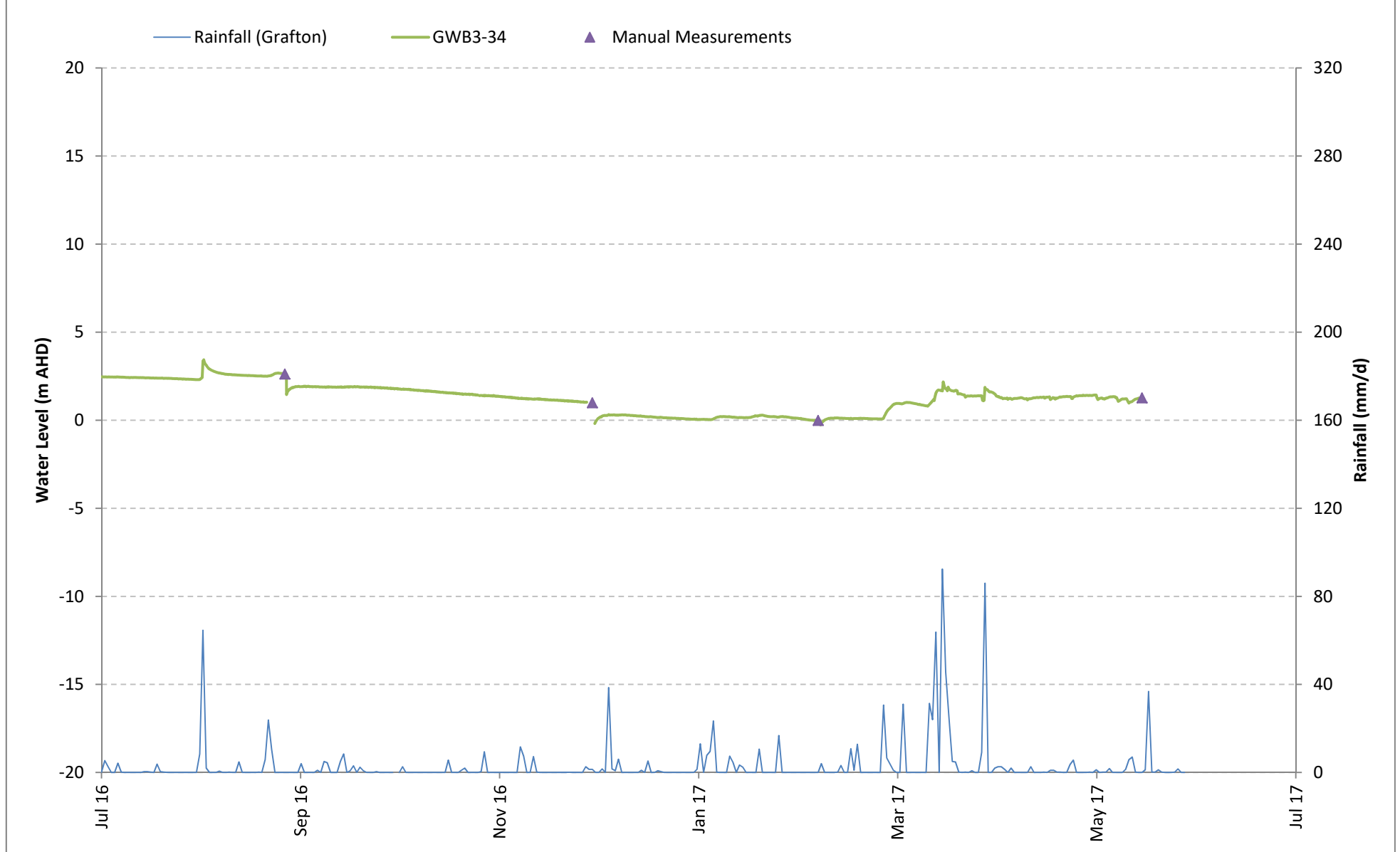
GWB3-30 & GWB3-31 Water Levels



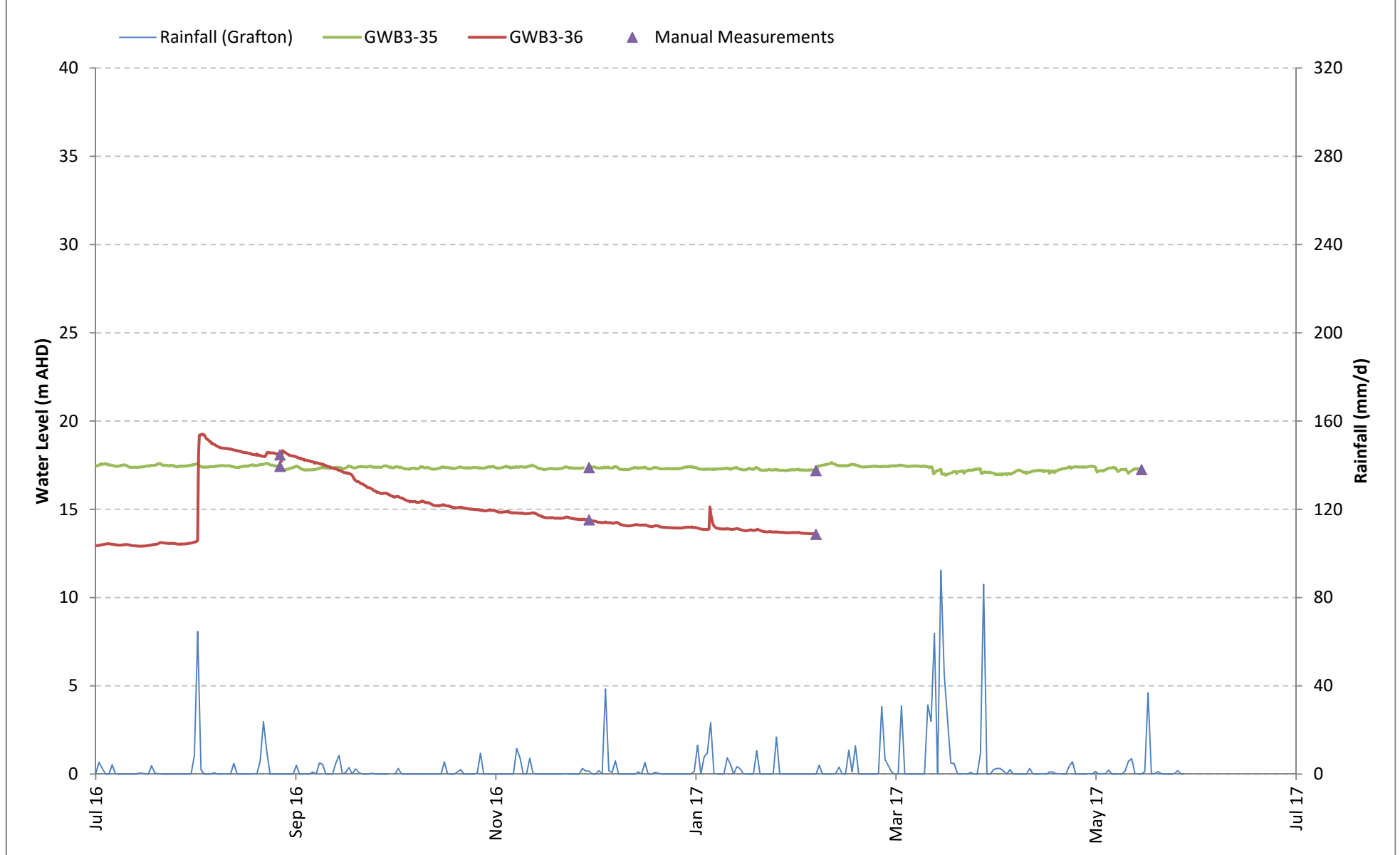
GWB3-32 Water Level



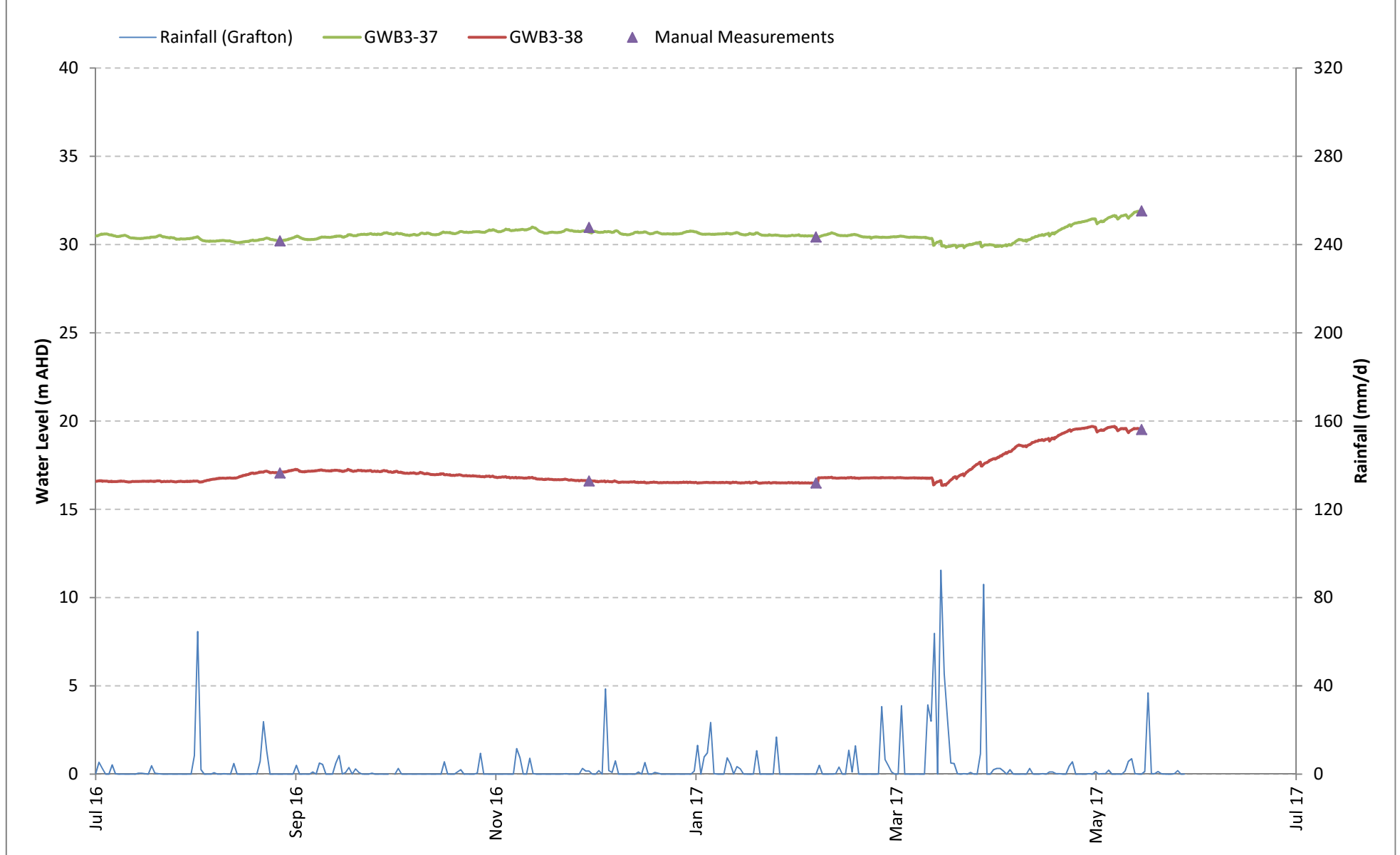
GWB3-34 Water Level



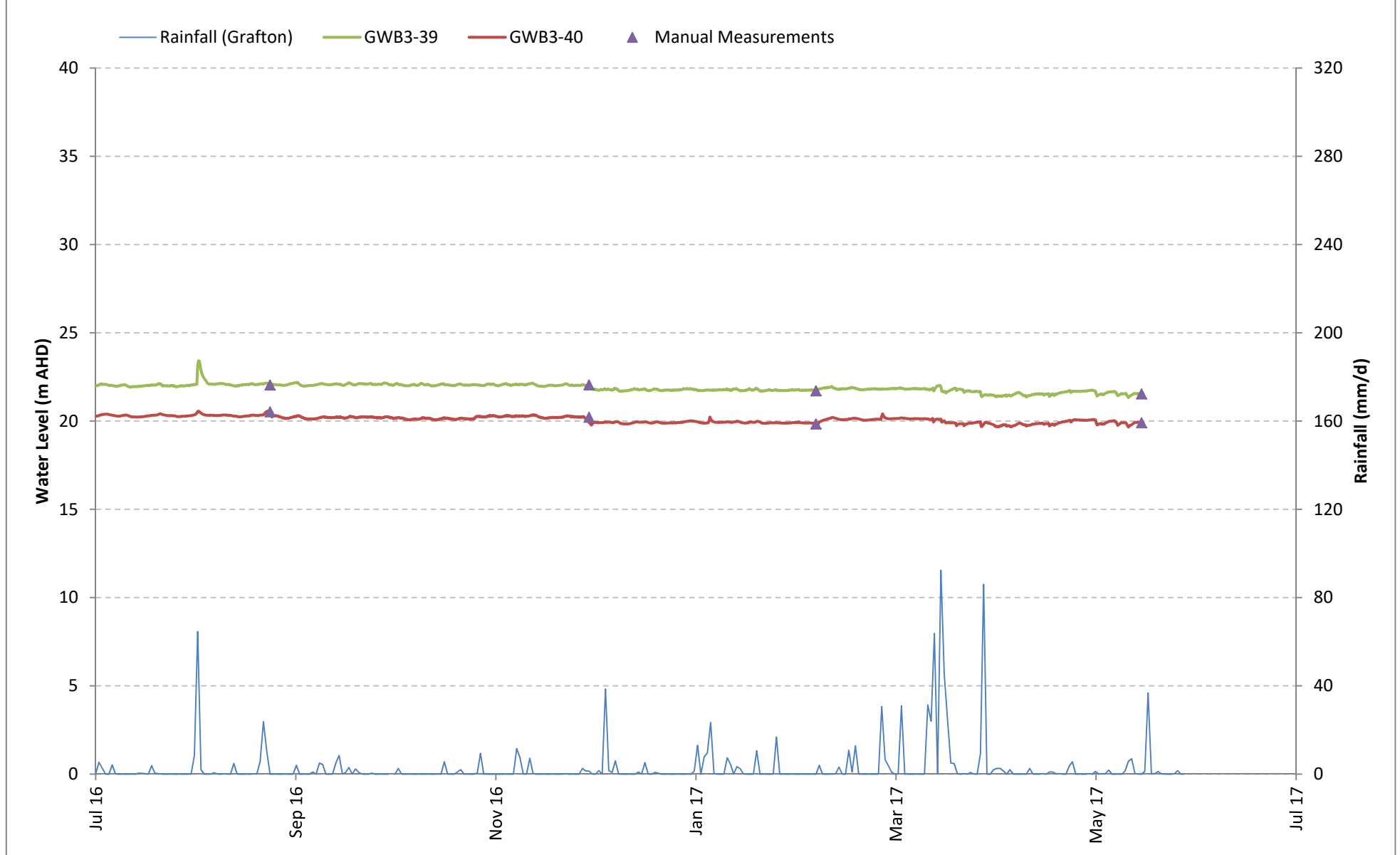
GWB3-35 & GWB3-36 Water Levels



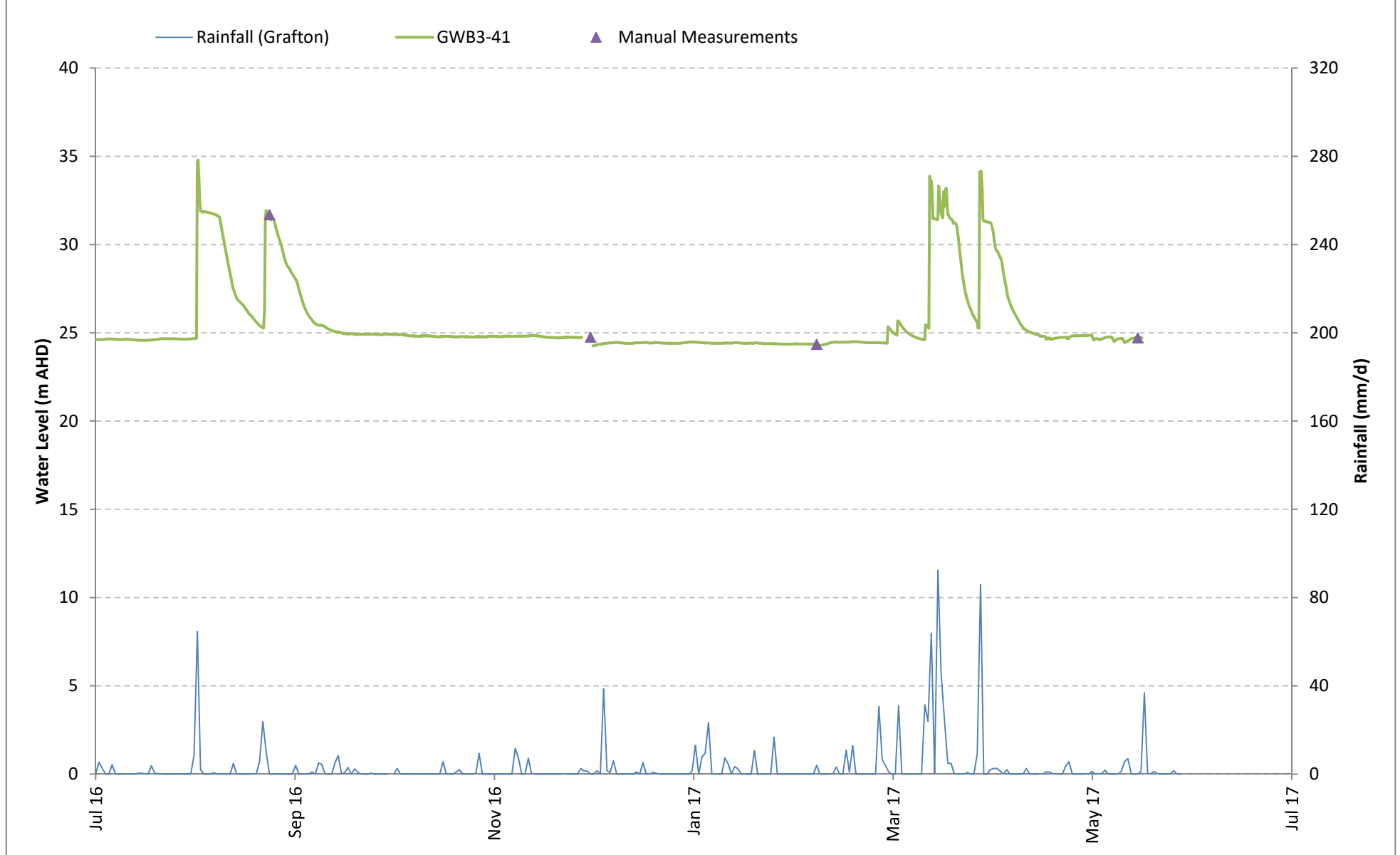
GWB3-37 & GWB3-38 Water Levels



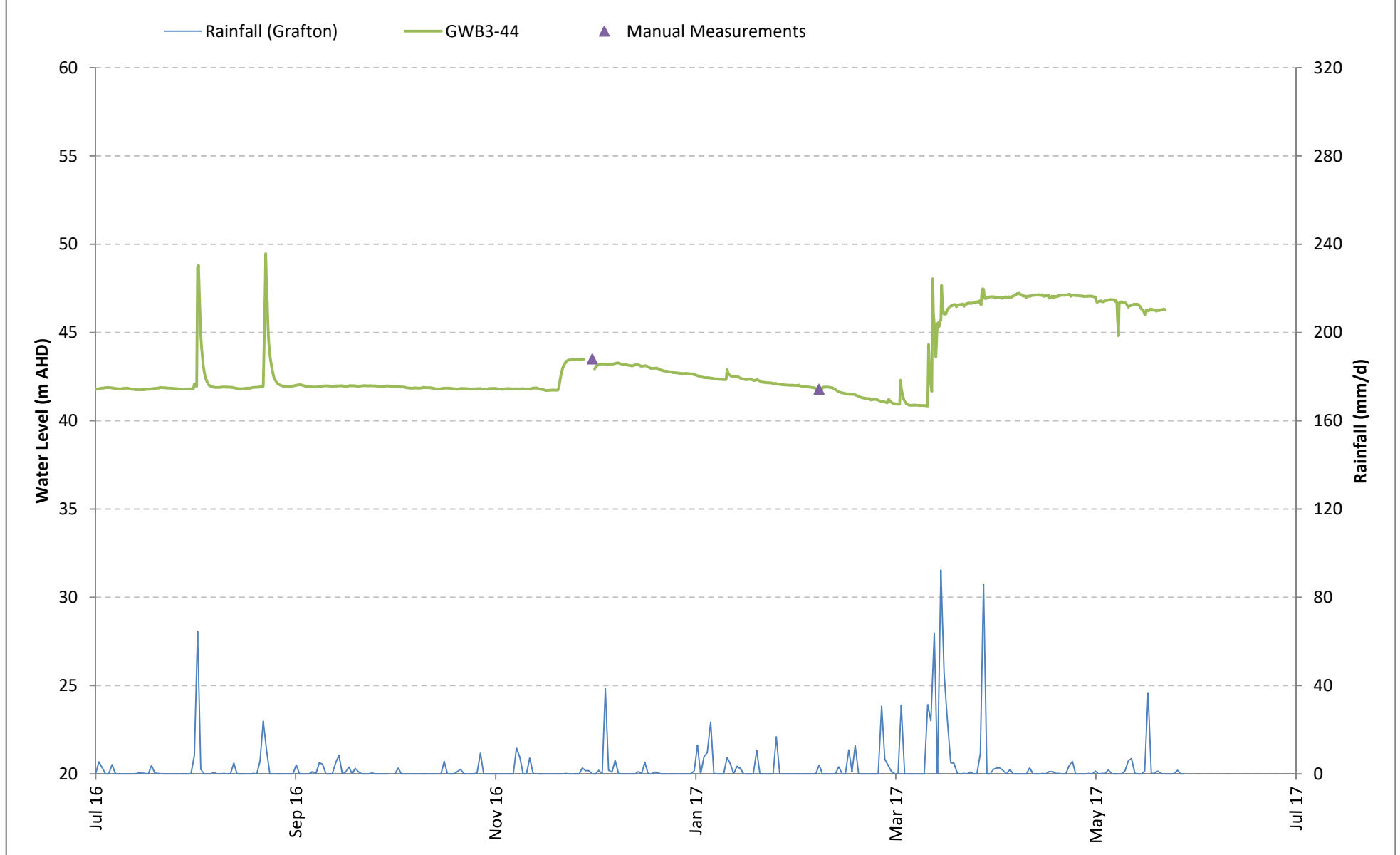
GWB3-39 & GWB3-40 Water Levels



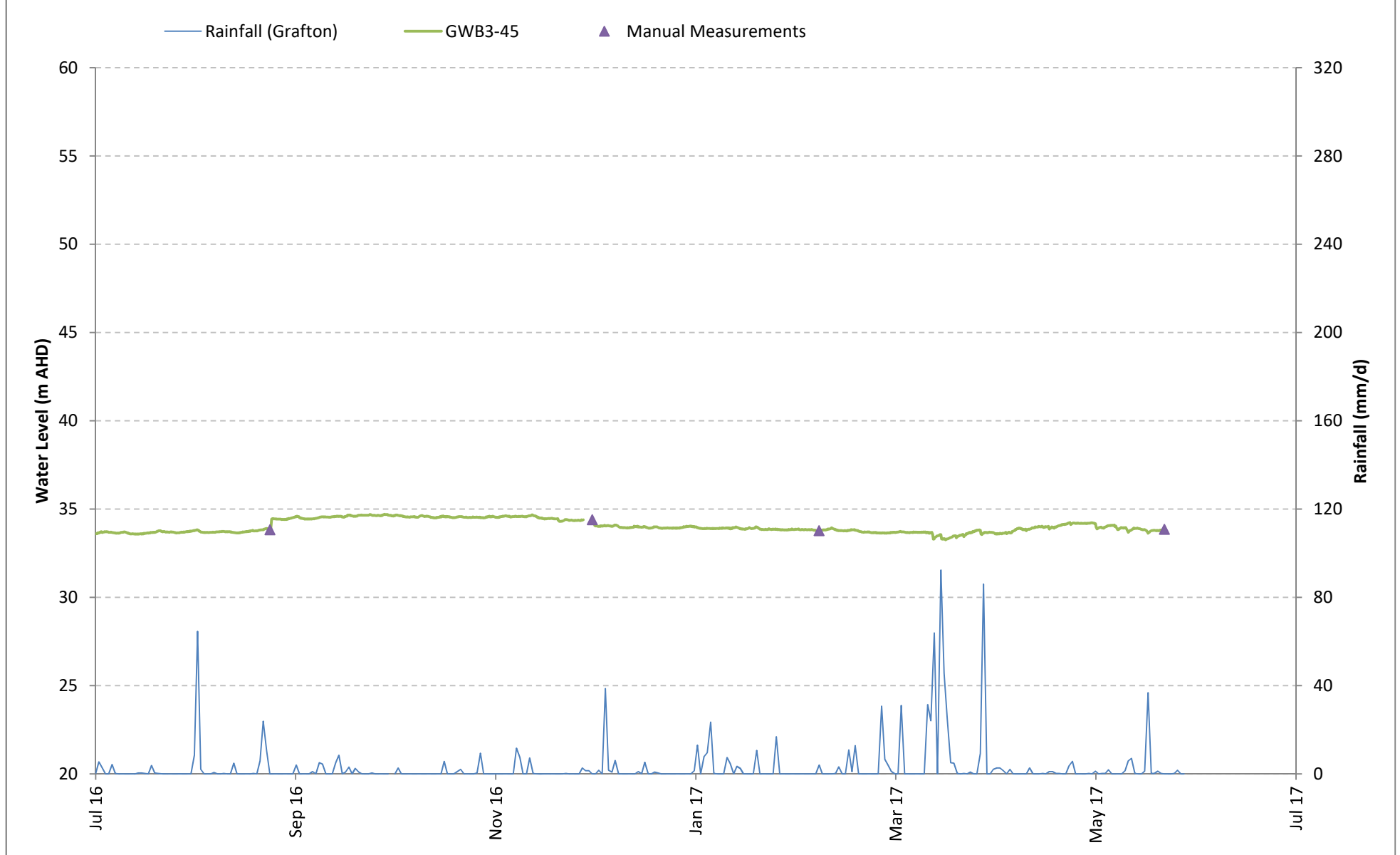
GWB3-41 Water Level



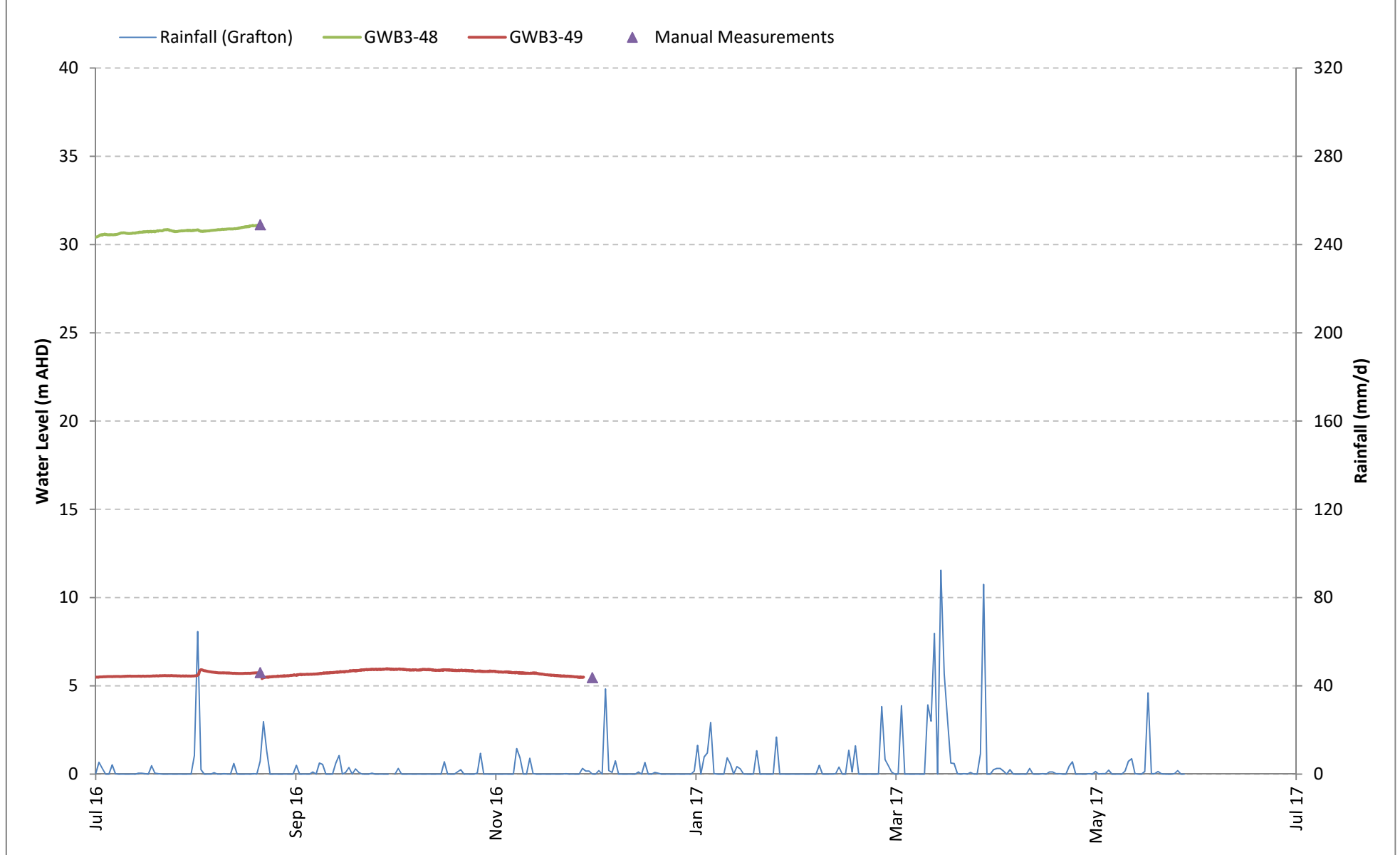
GWB3-44 Water Level



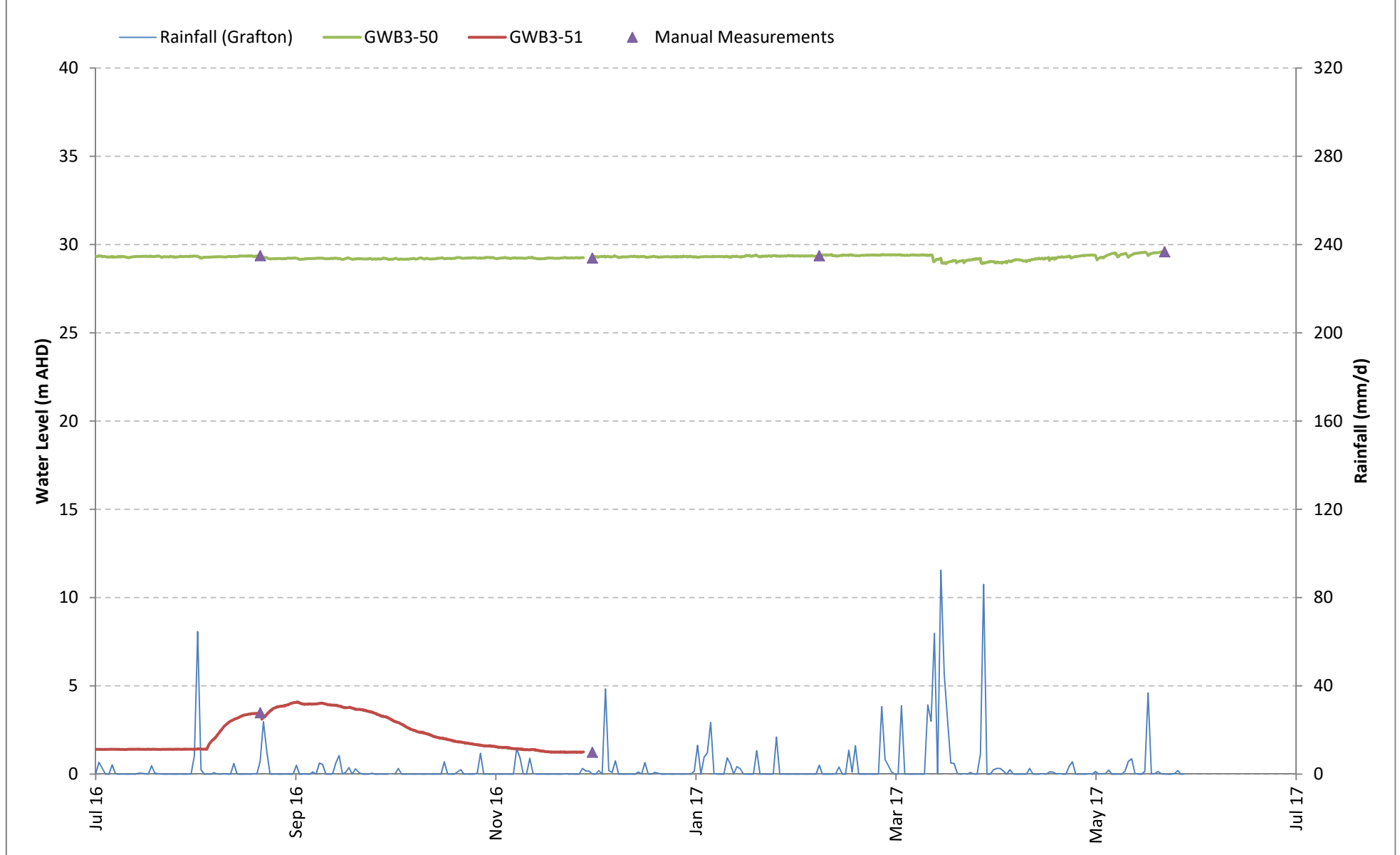
GWB3-45 Water Level



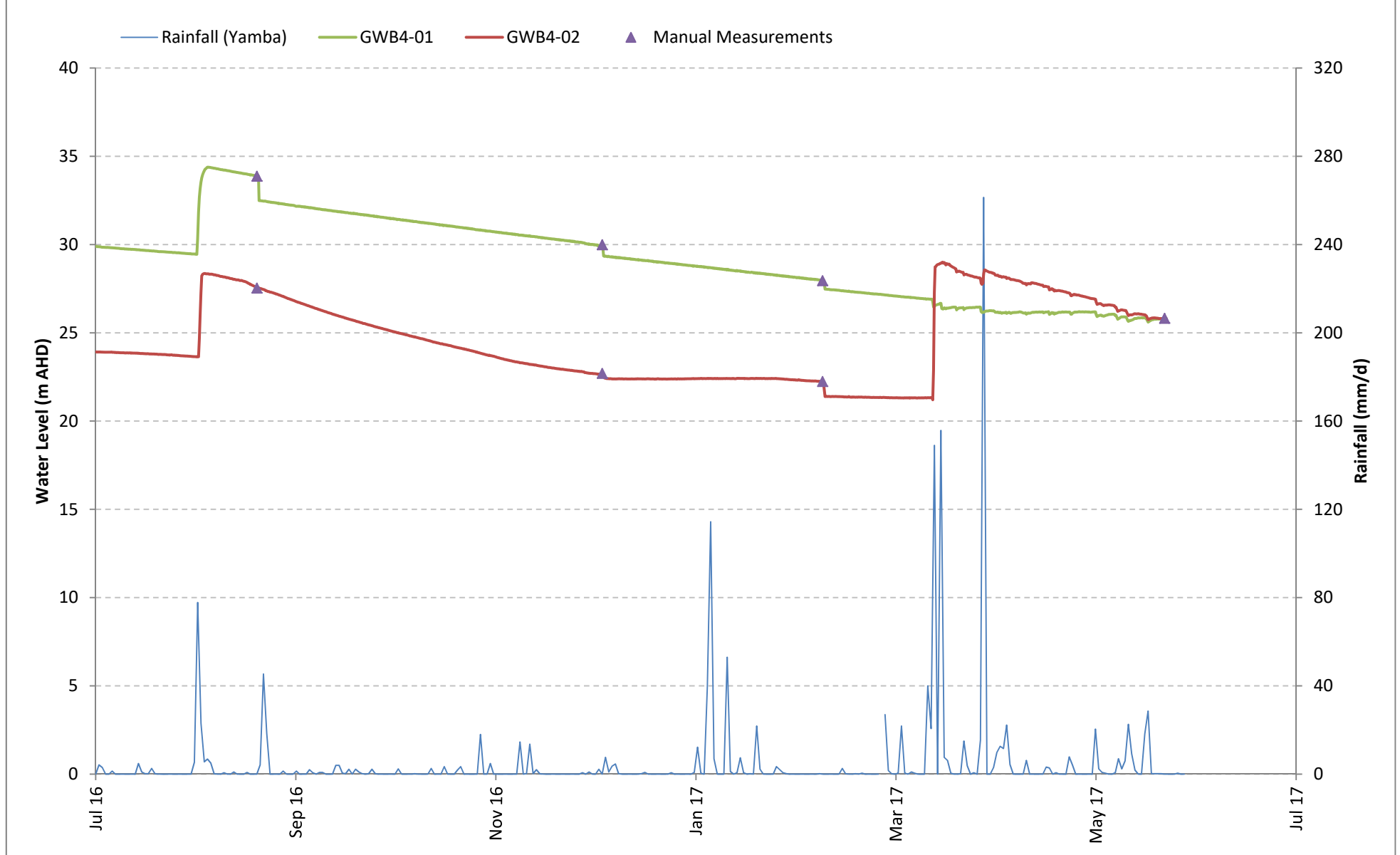
GWB3-48 & GWB3-49 Water Levels



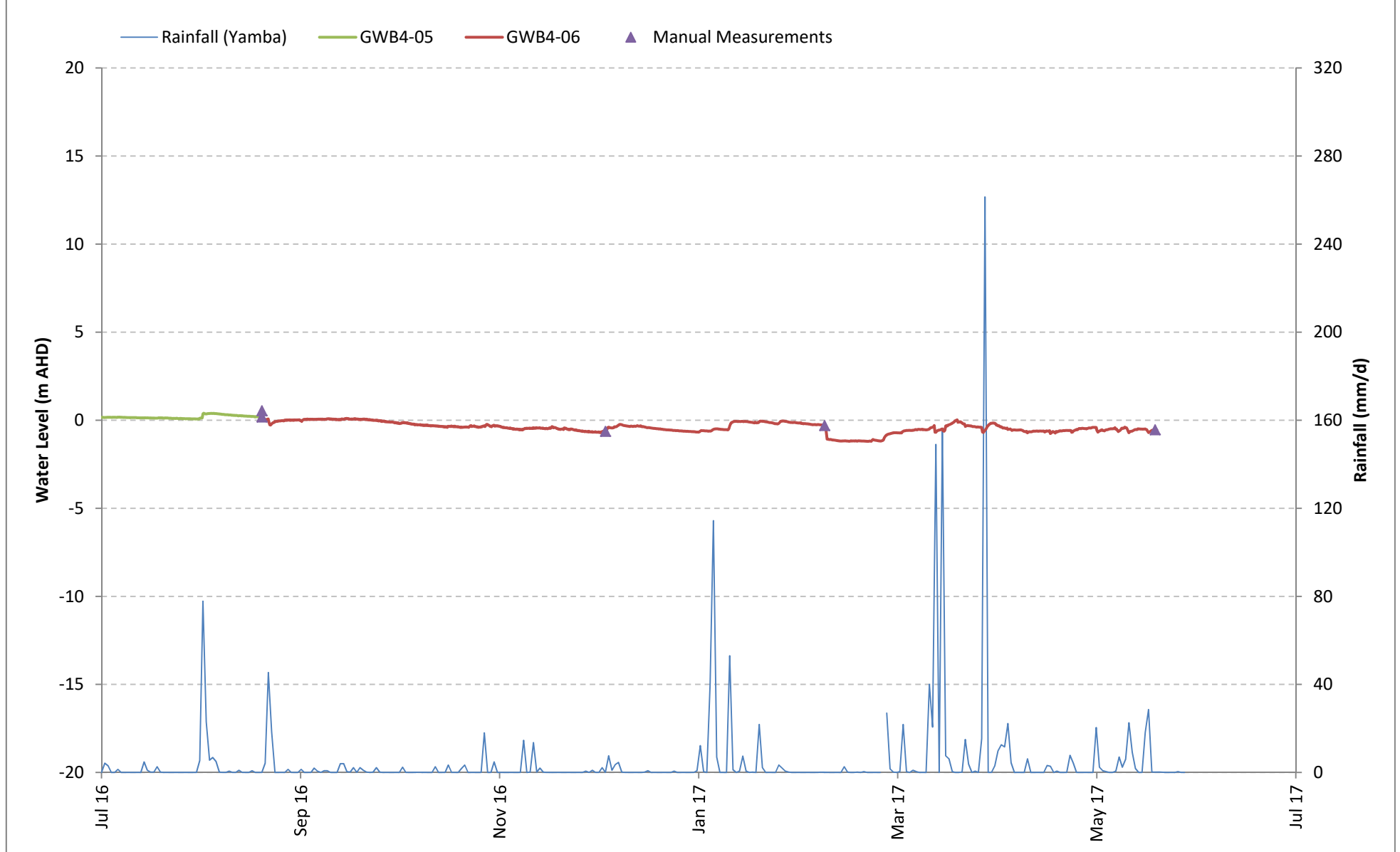
GWB3-50 & GWB3-51 Water Levels



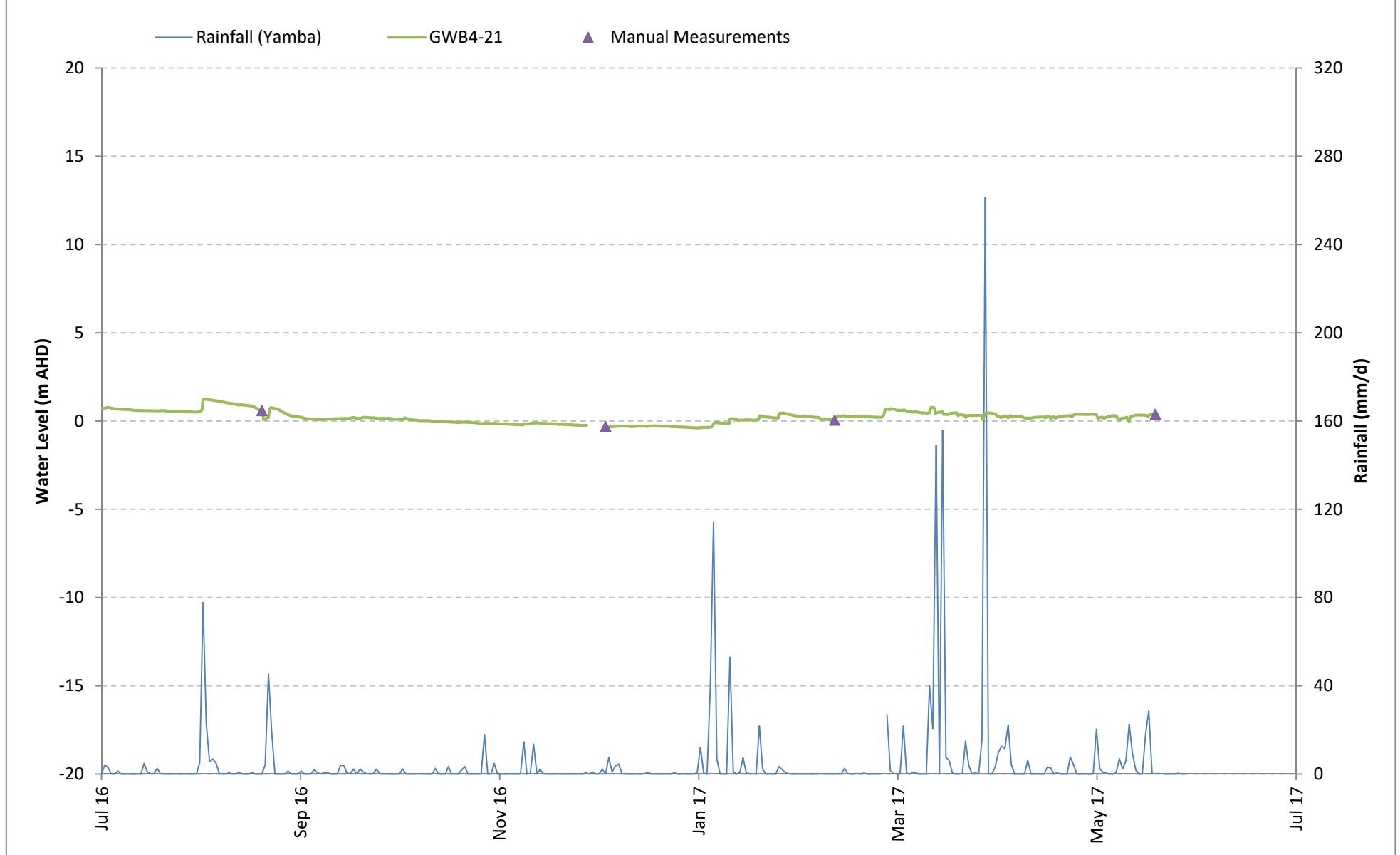
GWB4-01 & GWB4-02 Water Levels



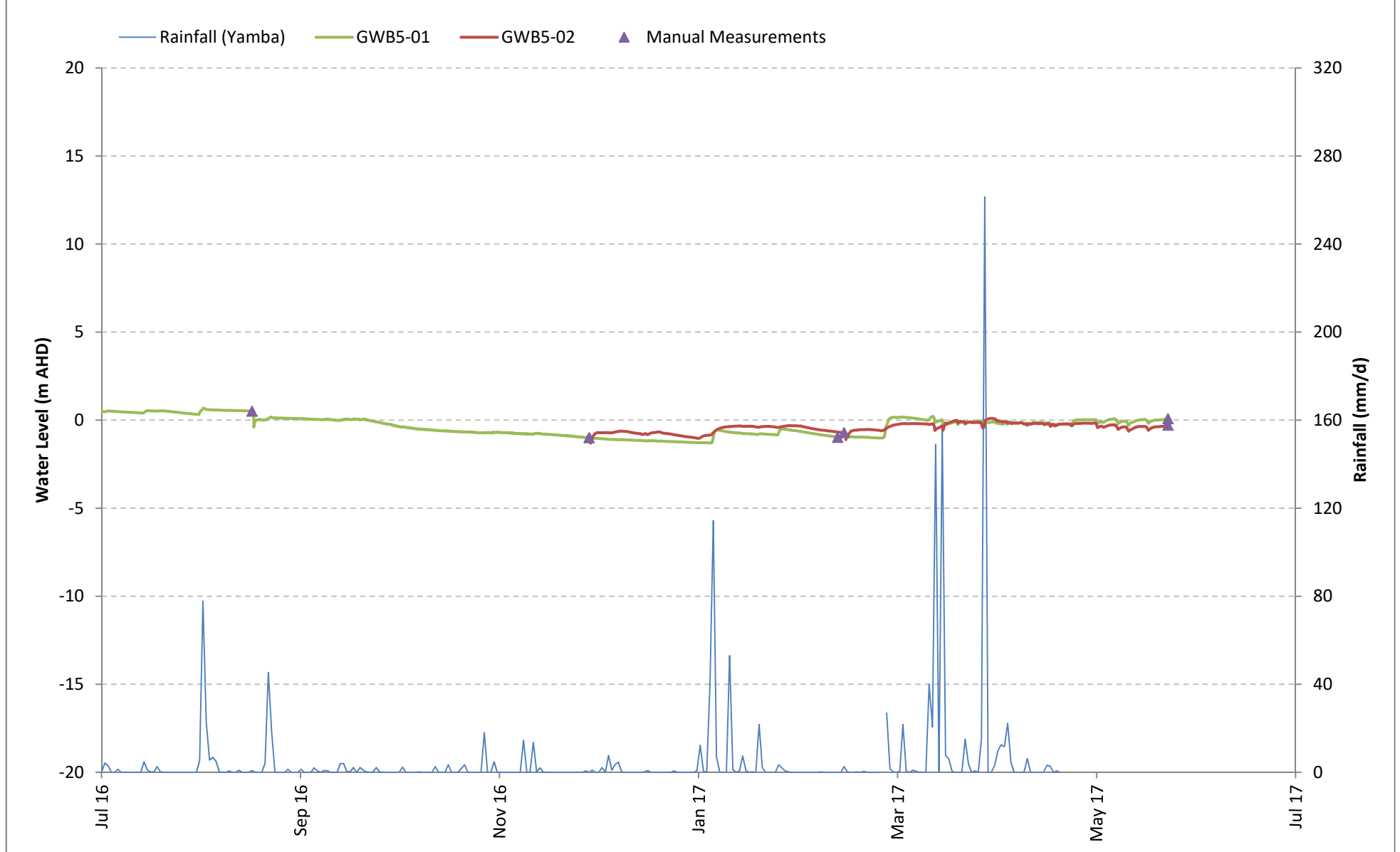
GWB4-05 & GWB4-06 Water Levels



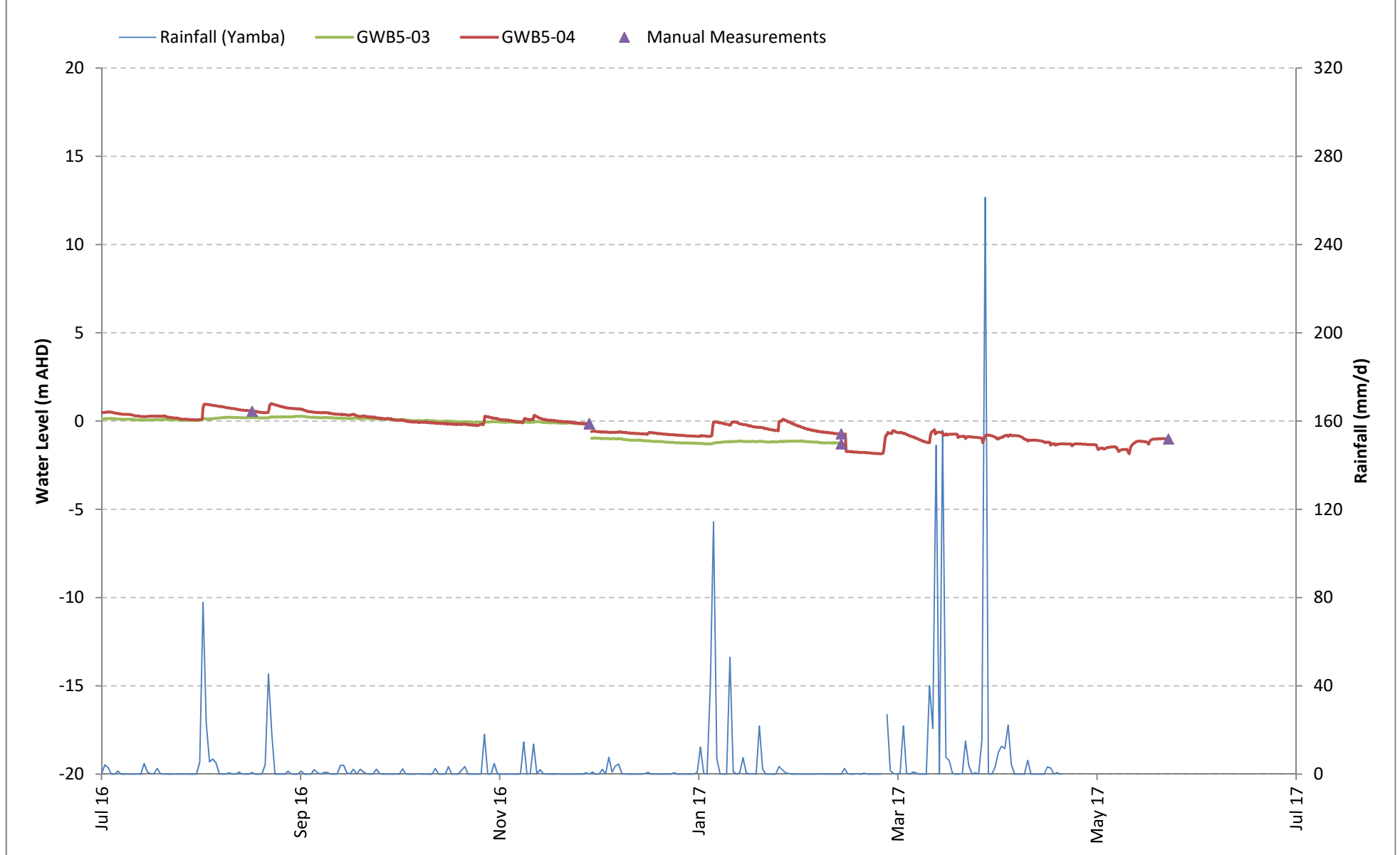
GWB4-21 Water Level



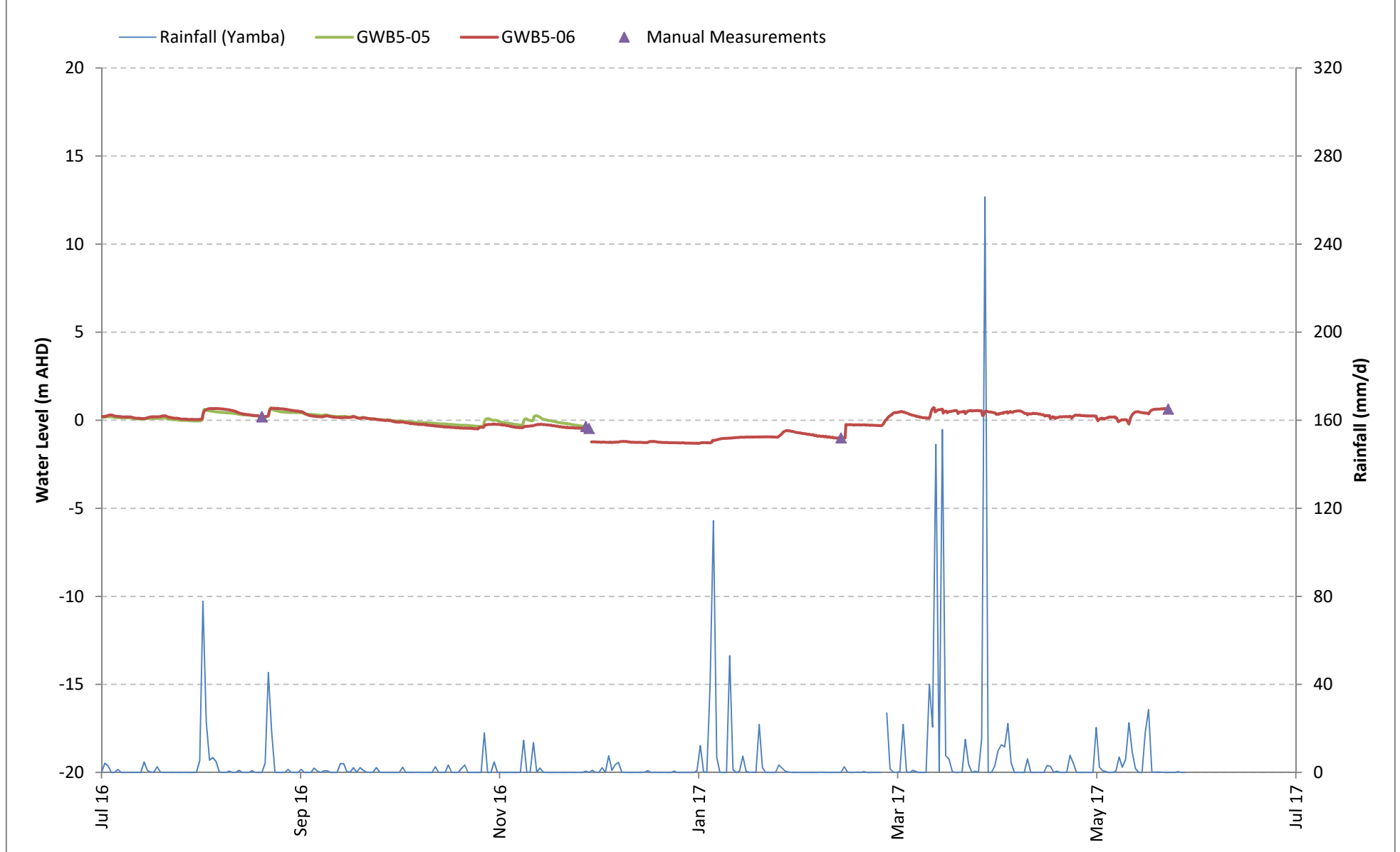
GWB5-01 & GWB5-02 Water Levels



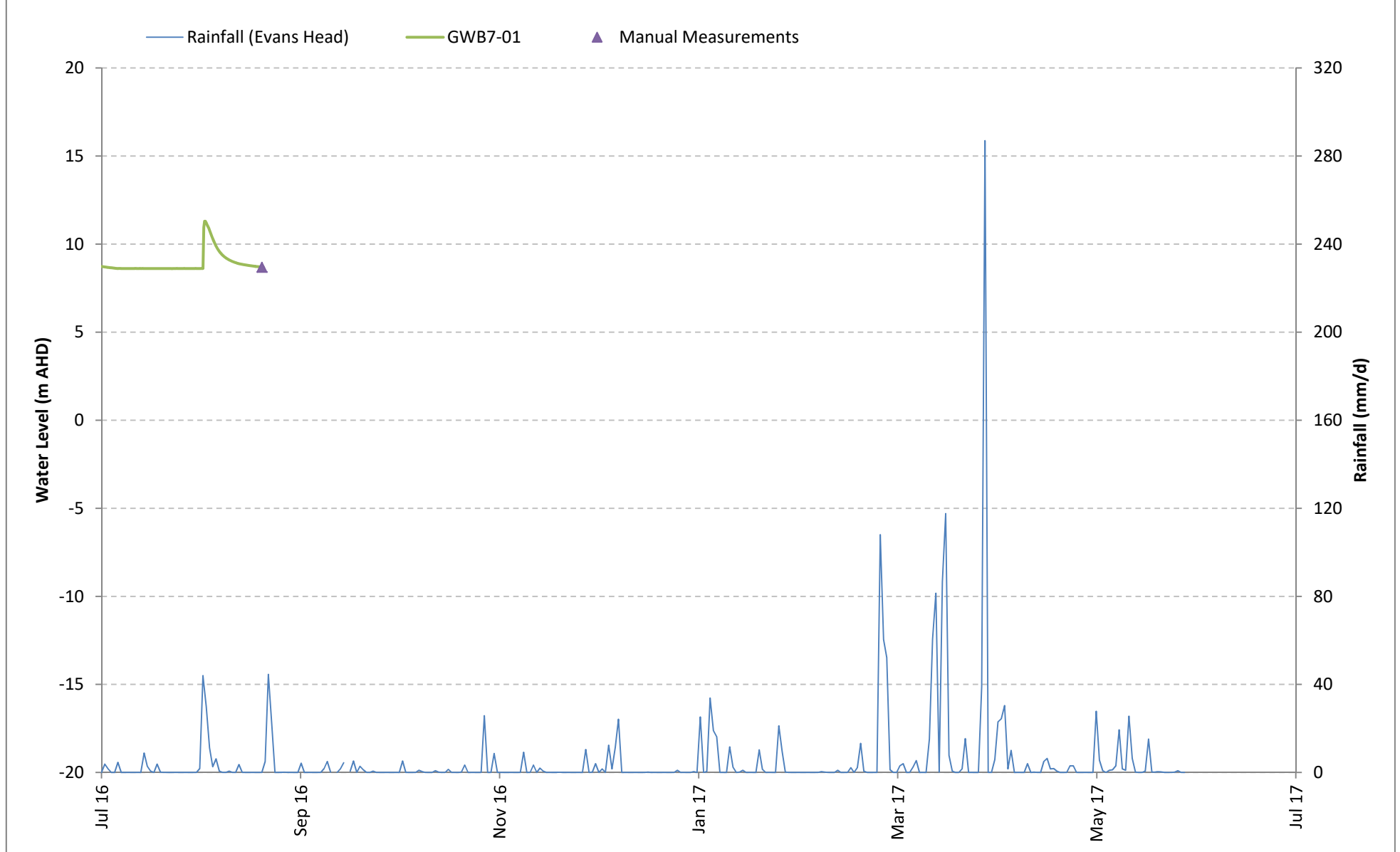
GWB5-03 & GWB5-04 Water Levels



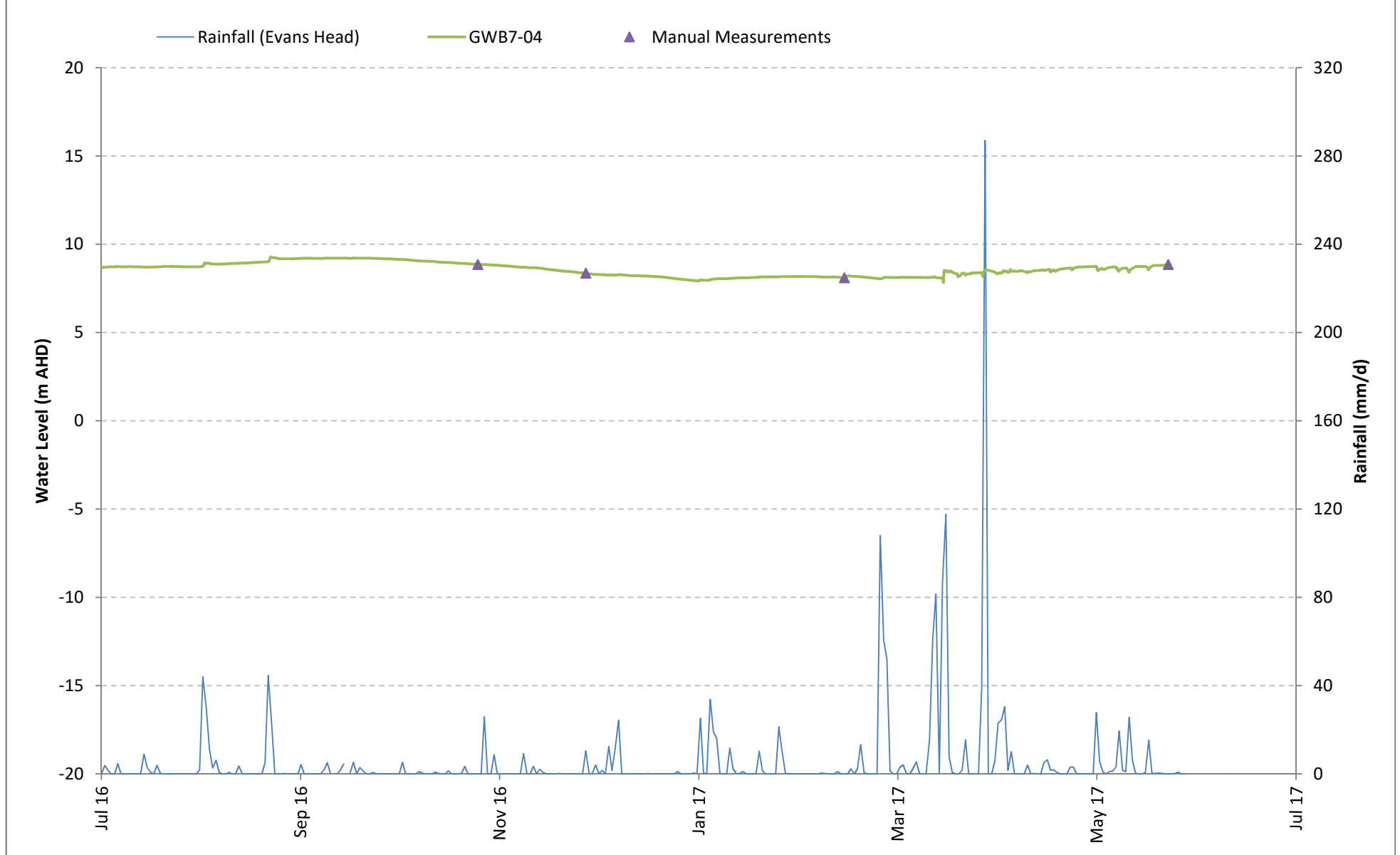
GWB5-05 & GWB5-06 Water Levels



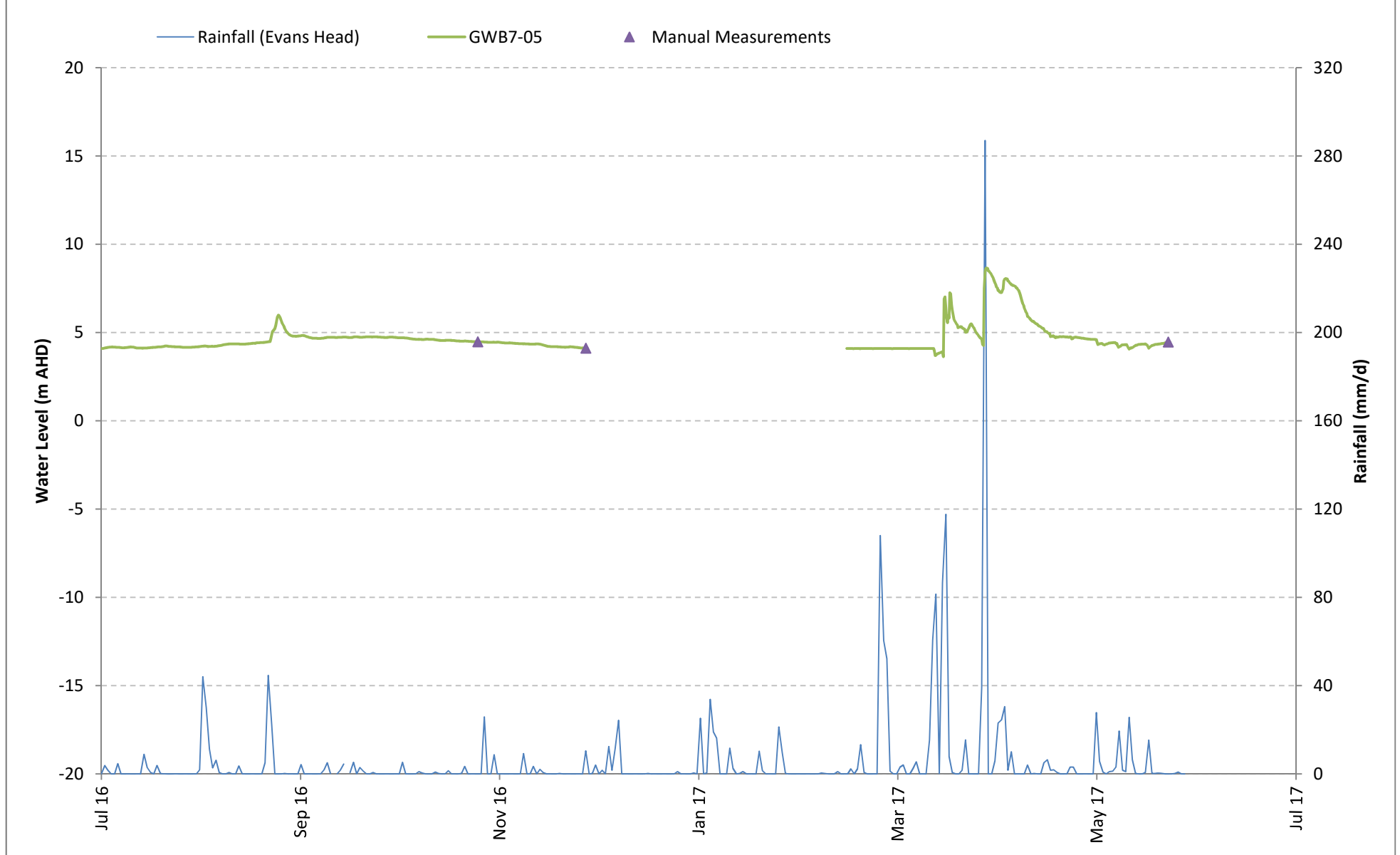
GWB7-01 Water Level



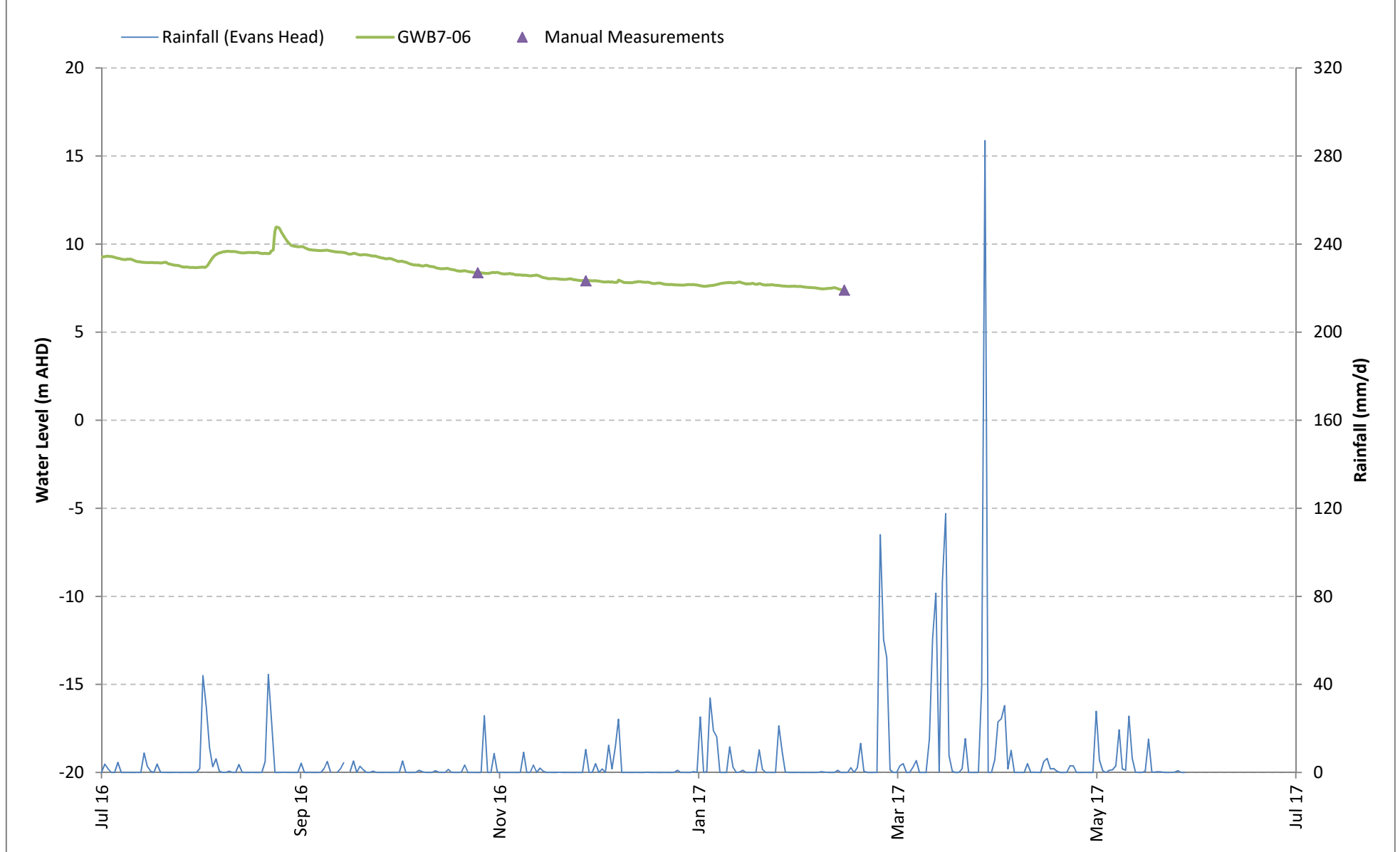
GWB7-04 Water Level



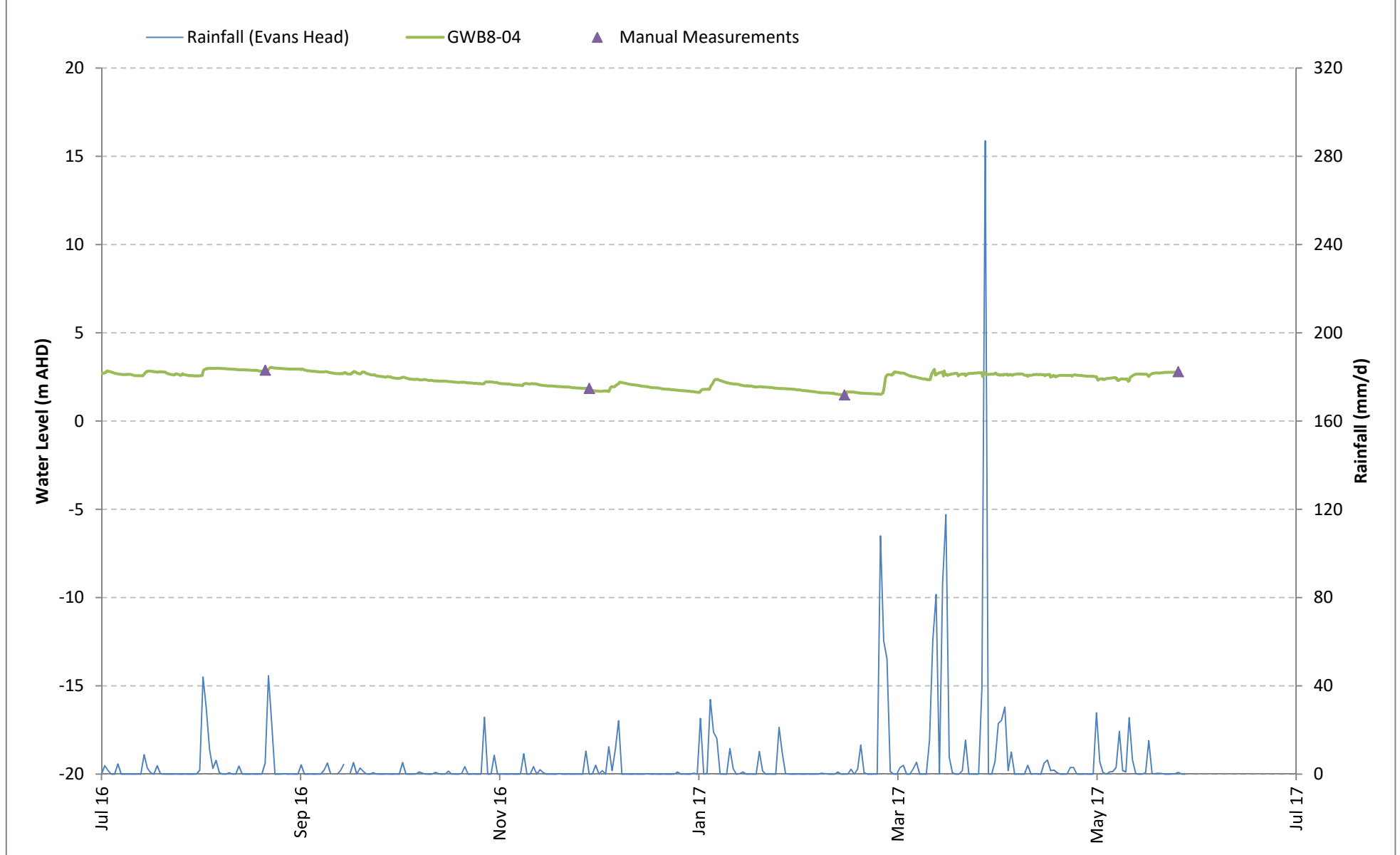
GWB7-05 Water Level



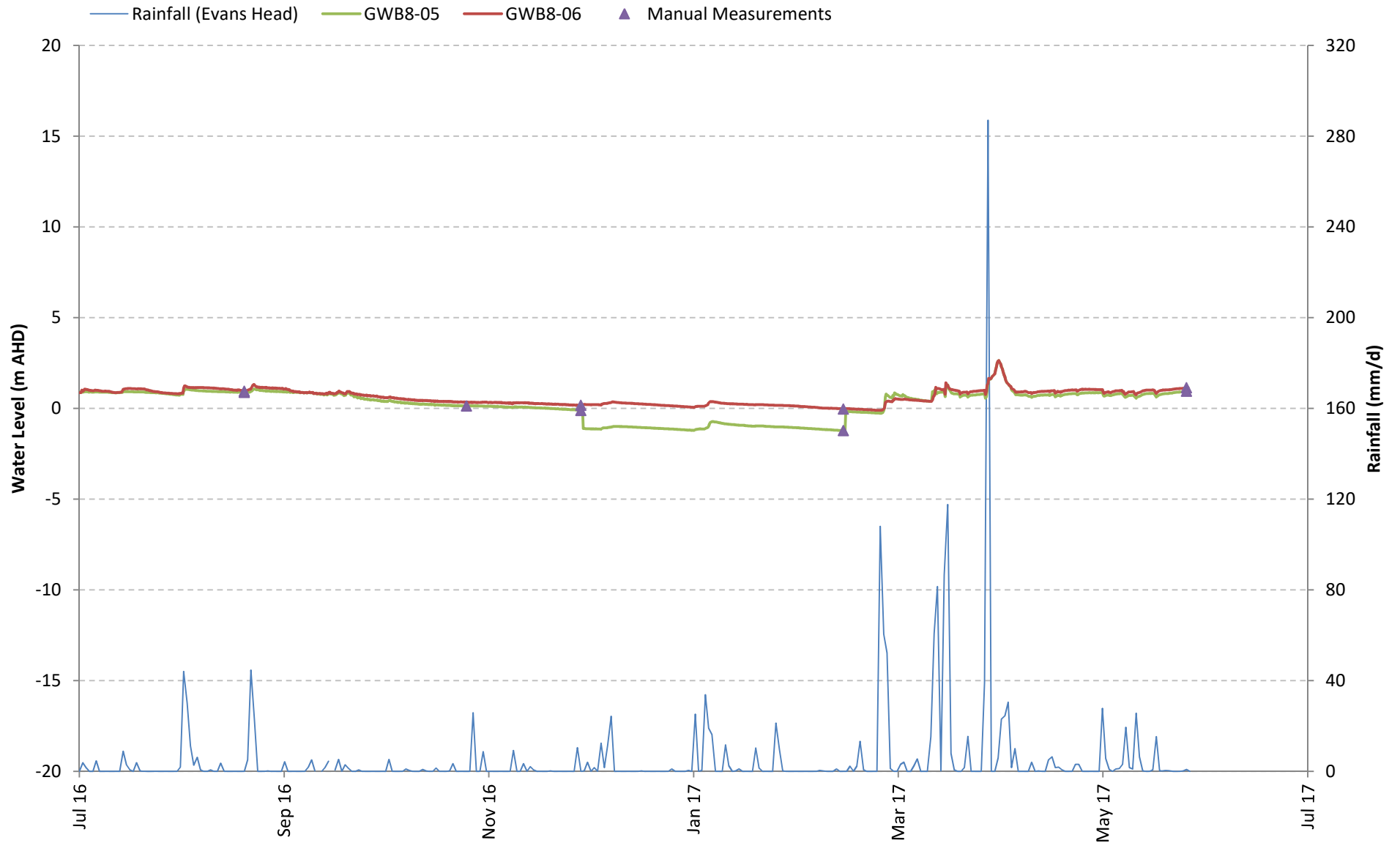
GWB7-06 Water Level



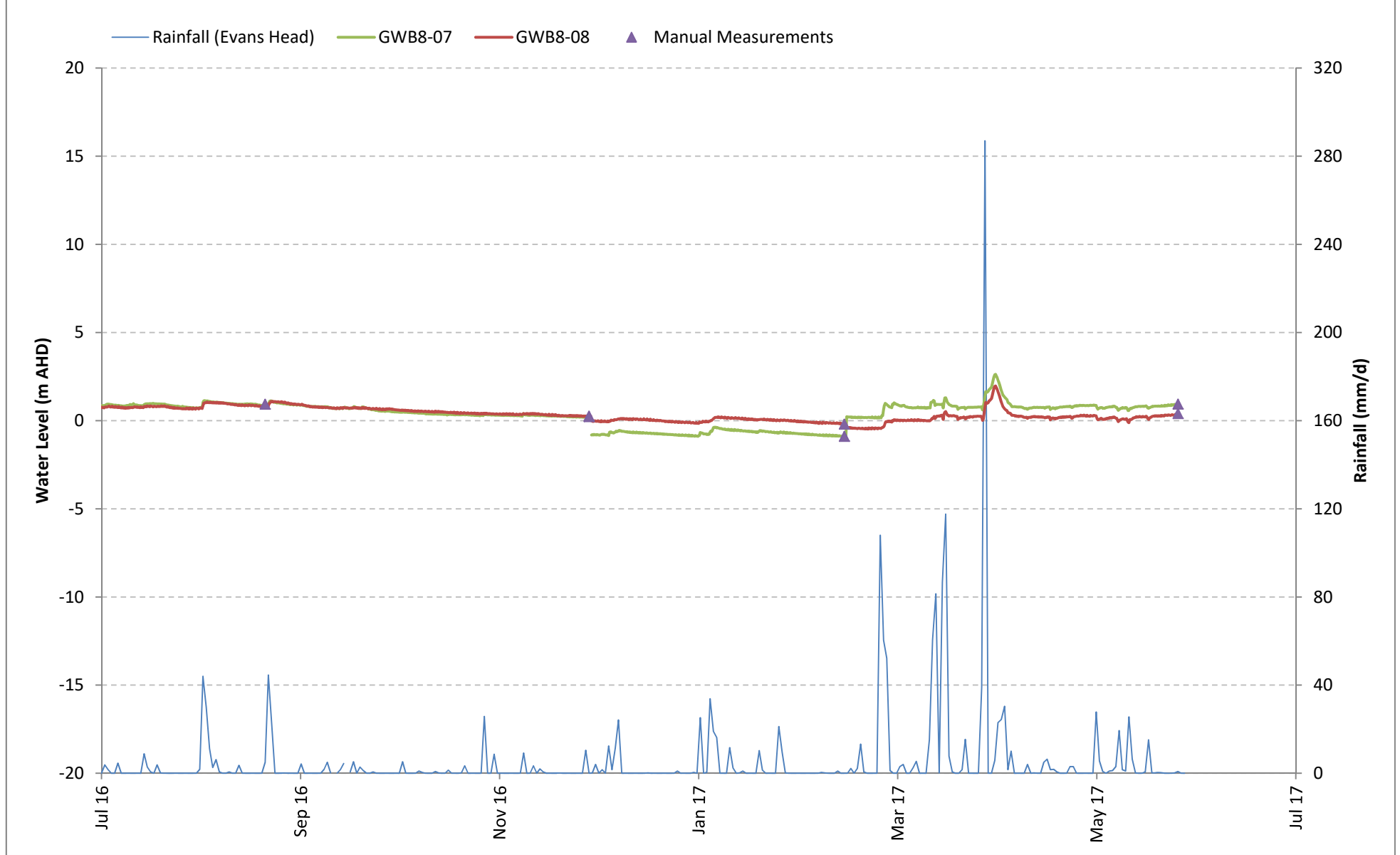
GWB8-04 Water Level



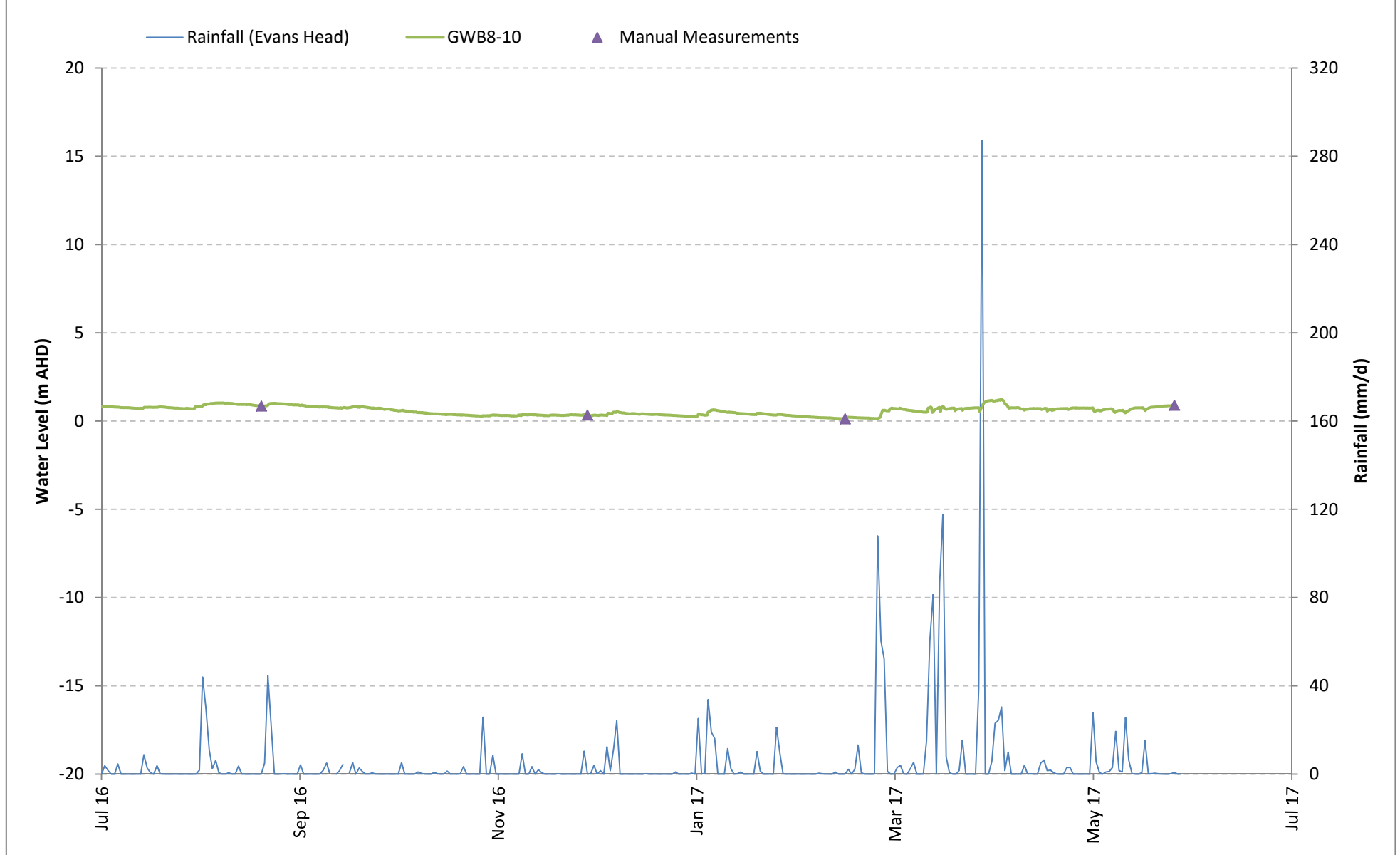
GWB8-05 & GWB8-06 Water Levels



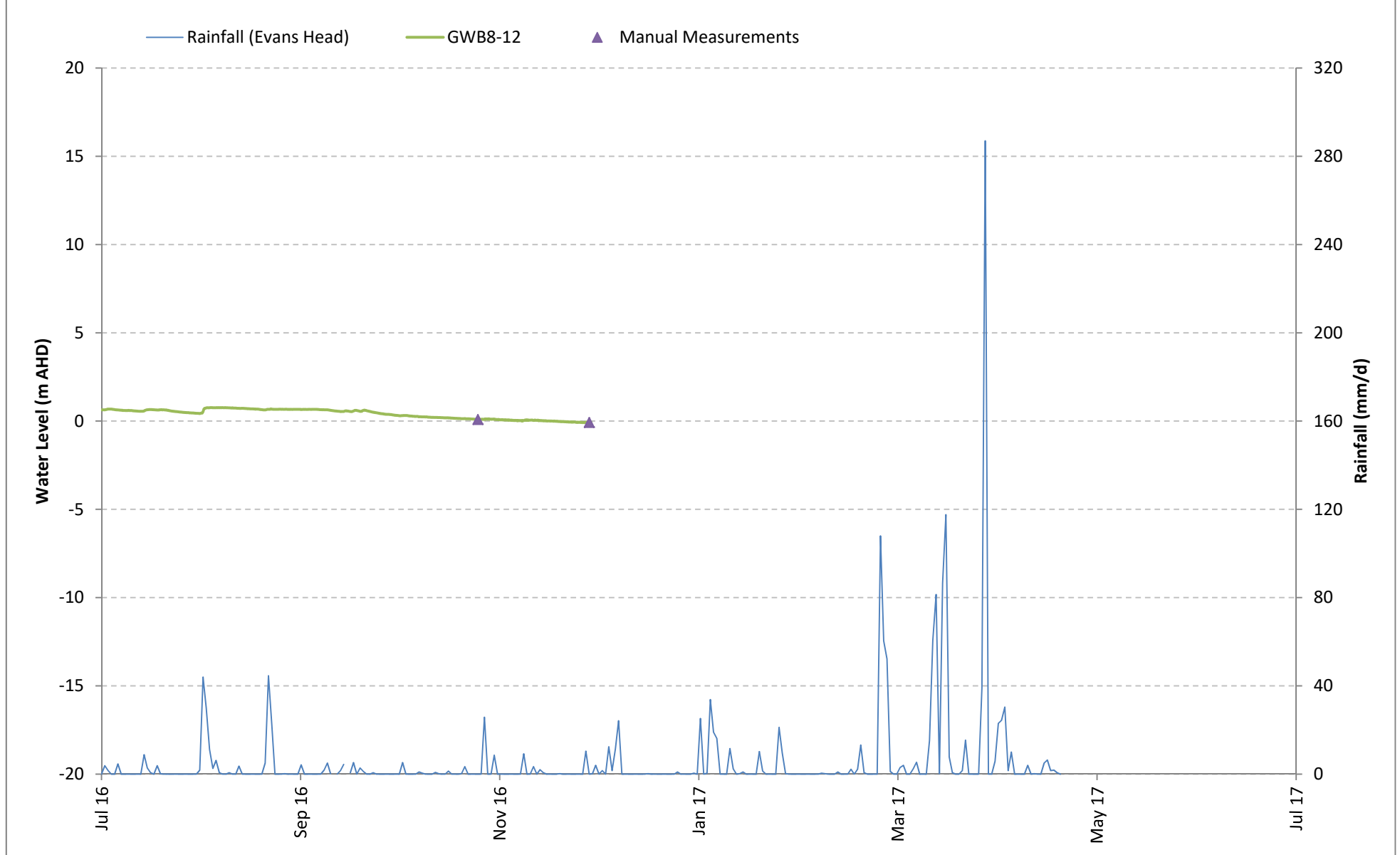
GWB8-07 & GWB8-08 Water Levels



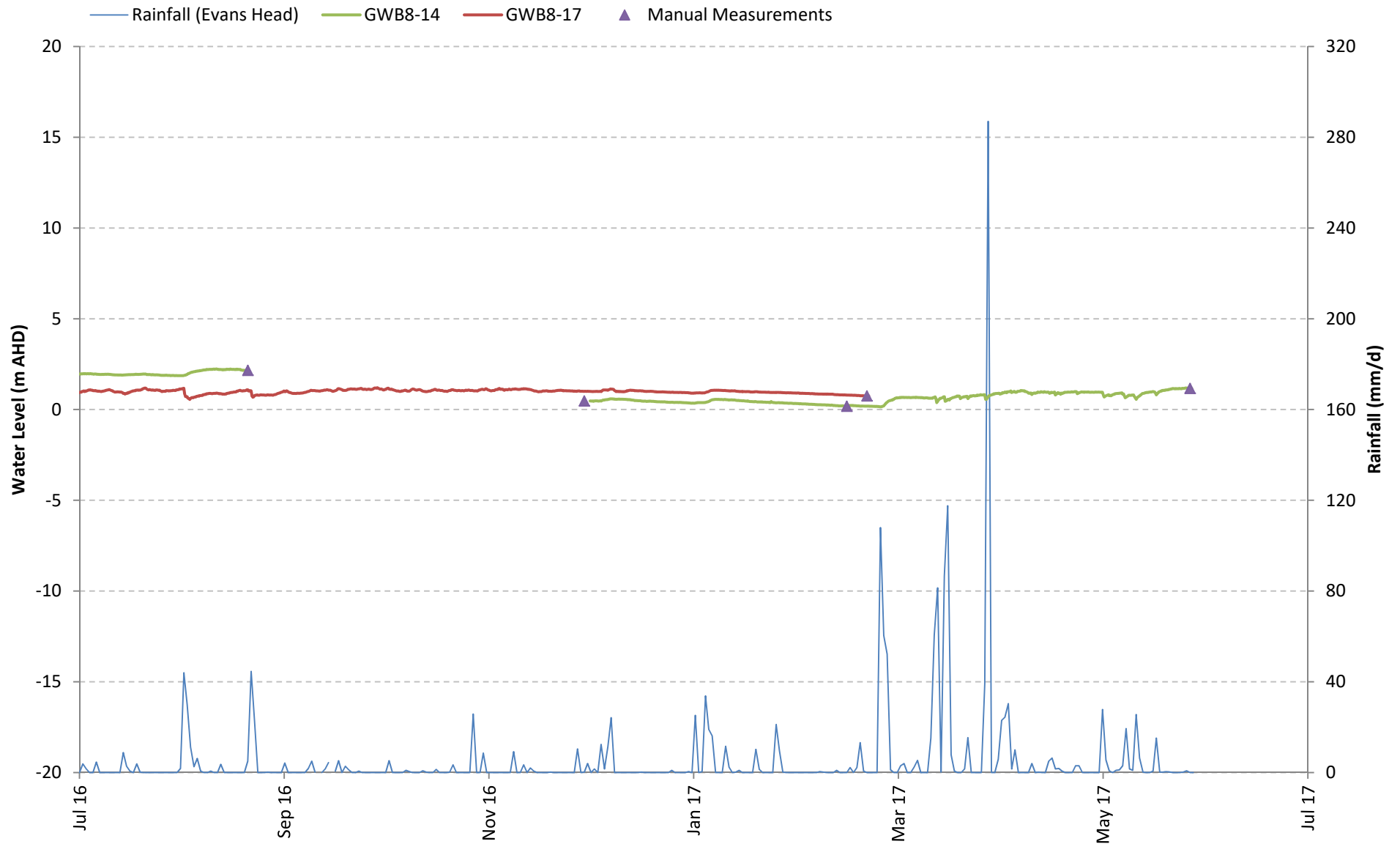
GWB8-10 Water Level



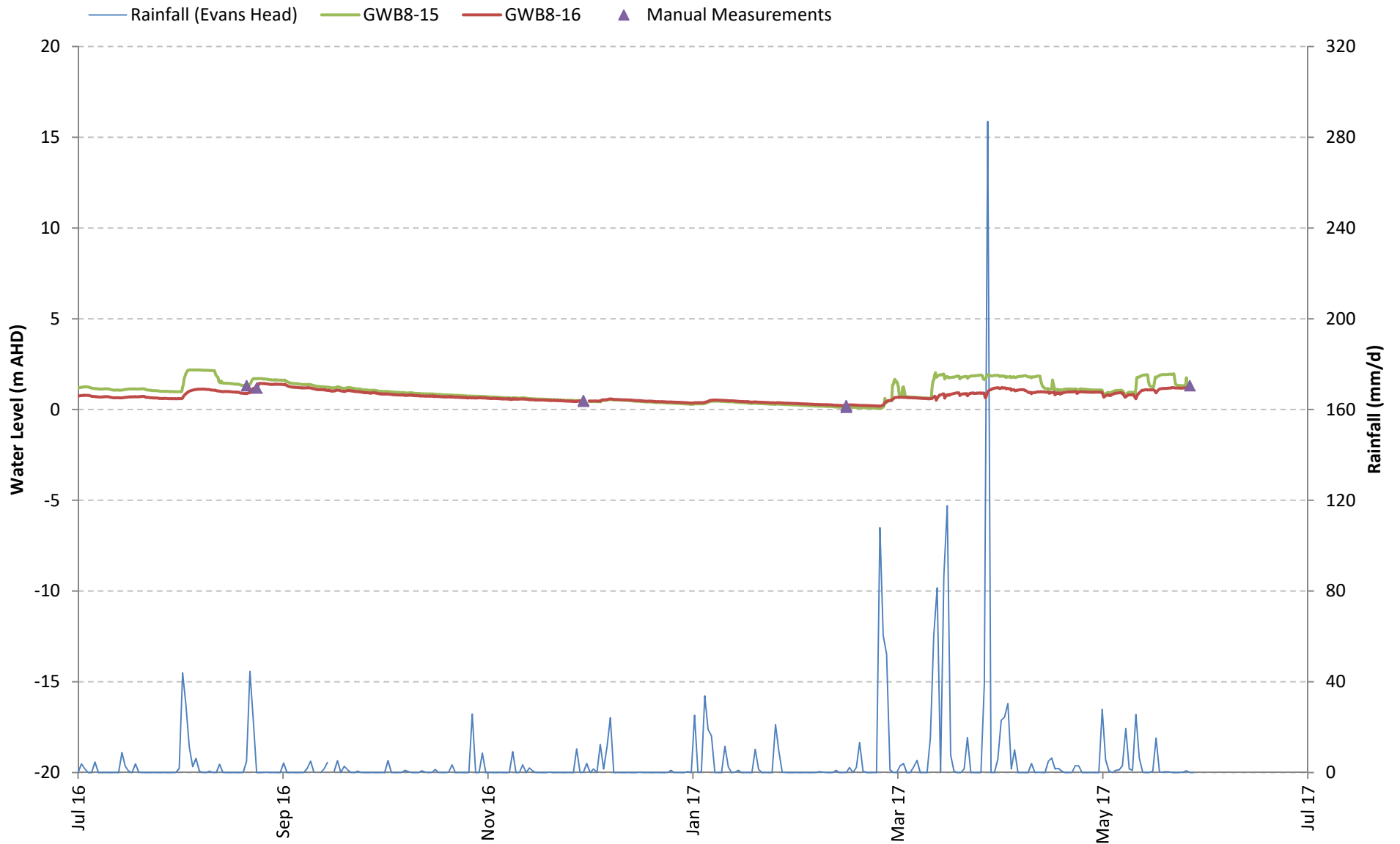
GWB8-12 Water Level



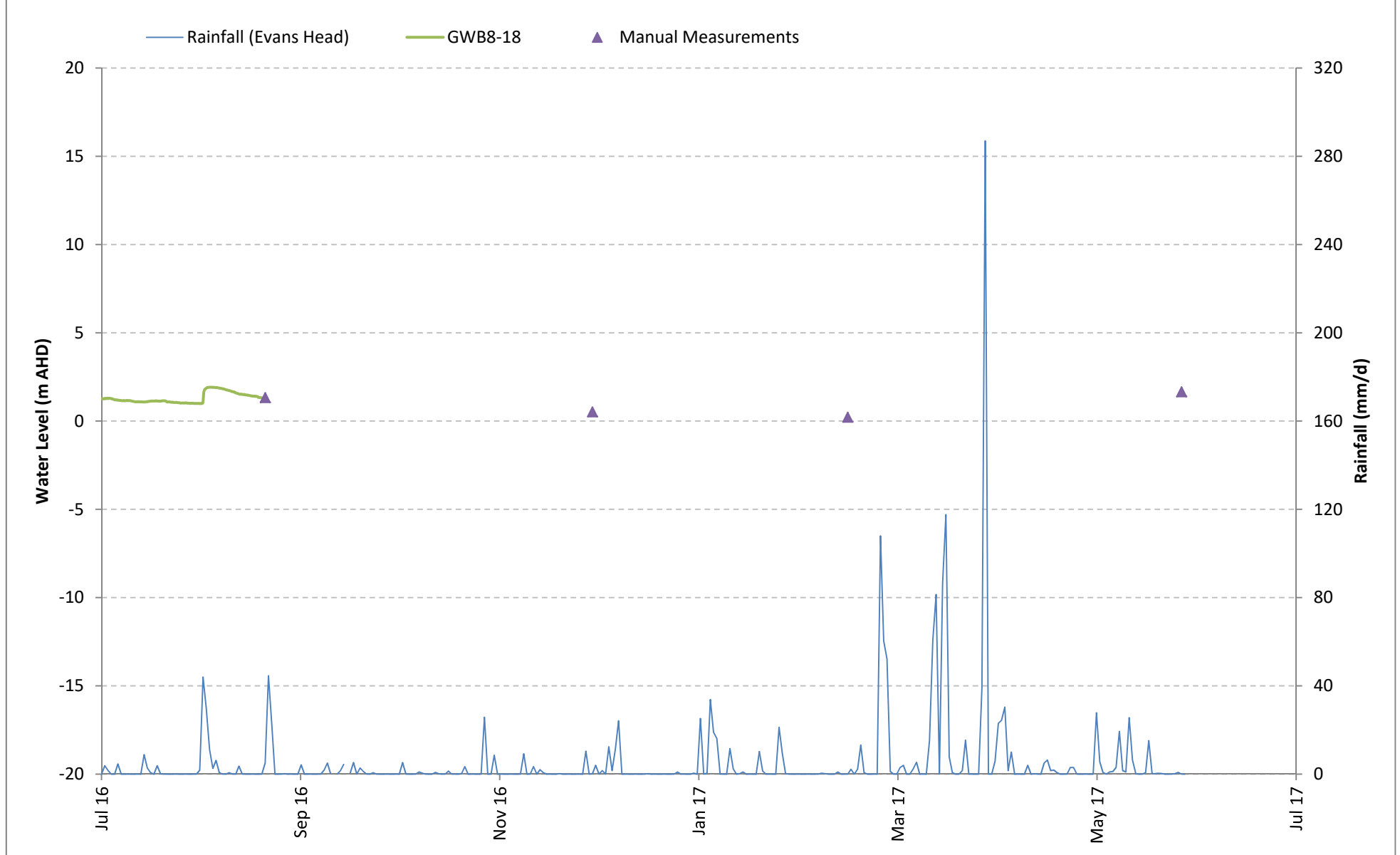
GWB8-14 & GWB8-17 Water Levels



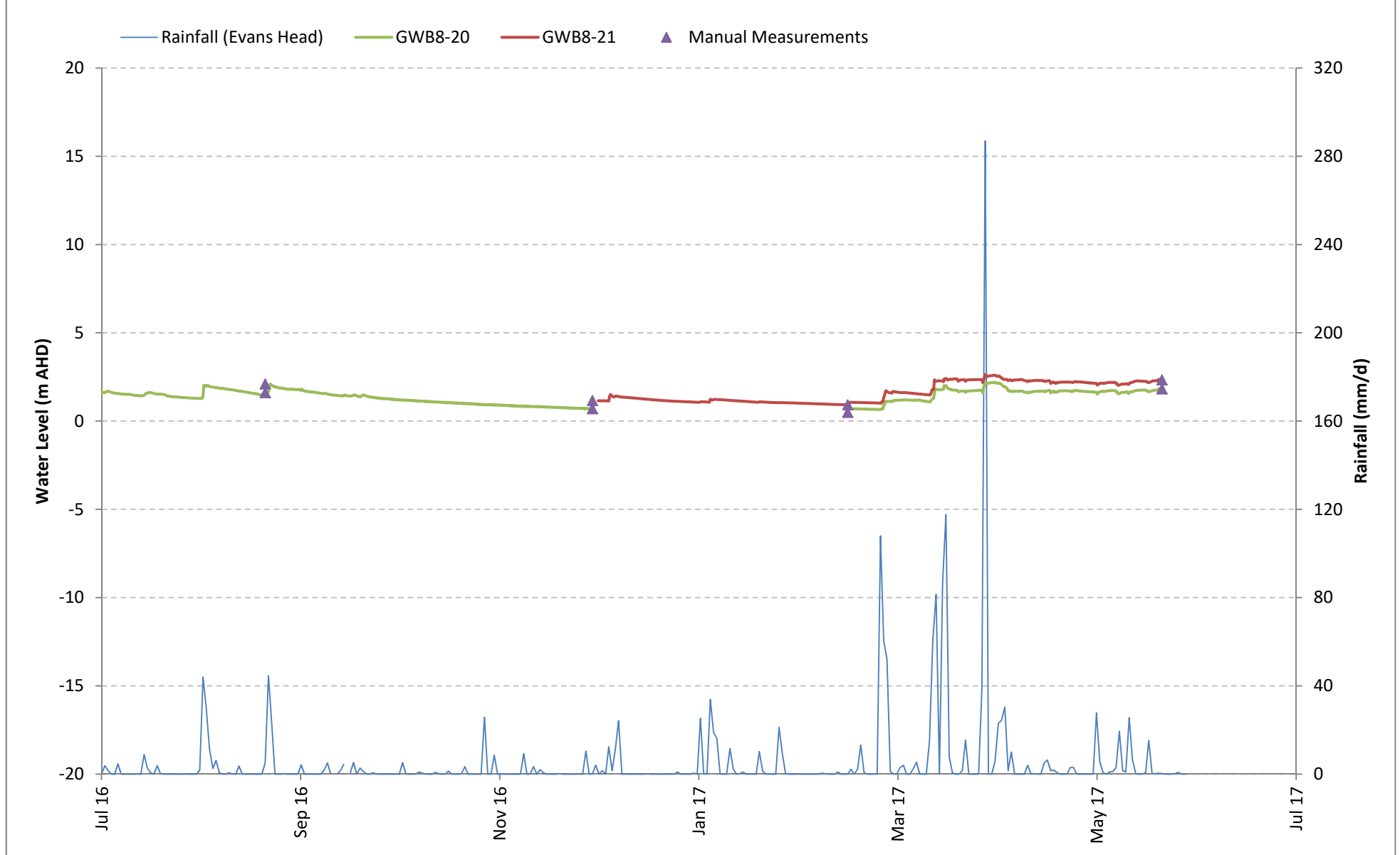
GWB8-15 & GWB8-16 Water Levels



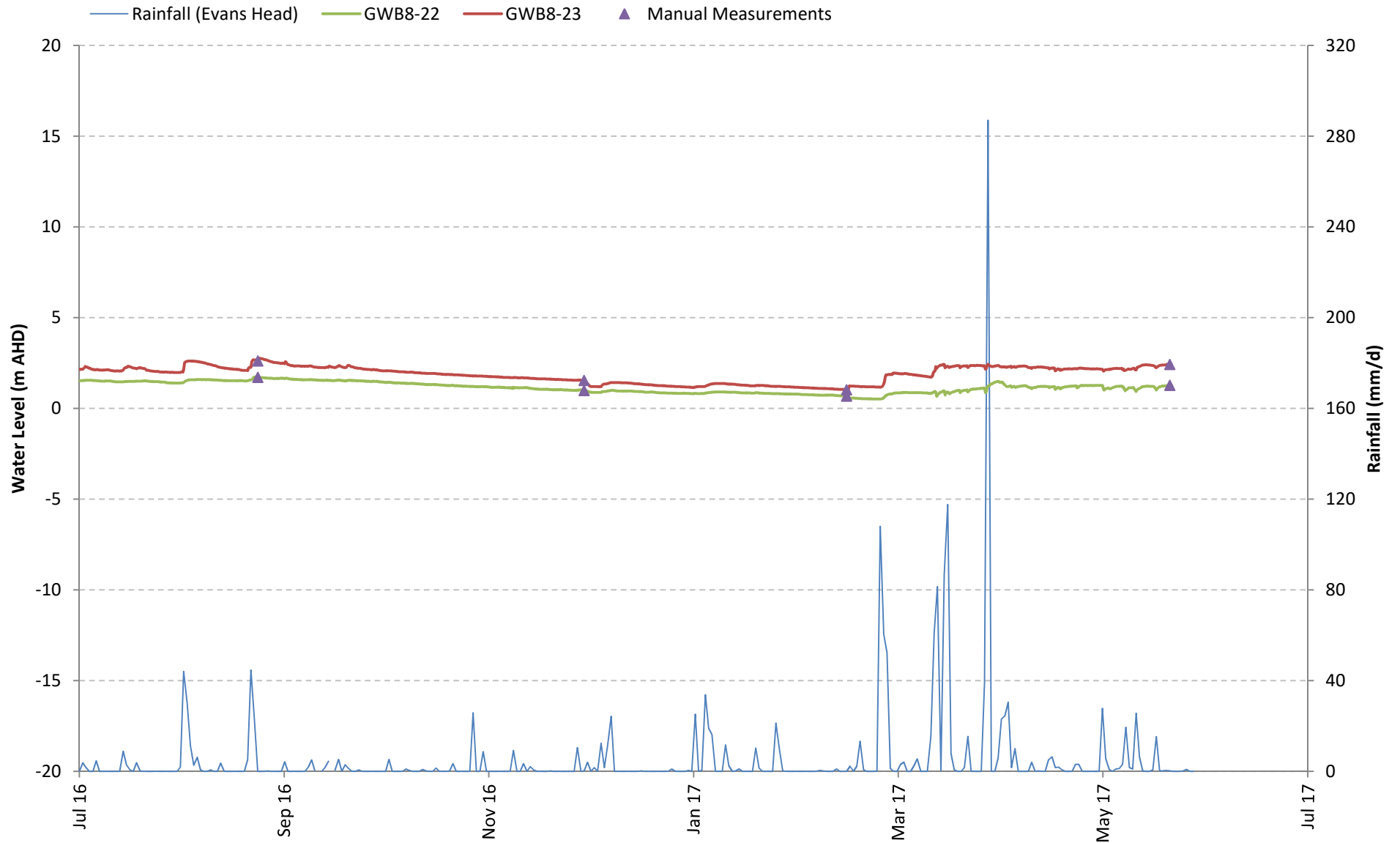
GWB8-18 Water Level



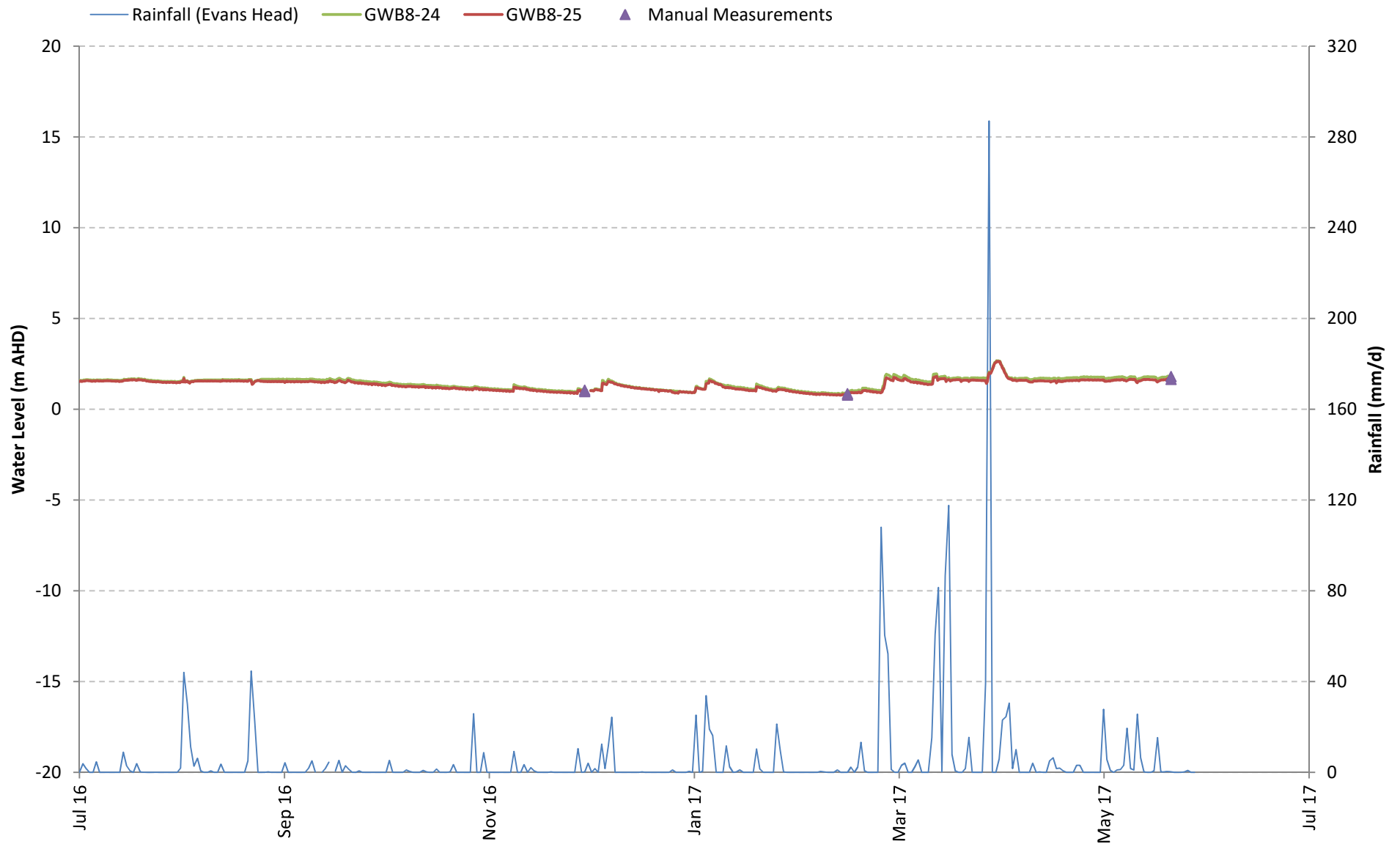
GWB8-20 & GWB8-21 Water Levels



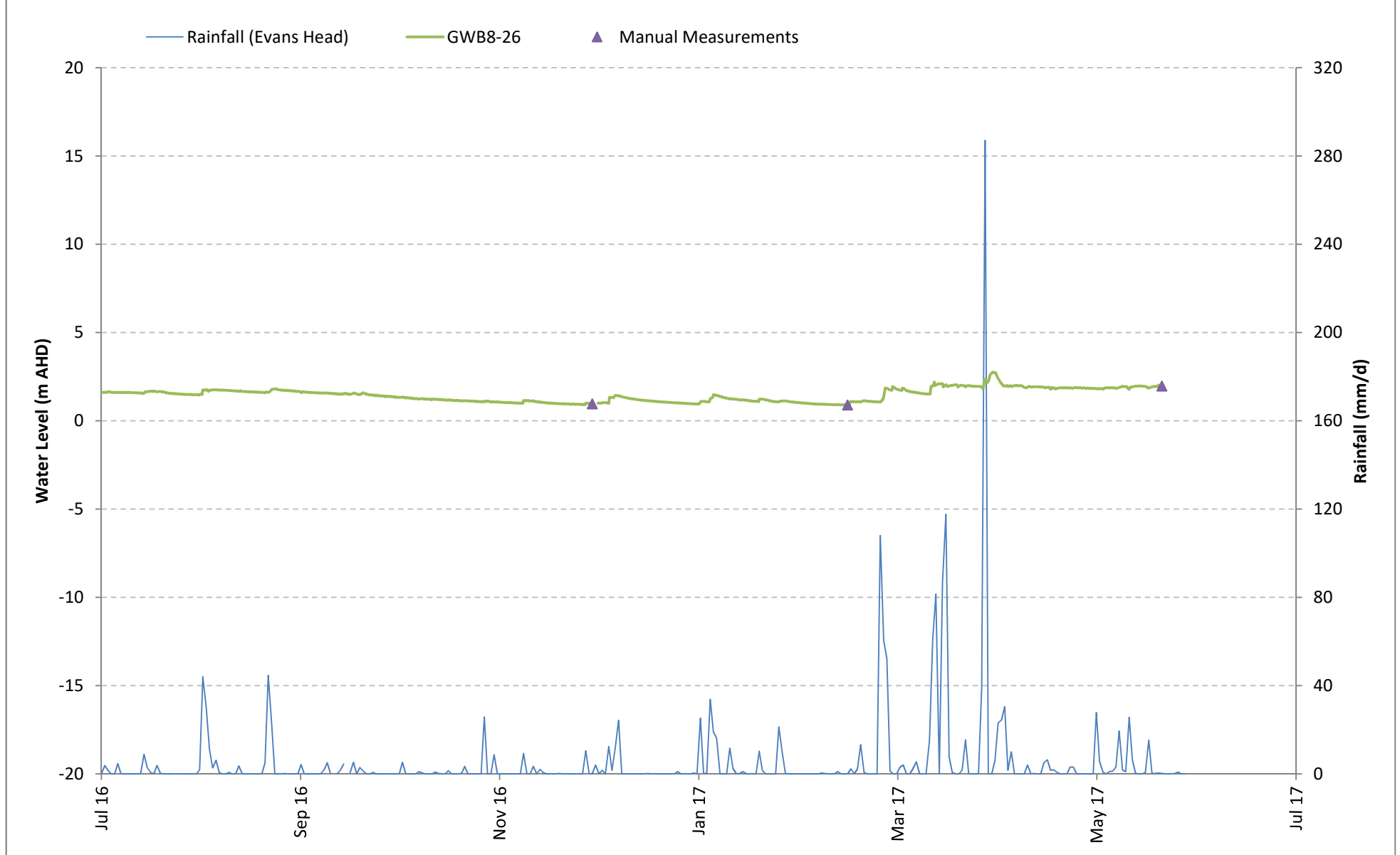
GWB8-22 & GWB8-23 Water Levels



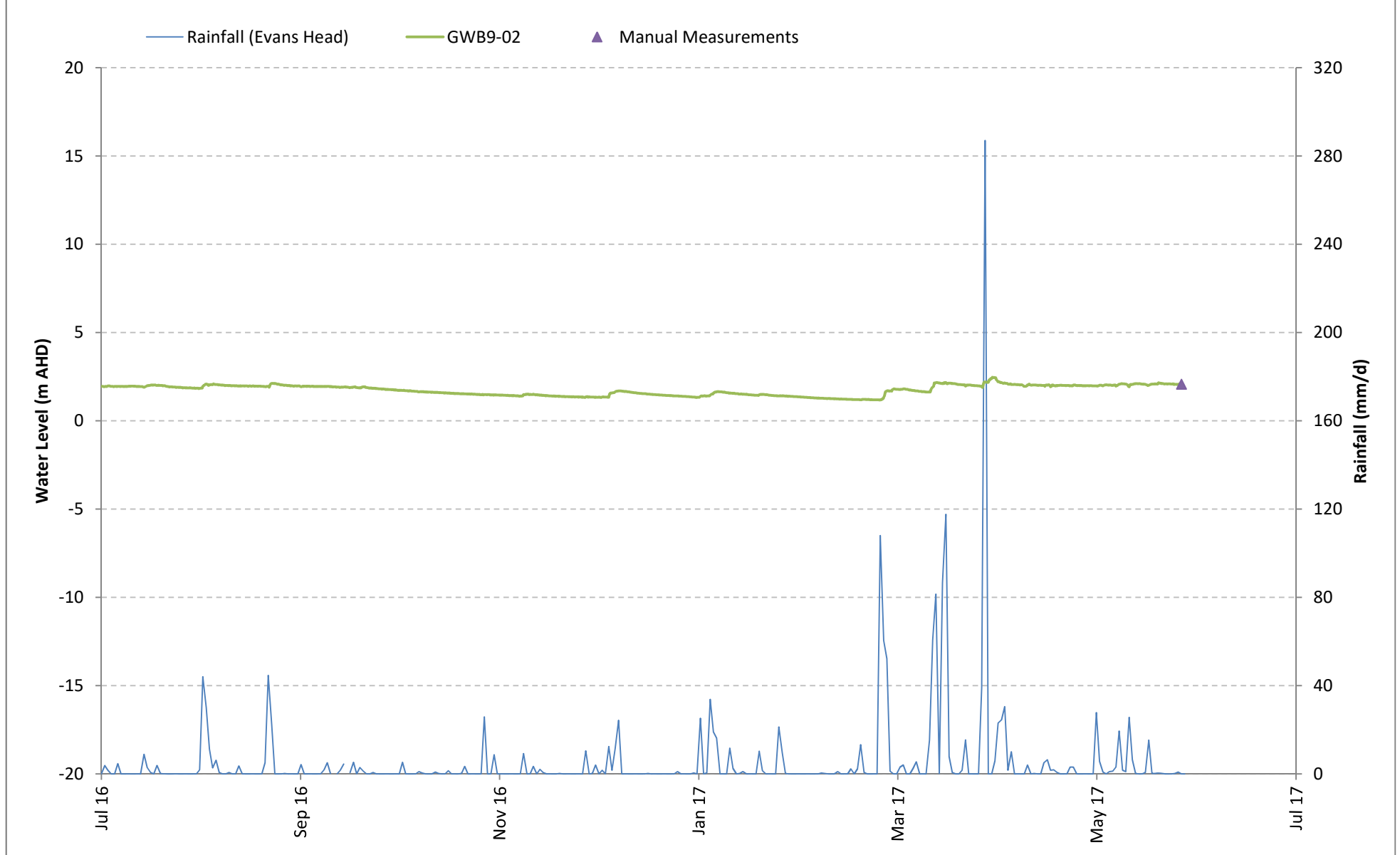
GWB8-24 & GWB8-25 Water Levels



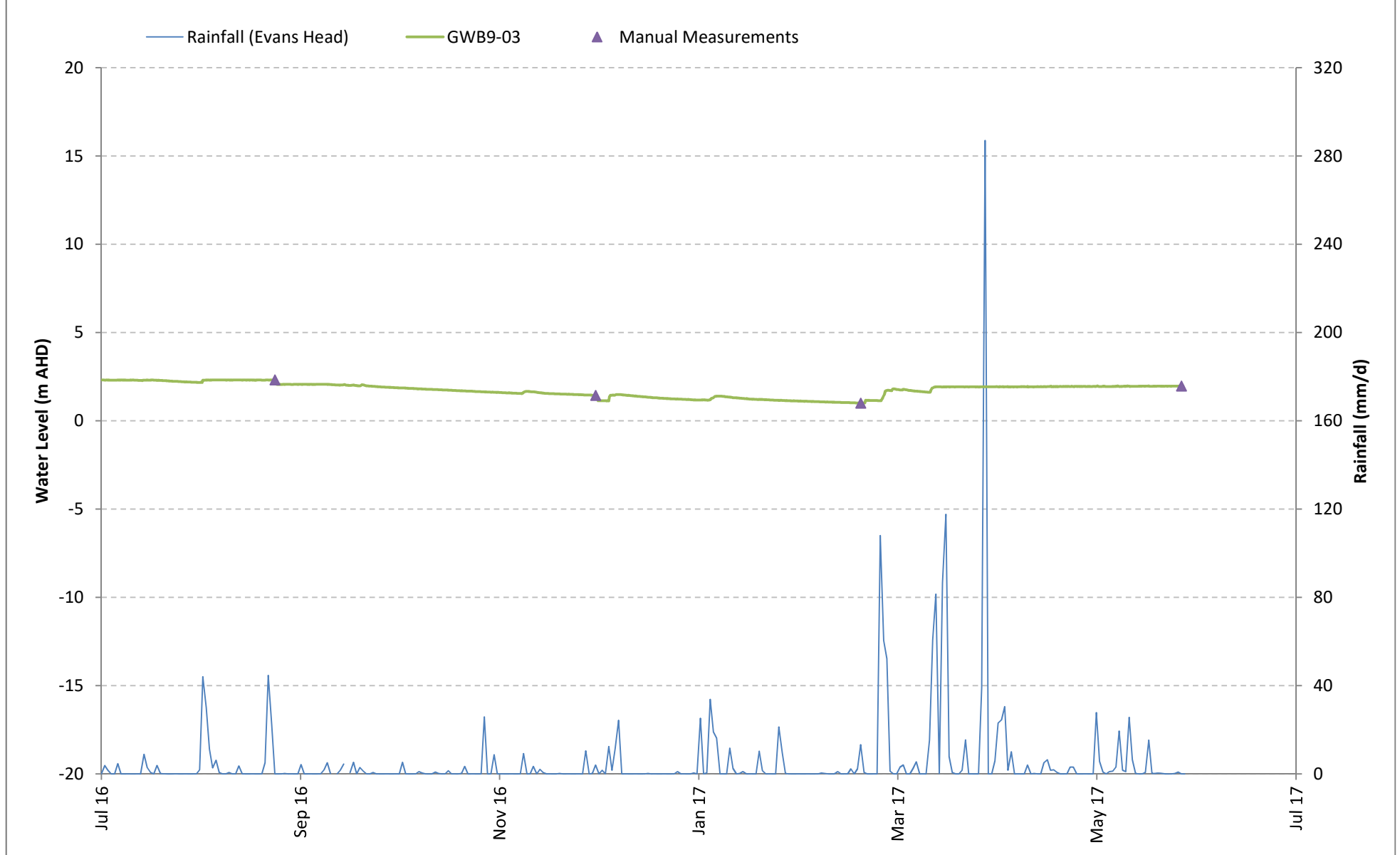
GWB8-26 Water Level



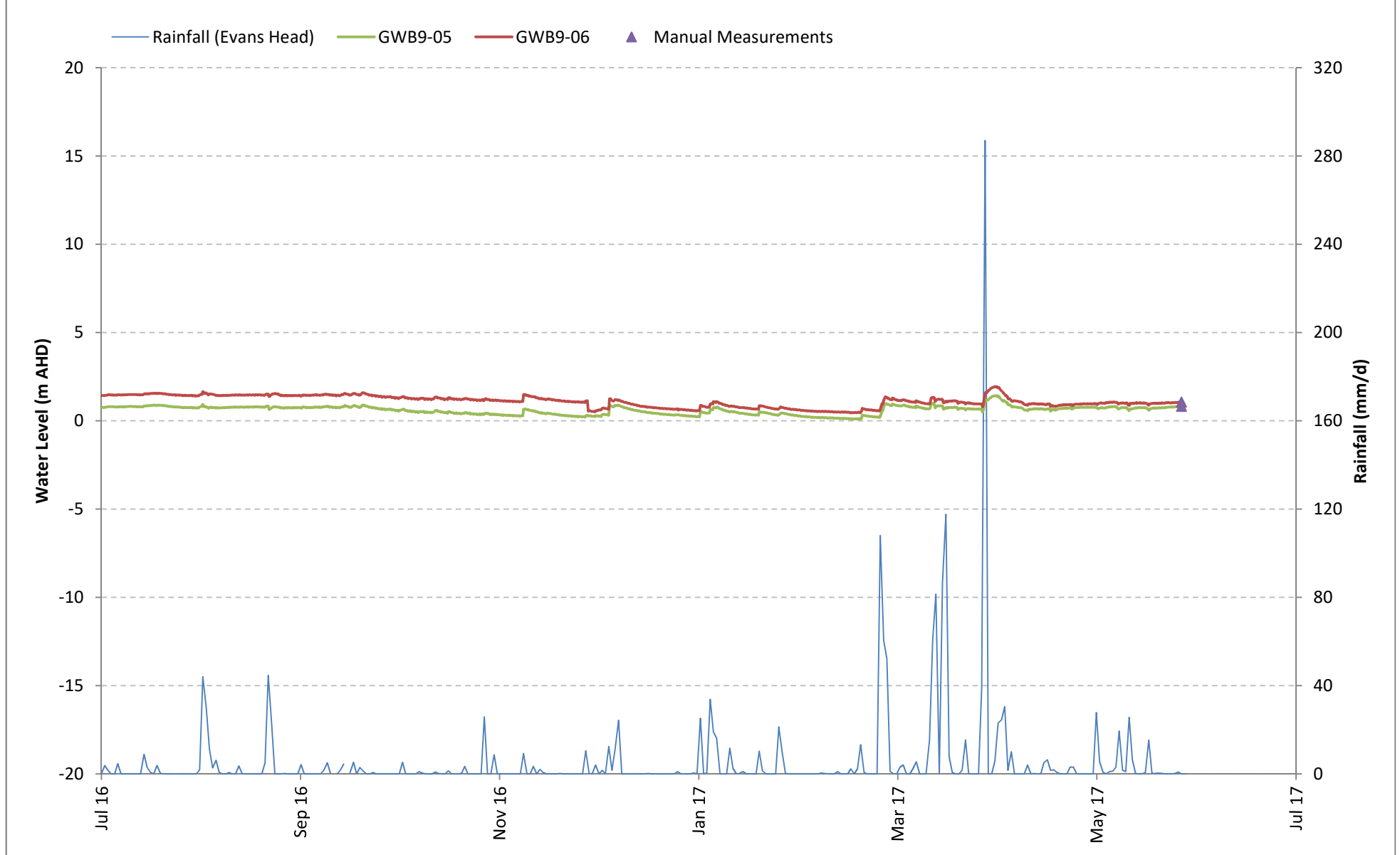
GWB9-02 Water Level



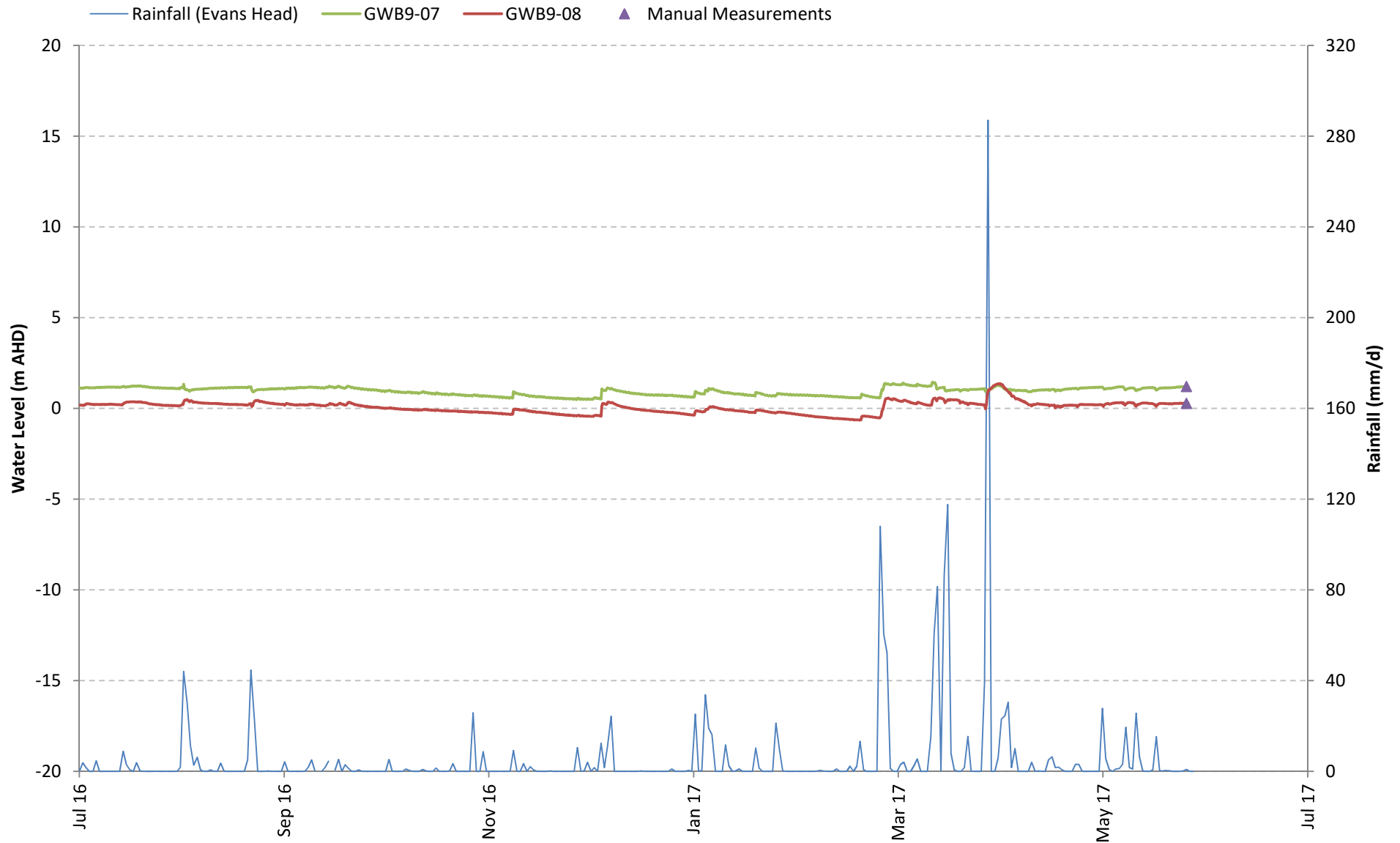
GWB9-03 Water Level



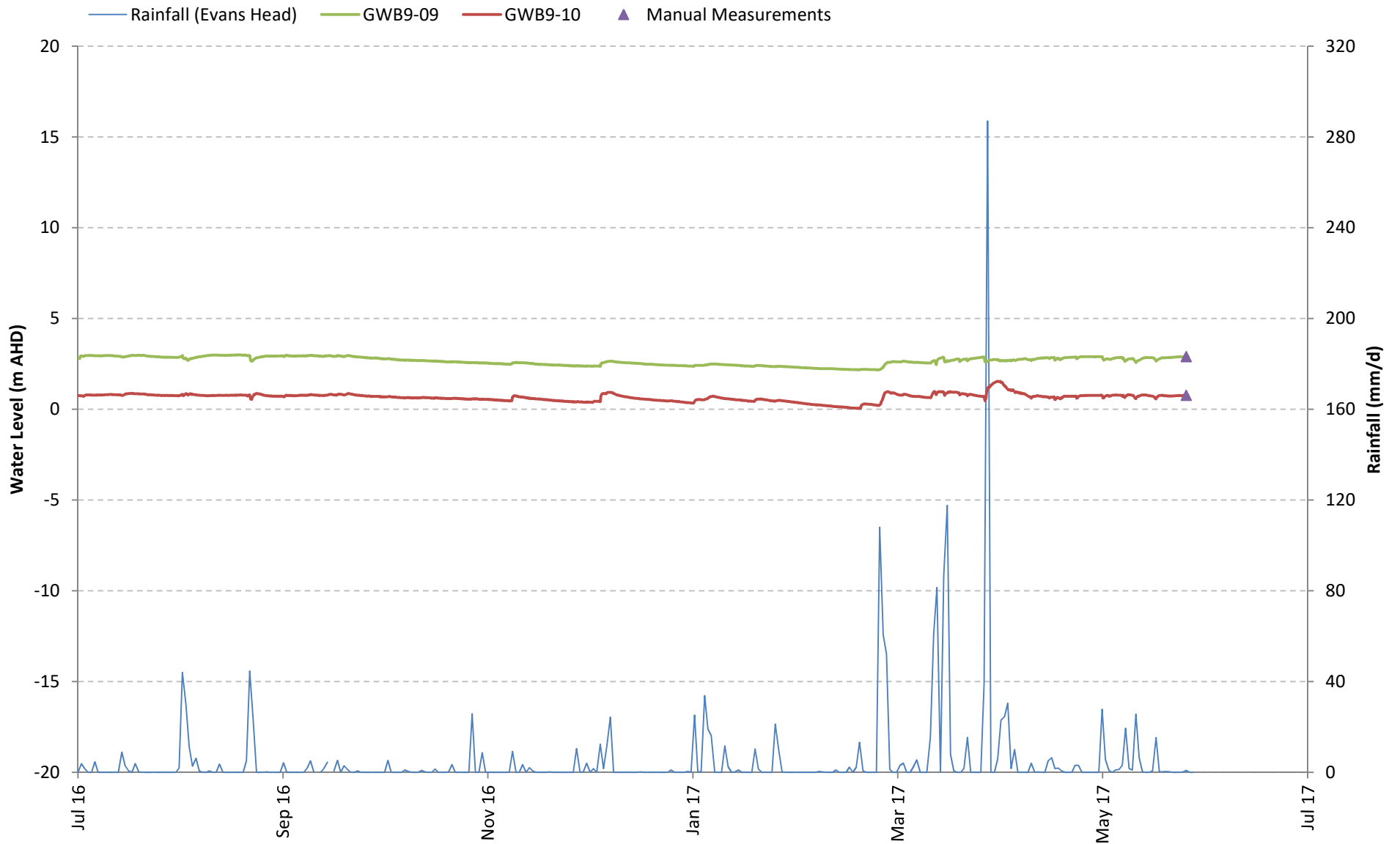
GWB9-05 & GWB9-06 Water Levels



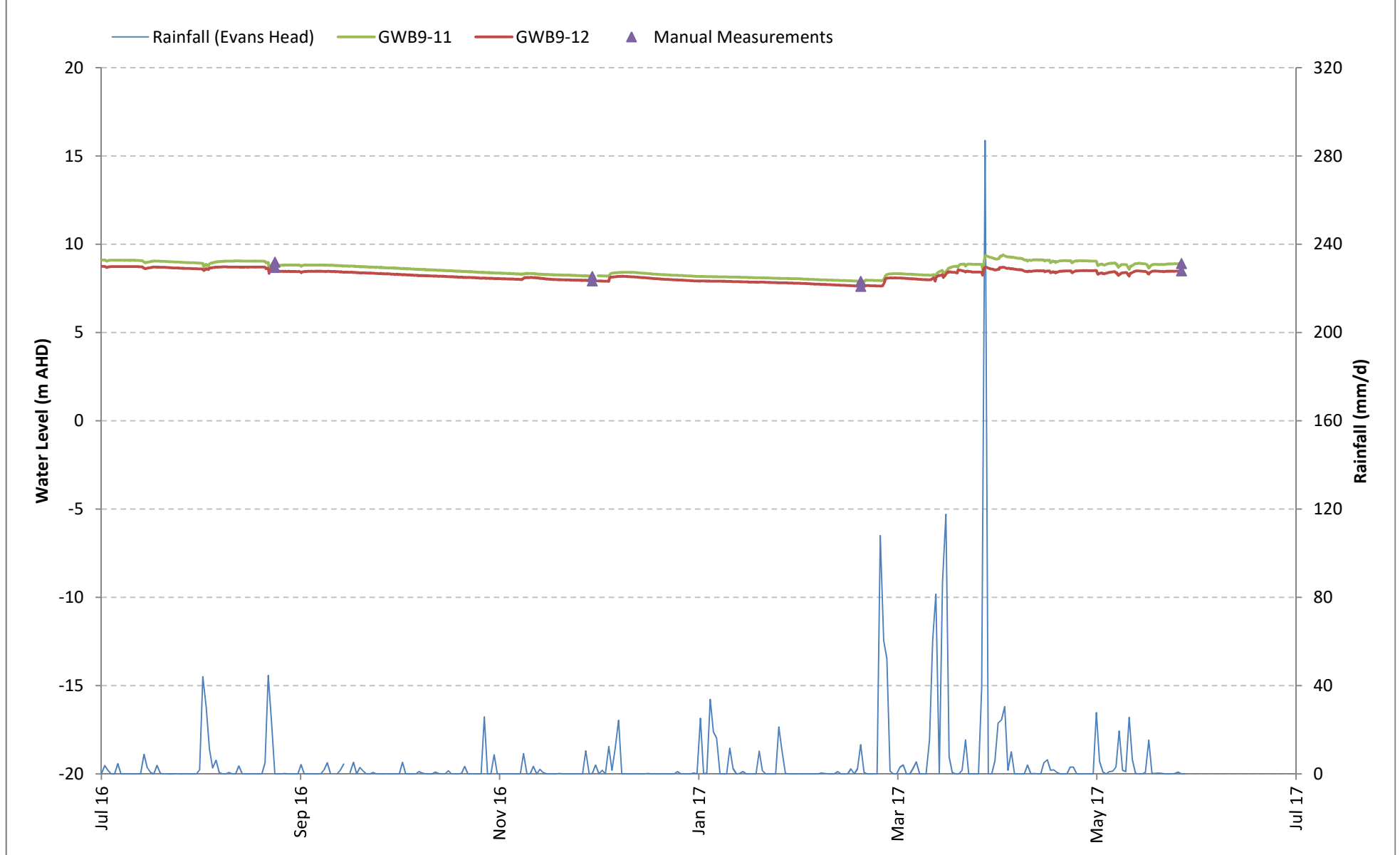
GWB9-07 & GWB9-08 Water Levels



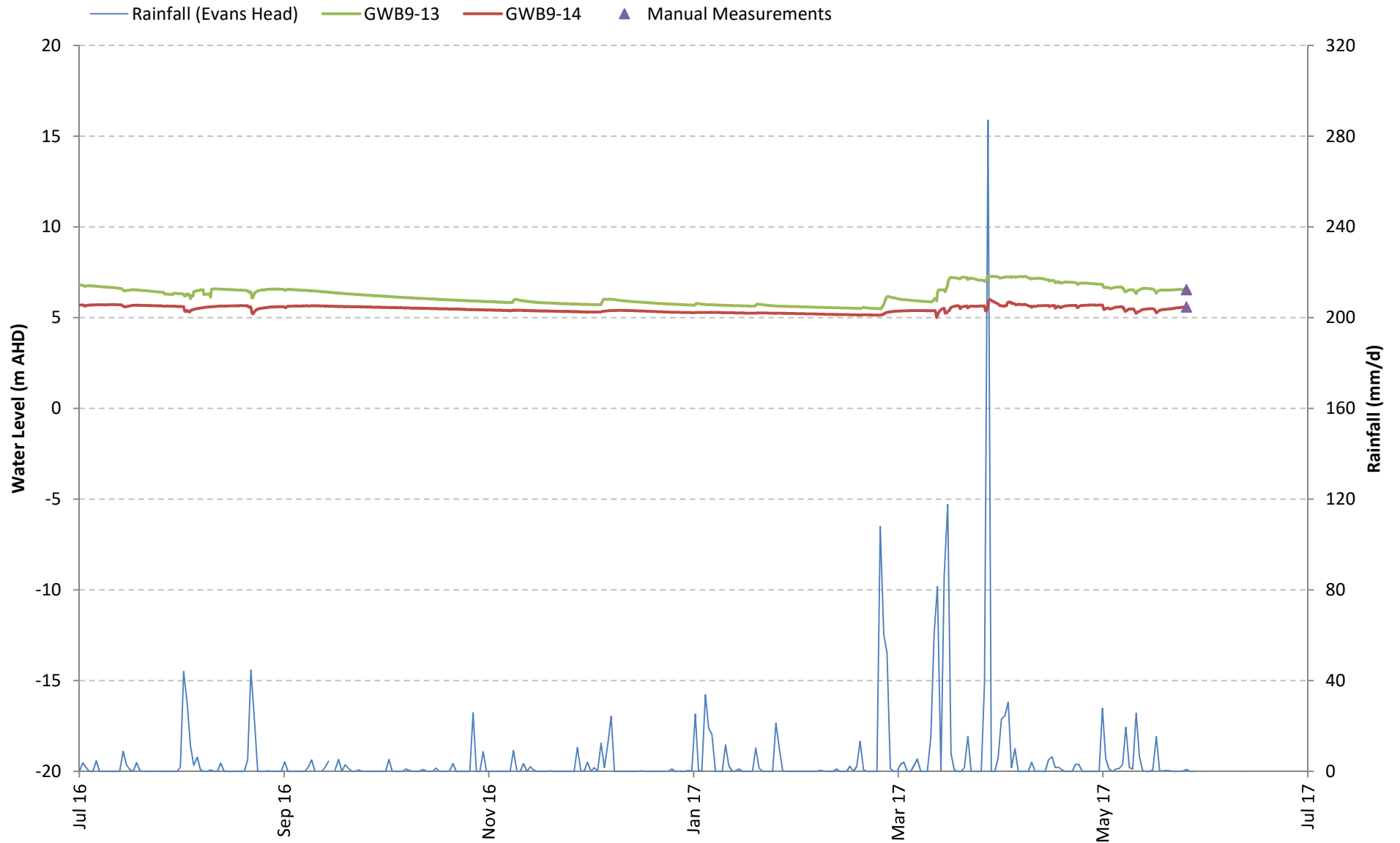
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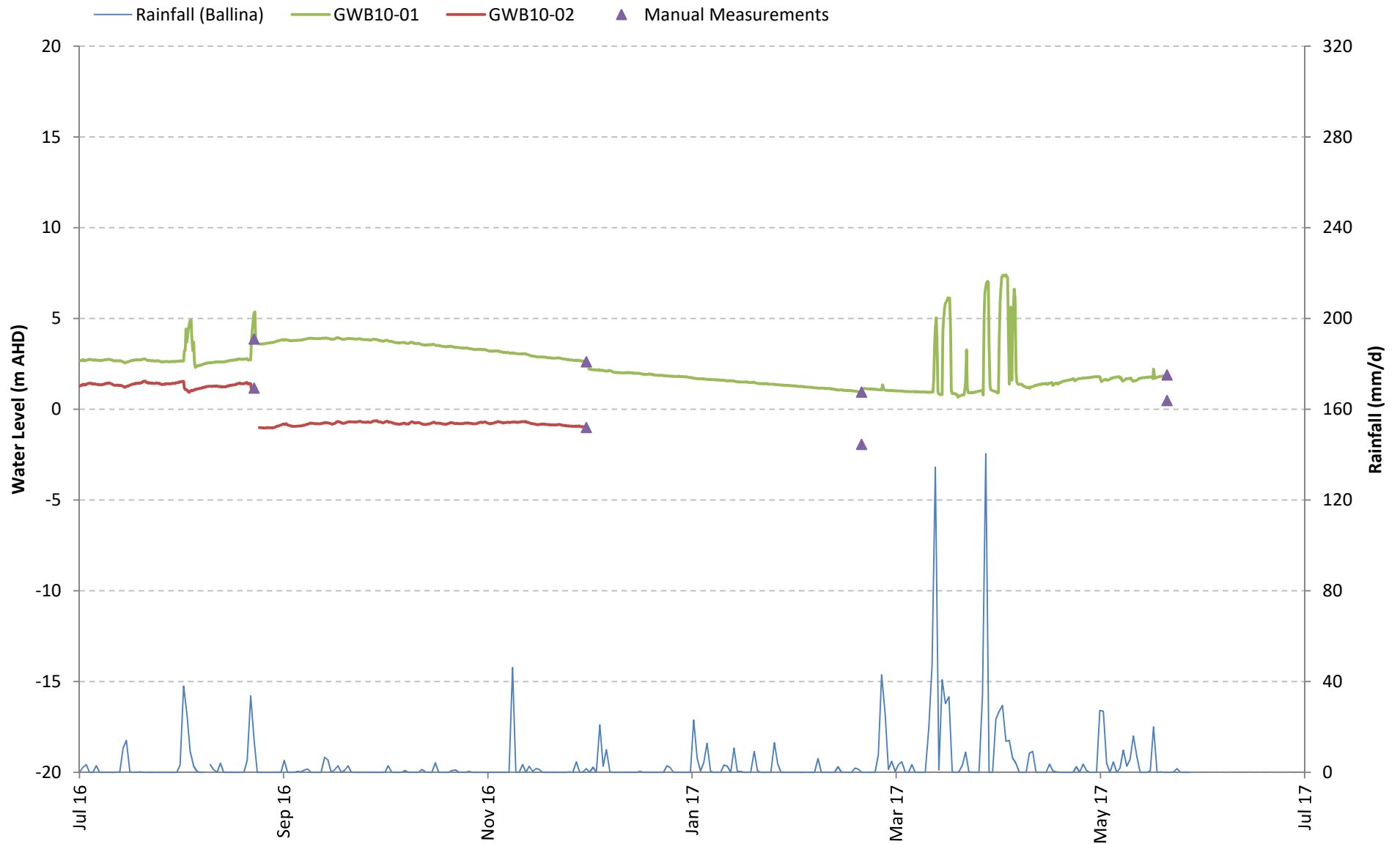
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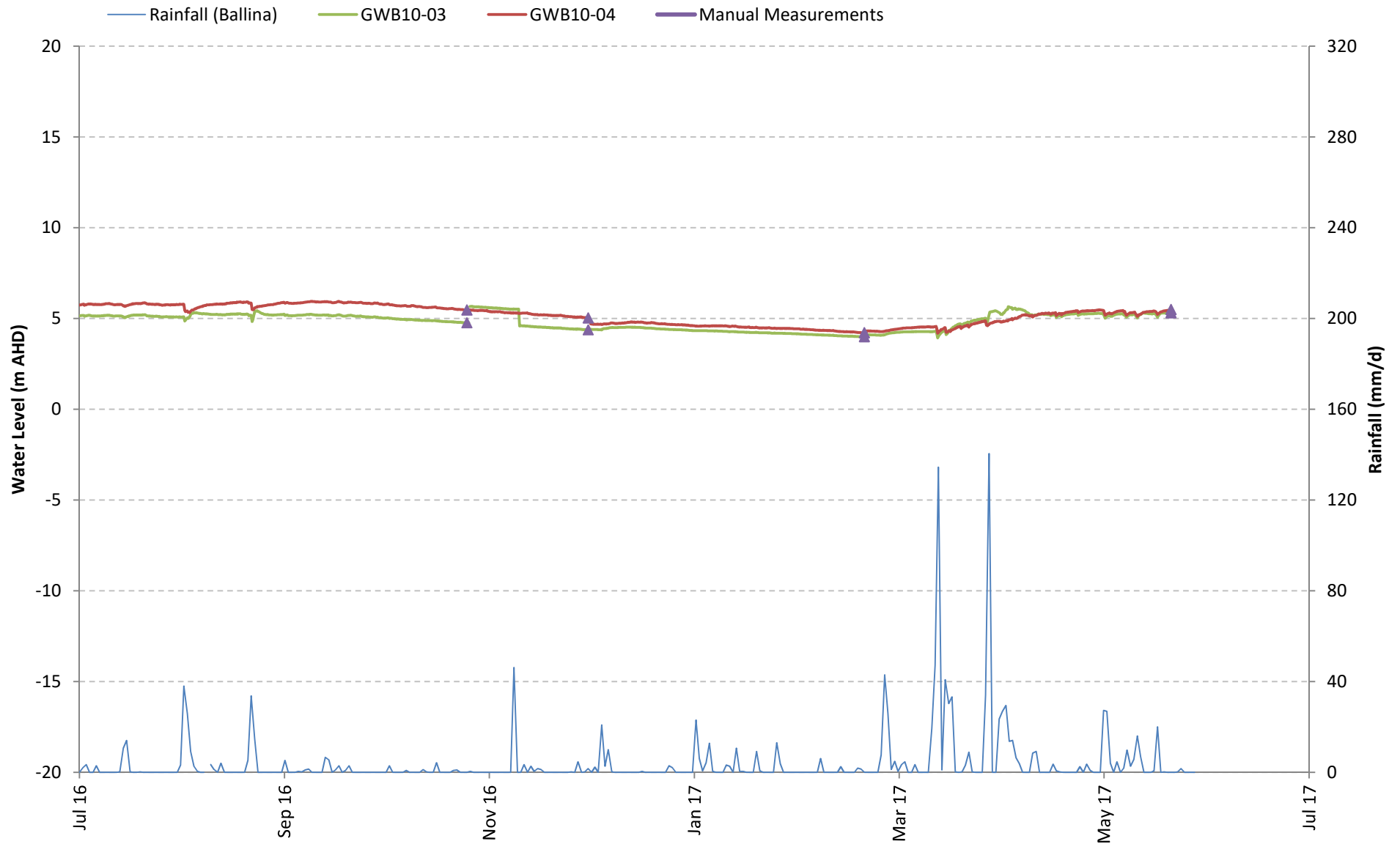
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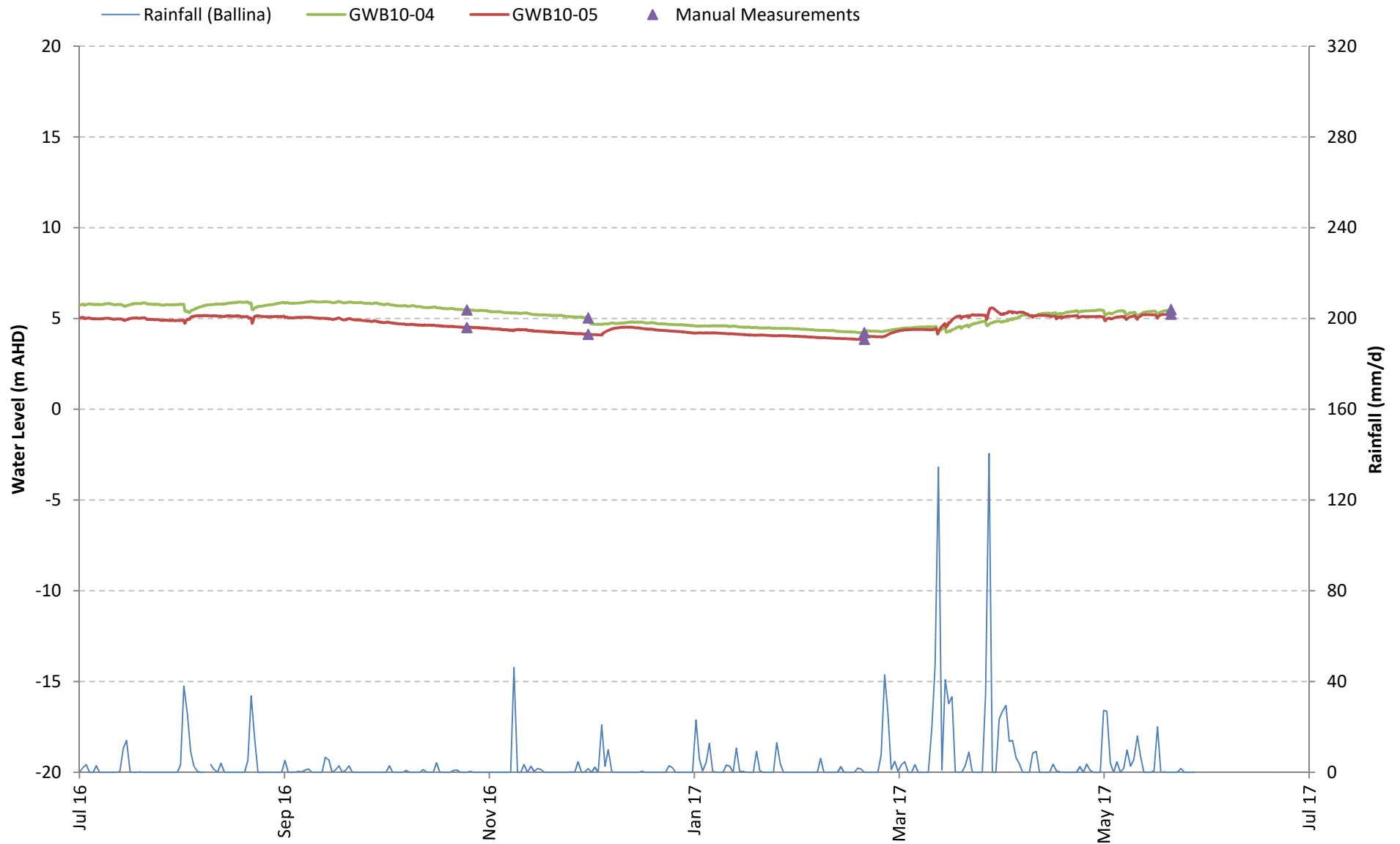
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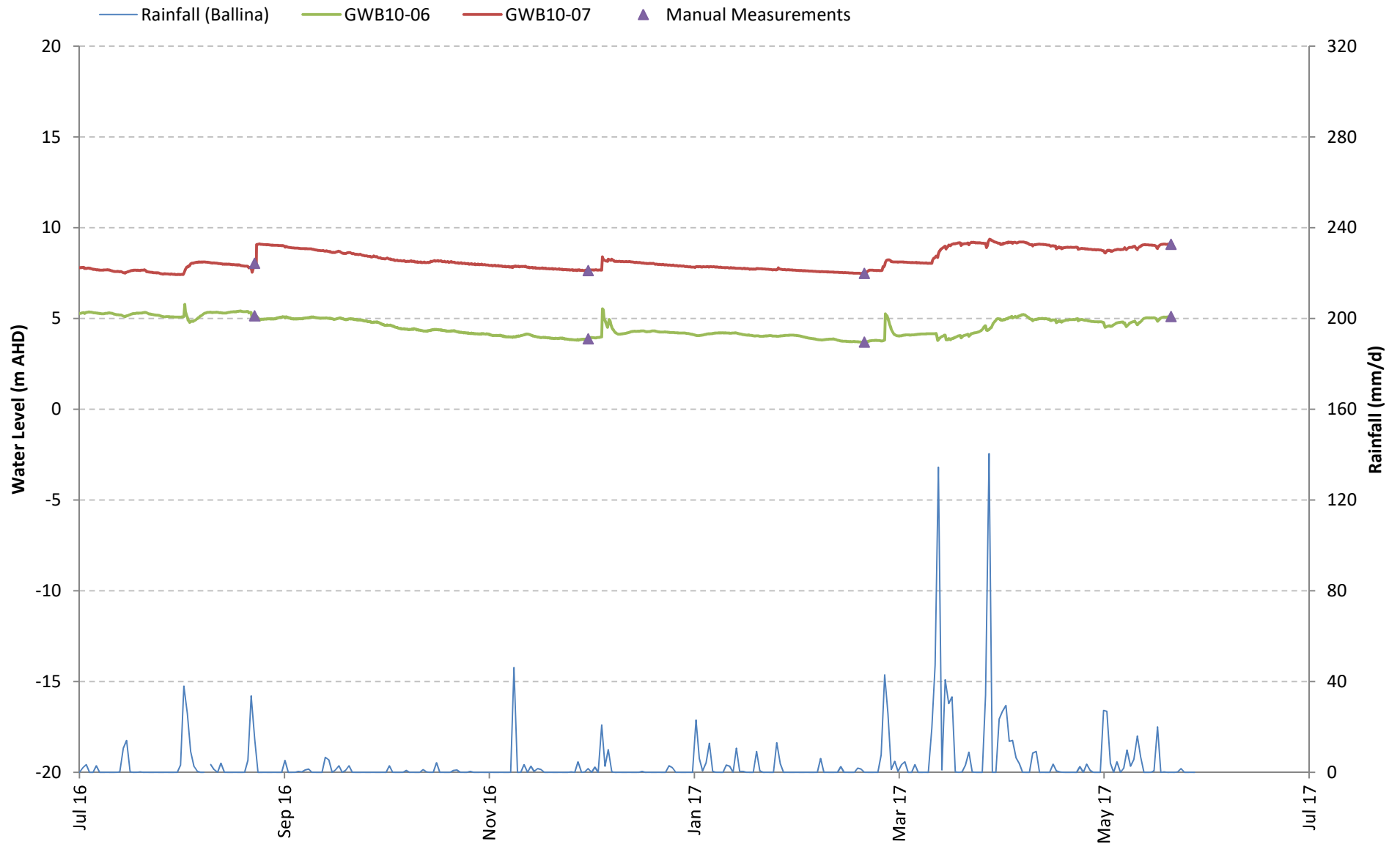
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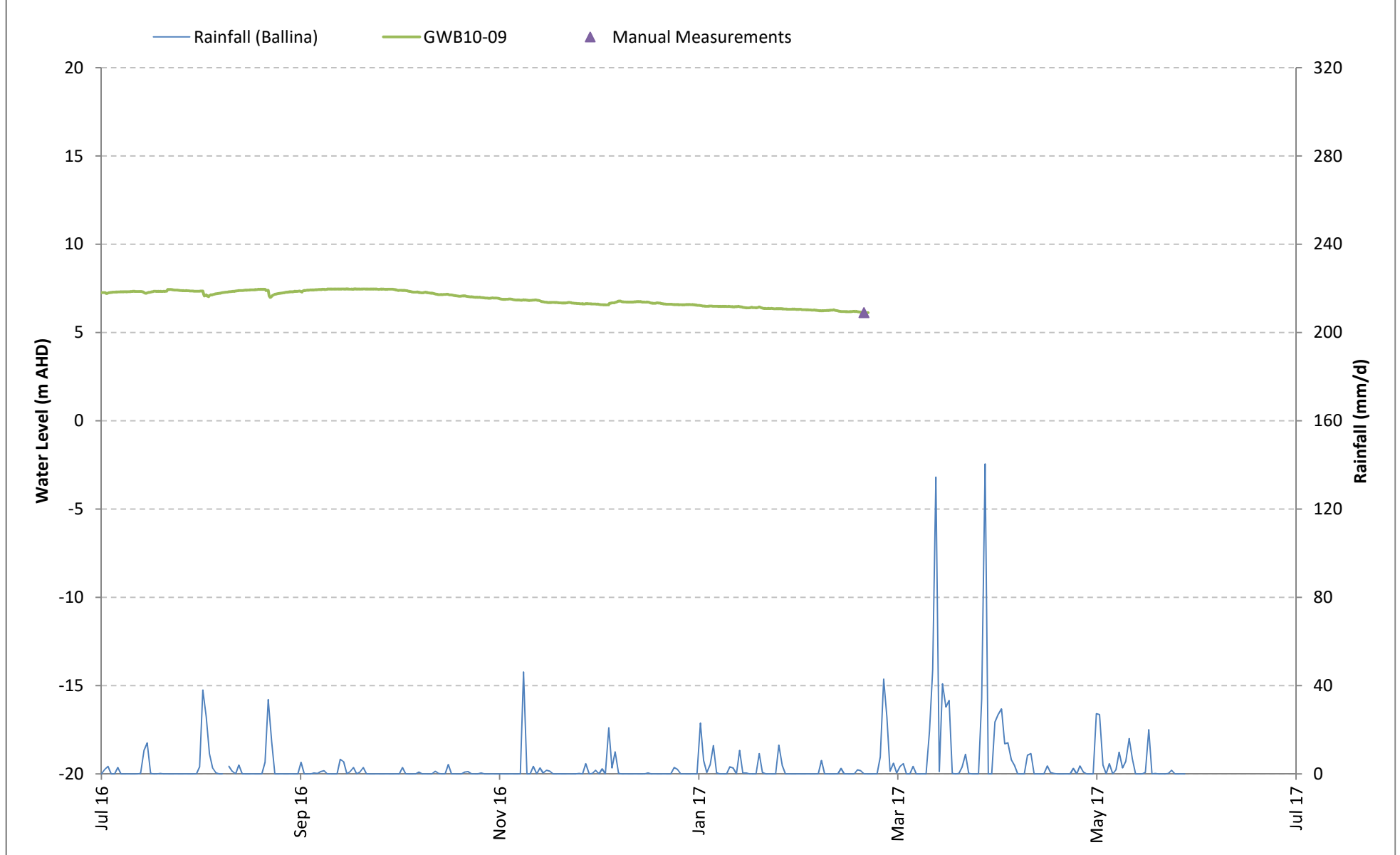
GWB10-04 & GWB10-05 Water Levels



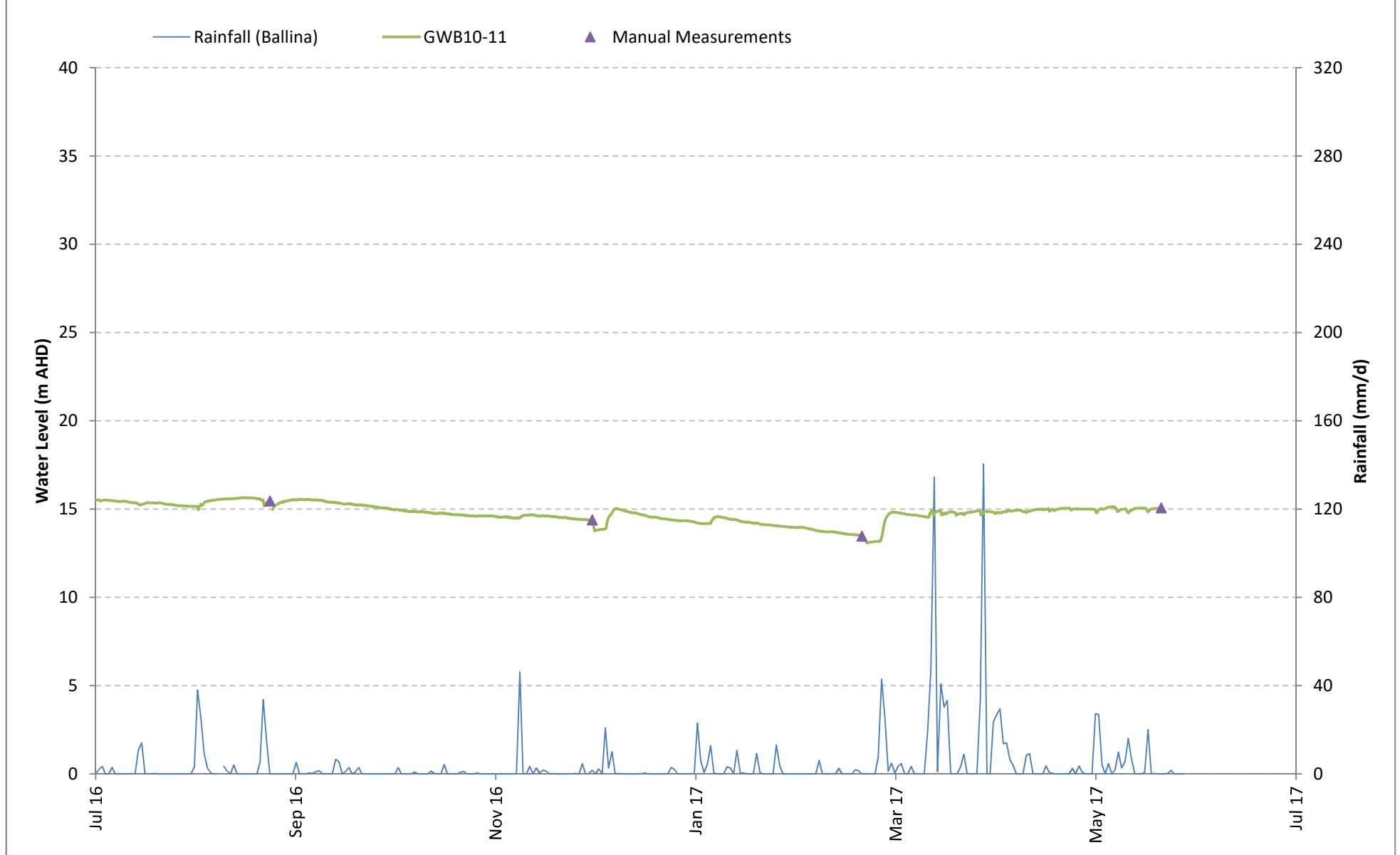
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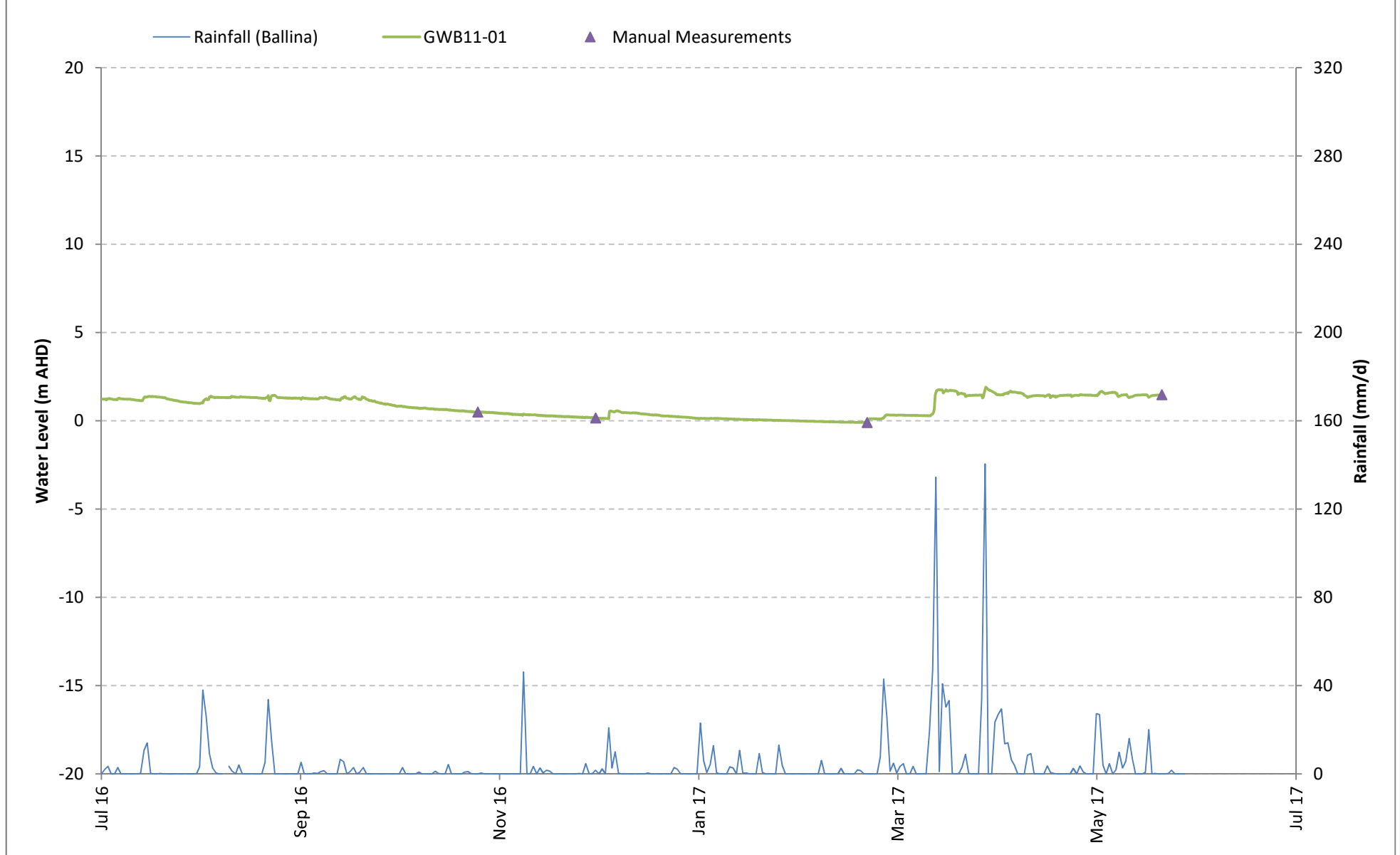
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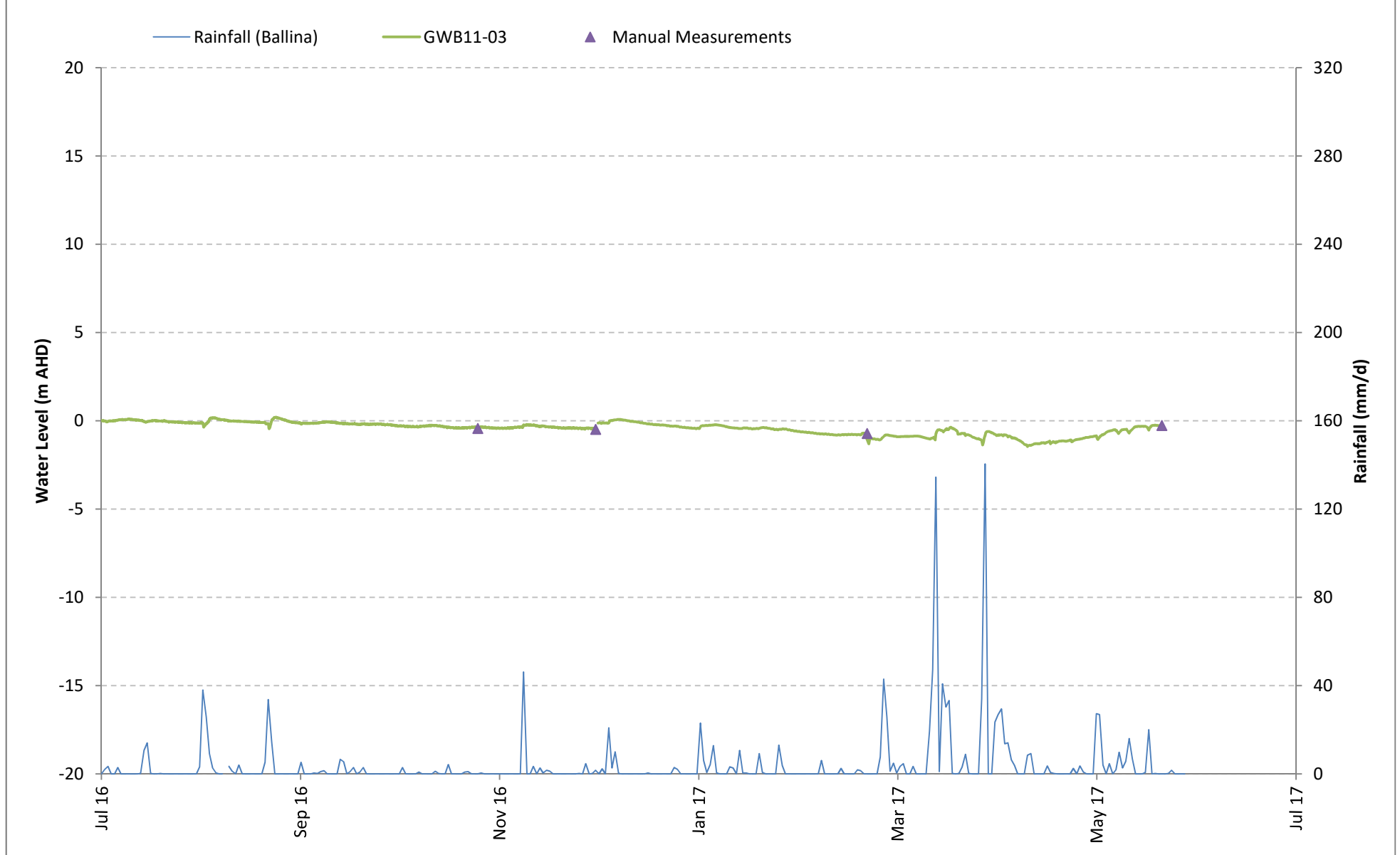
GWB10-11 Water Level



GWB11-01 Water Level



GWB11-03 Water Level





Appendix H

Incidents with Potential Water Impacts

Incident Summary (provided by Pacific Complete)						Assessment for correlation with water quality results			
Date of Event	Summarise the Event Details	Exact Location	Affected environmental media / receptor	Incident located ≤50m to nearest waterway / drain	details of nearest waterway / drain	If incident involved hydrocarbon (or liquid waste) spill more than 50 m from a waterway/drain, was the spill greater than 5 L?	Closest surface water monitoring site (and approx. distance and bearing from spill)	WQMP Results of Interest (for relevant parameter) within 1 month following the incident?	Potential correlation between incident and WQMP Results of Interest?
1-Jul-16	A dozer was pushing up material in cut when a hydraulic hose blew. The spill was very minor and contained on-site in the immediate area. The spill was cleaned up and placed into the hydrocarbons bin at the main compound.	Approximately 29 30'15.34S and 153 12'07.75E. 211m from the roadside table drain.	Ground	no		no			
1-Jul-16	A hydraulic hose blew on a loader whilst working in the Greenhill Cut. The spill was <20L and was contained within the immediate area of the loader and did not leave the site. The spill was cleaned up with 3 bags of contaminated soil placed into the hydrocarbons bins at the main compound.	Approximately 29 30'15.34S and 153 12'07.75E. Located 173m from roadside drain. [Approx Ch 76800]	Ground	no		yes	SW4-04 (approx. 1.8 km S)	no	
4-Jul-16	Minor fuel spill (approximately 2L) from scraper. The spill was contained and spill kit absorbent material was applied.	McIntyres Lane site compound, east of access. 150m north of spill is a cane drain	Ground	no		no			
9-Jul-16	A hydraulic hose blew on the pozi-track spilling 40 litres of hydraulic oil. Works ceased immediately and the crew were quick to contain the spill with booms, rags and pads. The spill was cleaned up and loaded into a truck and covered with plastic whilst being transferred to the licensed landfill facility at Grafton for disposal.	Within the Tyndale EEC	Ground	yes	Not a waterway, but occurred within the EEC	na	SW3-23 (approx. 1.7 km SW)	no	
9-Jul-16	A backhoe was using hoe to heap up left over material when it was observed that there was an oil leak near the back of the large front bucket. 40 litres of hydraulic oil spilled on embankment fill. The spill did not leave the site or enter any adjacent waters. The hose was replaced and the spill cleaned up. Contaminated soils were placed into same truck that had sand from earlier spill and disposed of at the licensed landfill facility at Grafton.	Approximately Chainage 85520, Fill 5-4. 25 meters from pond site water within our controls and 115m from existing water course.	Ground	no		yes	SW5-04 (< 150m E)	no	
13-Jul-16	A tree harvester operated by the clearing contractor bust an o-ring, resulting in a small quantity (approx. 10L) of hydraulic fluid being spilt on site. The spill was contained and cleaned up.	Causleys Cut (CH78300)	Ground	no		yes	SW4-06 (approx. 1.3 km N)	no	
14-Jul-16	A small quantity of diesel (approx. 5L) spilled to the ground from the release valve on a scraper parked within the site compound.	McIntyres Lane Site Compound, east of access road - 150m to the cane drain north east of the work area	Ground	no		no			

Incident Summary (provided by Pacific Complete)						Assessment for correlation with water quality results			
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21-Jul-16	A minor overflow of ablutions storage tank, approximately 20L. The pump was manually restarted and plumbing contractor contacted to attend to resolve. Spill contained and cleaned up.	McIntyres Lane Site Compound. 150m from a cane drain, NE of works area. [Ch 77000]	Ground	no		yes	SW4-04 (approx. 2.0 km S)	no	
27-Jul-16	A hydraulic hose broke whilst moving drill rig into new position. The track on the drill had come off and the hydraulic hose blew off when the drill rig was raised to fix the drill. The machine was shut down immediately and a spill kit was used to control the small amount of fluid that was dripping from the hose.	Portion C, Section 8 near chainage 129700	Ground	no		no			
28-Jul-16	Diesel was observed to have leaked to ground (compacted embankment fill) from a recently refueled Dozer. The Dozer had been fuelled up that morning but hadn't been started for the day. The fuel has expanded with the rising heat of the day and leaked onto the embankment fill. There was no risk to runoff offsite or to a waterway.	Fill 5-4 - Wave 1	Ground	no		no			
28-Jul-16	A small hydraulic leak was identified from the watercart as it was performing dust suppression / moisture condition of material on embankment fill 6-5. Less than 1l was spilt to ground. Minor repairs were made to the water cart to fix the leak and impacted material from the spill was cleaned up and disposed of to a licenced facility. There was no risk to runoff offsite or to a waterway.	Wave 1 Fill 6-5	Ground	yes	clean water drain	na	Unable to determine location of incident.		
1-Aug-16	During re-fuel of fuel truck, there was an overflow resulting in diesel spill to the ground. Approx. 10L of diesel was spilt, 150m from the nearest cane drain.	McIntyres Lane site compound, Laydown Yard, Re-fuel area	Ground	no		yes	SW4-04 (approx. 2 km S)	no	
2-Aug-16	Whilst undertaking rock breaking activities, an excavator hydraulic hose burst, resulting in hydraulic fluid spill to ground (Approx. 5L). The spill occurred 680m from Crackers Drain.	Tyndale, CH69150	Ground	no		No			
15-Aug-16	While undertaking geotechnical drilling works, the drill head winch cable got caught on a hydraulic fitting. The applied pressure lead to the metal fitting splitting and approx. 200mL of hydraulic oil squirting out, spraying oil 5m from the machine. Some oil went into the cane drain north of the drill site and also sprayed onto some Lantana nearby.	4BH3067 at 6739427N 520028E, located between Edwards Creek and cane drain, west of the Pacific Highway - Portion A, Section 4	Ground	yes	Waterway	na	SW4-06 (approx. 130 m W)	no	

Incident Summary (provided by Pacific Complete)						Assessment for correlation with water quality results			
Date of Event	Summarise the Event Details	Exact Location	Affected environmental media / receptor	Incident located ≤50m to nearest waterway / drain	details of nearest waterway / drain	If incident involved hydrocarbon (or liquid waste) spill more than 50 m from a waterway/drain, was the spill greater than 5 L?	Closest surface water monitoring site (and approx. distance and bearing from spill)	WQMP Results of Interest (for relevant parameter) within 1 month following the incident?	Potential correlation between incident and WQMP Results of Interest?
17-Aug-16	During earth works, a D10 Dozer hose burst resulting in approx. 20L of hydraulic fluid spilling to the ground. The spill occurred 680m from Crackers Drain.	Tyndale Cut	Ground	no		yes	SW3-23 (approx. 1.9 km SW)	no	
19-Aug-16	During push up operations at Mororo Cut the Dozer blew an 'O' ring resulting in a spill of hydraulic oil to ground of less than 10L. The works were stopped, the machine isolated and the spill contained and cleaned up. There was no risk to runoff offsite or to a waterway.	Wave 1 - Mororo Cut	Ground	no		yes	SW6-02 (approx. 1 - 1.5 km SSE)	no	
24-Aug-16	Significant rainfall (91mm in total) was received on site in less than 12 hours (greater than 64mm ie. 5 day 90th percentile event) resulting in clean water bunds, site water bunds and mulch bunds around stockpiles, overtopping. A post rainfall inspection and water quality monitoring was undertaken and the event was deemed not to have caused environmental harm.	Wave 5C area between chainage 114,100 and 115,500. Tabbimoble floodway located within 50m.	Surface Water	Yes	Tabbimoble Floodway	na	SW7-02 (approx. 170 m S)	no	
29-Aug-16	Hose to drill rig burst resulting in hydraulic fluid spilling to the ground. Approx. 8 litres of fluid. The hose burst due to wear and tear.	Goodwood Site -CH080420 - Western side of Pacific Highway. Drain adjacent to road approx. 80m. Clarence River 140m.	Ground	no		yes	SW4-06 (approx. 250 m S)	no	
29-Aug-16	Hose to drill rig burst resulting in hydraulic fluid spill of 8L to ground. The spill occurred 80m from a drain adjacent to the road.	Goodwood site. CH80420 Western side of Pacific Highway	Ground	no		yes	SW4-06 (approx. 250 m S)	no	
1-Sep-16	Minor spill of 1L of diesel to the ground from mobile generator. The generator was being moved at the time. The spill occurred 40m from Shark Creek.	Shark Creek North Works Site CH75000	Ground	yes	Waterway	na	SW4-04 (approx. 70 m S)	no	
1-Sep-16	A hydraulic hose ruptured on a front end loader whilst moving pipe, causing hydraulic oil (<2L) to drip down through the chassis and onto the fill and rock access track. The leak occurred approx. 700m south (approx. CH130,000) of the Tuckombil Canal.	Wave 4 works site (approx. CH130,000)	Ground	no		no			
2-Sep-16	While undertaking excavator works, 1.5L of Hydraulic Fluid spilled to the ground from the 12tn excavator. The spill was 380m from the Clarence River (intersected by Pacific Highway)	Tyndale stockpiling site CH69400	Ground	no		no			

Incident Summary (provided by Pacific Complete)						Assessment for correlation with water quality results			
Date of Event	Summarise the Event Details	Exact Location	Affected environmental media / receptor	Incident located ≤50m to nearest waterway / drain	details of nearest waterway / drain	If incident involved hydrocarbon (or liquid waste) spill more than 50 m from a waterway/drain, was the spill greater than 5 L?	Closest surface water monitoring site (and approx. distance and bearing from spill)	WQMP Results of Interest (for relevant parameter) within 1 month following the incident?	Potential correlation between incident and WQMP Results of Interest?
3-Sep-16	During refueling of a generator associated with a Ancillary Facility (Site Office), <2L of diesel was spilt and lost to the ground (imported rock pad layer). Following observation of the spill, the impacted material was cleaned, bagged and placed in the contaminated waste bin.	The Wave 4 - Site Office Compound (Ancillary Facility 8-1).	Ground	yes	Tuckombil Canal	na	SW8-02 (approx. 250 m E)	no	
5-Sep-16	Plant operator noticed a pad foot roller which was parked up onsite was leaking oil to the embankment fill (6-7). It is estimated approx. <1L of oil had spilt to the compacted embankment. A spill kit was used to contain and cleanup the impacted material for disposal at a licenced facility.	Wave 1 - Fill 6-7	Ground	yes	clean water drain	na	Unable to determine locatation of incident.		
13-Sep-16	Minor spill while undertaking concrete pumping, approximately spilled 10L to the ground. The spill occurred 15m from Sharks Creek.	Sharks Creek South work site	Ground	yes	Waterway	na	SW4-04 (approx. 15 m N)	no	
15-Sep-16	During the mobilization check of a screening plant, the fitter undertaking the inspection observed a small oil leak on the stabilization leg. As a result a small amount of hydraulic oil was observed spilt to ground on the former RMS highway hardstand (onsite). There was no risk to runoff offsite.	RMS former hardstand / laydown inside the Mororo Cut worksite footprint	Ground	no	Waterway	no			
19-Sep-16	While undertaking crane set up a minor hydraulic oil spill (0.2L) to the ground occurred. The spill was 10m from Sharks Creek water way. The spill was caused by a weak point in a hose sleeve of the crane. The crew identified the issue during set up.	Shark Creek North crane pad	Ground	yes	Waterway	na	SW4-04 (approx. 40 m S)	no	
21-Sep-16	On completion of unloading of general fill onto the southern embankment from the dog trailer of a HV. The dog trailer was lowering back to resting position when the hydraulic hose to the dog trailer ruptured causing the hydraulic oil to spill to ground (fill). The spill (30L of hydraulic oil) occurred over 400m to the nearest drainage line.	Wave 4 - Southern Embankment (CH129,500)	Ground	no		yes	SW8-02 (approx. 550 m NE)	no	
7-Oct-16	Minor hydraulic fluid spill of 0.5L to ground when excavator bucket was being changed out. A hose became loose resulting in the spill. The hose was re-secured before works recommended.	Tyndale Cut - 680m from a farm drain	Ground	no		no			

Incident Summary (provided by Pacific Complete)						Assessment for correlation with water quality results			
Date of Event	Summarise the Event Details	Exact Location	Affected environmental media / receptor	Incident located ≤50m to nearest waterway / drain	details of nearest waterway / drain	If incident involved hydrocarbon (or liquid waste) spill more than 50 m from a waterway/drain, was the spill greater than 5 L?	Closest surface water monitoring site (and approx. distance and bearing from spill)	WQMP Results of Interest (for relevant parameter) within 1 month following the incident?	Potential correlation between incident and WQMP Results of Interest?
12-Oct-16	A minor hydraulic fluid spill (0.5L) to the ground occurred whilst changing over excavator tilt buckets. A hose became loose resulting in the spill. The spill occurred 200m from a farm drain.	Tyndale North CH70200	Ground	no		no			
15-Oct-16	A hydraulic spill of 0.2L to the ground occurred when a Pozi Track was moving R31 rocking. A hose of the pozi track was caught on the rocking and became loose. The spill occurred 300m from the nearest farm drain.	Causleys to Edwards adjacent to BP access road.	Ground	no		no			
29-Oct-16	22T excavator burst a hydraulic hose, spilling 5L of hydraulic fluid. The incident occurred whilst undertaking ERSED works adjacent to the new compound site at Tyndale. The spill was 20m from the nearest sensitive receiver/waterway.	CH 67400	Ground	yes	Waterway	na	SW3-23 (approx. 600 m NW)	no	
31-Oct-16	Minor spill (approximately 5 litres) lost from an Articulated Dump truck reversing up a stockpile ramp to tip a load. Closest waterway is 50m to the road side drain and >1klm from the Tabbi Floodway 1.	The incident occurred at CH114,350. Closest waterway is 50m to the road side drain and >1klm from the Tabbi Floodway 1.	Ground	yes	Roadside drain	na	SW7-02 (approx. 500 m S)	no	
1-Nov-16	Operator of clearing crew, observed a small oil leak from the grinder during the daily pre-start inspection. The operator with the fitter removed a plate to find hose fitting was slowly dripping. Approximately 1L of oil was spilled. The closest watercourse was an old farm drain, 33m uphill from the spill.	Approx CH 66770 514221 6728883	Ground	yes	Old farm drain, uphill from the spill	na	SW3-23 (approx. 1.5 km NW)	no	
3-Nov-16	Potential Cat 2 oil spill from watercart operating at Mororo Cutting Wave 1. Pump seal failed. Approximately 15L of oil spilled to Mororo Fire Trail sealed surface and acceleration lane (south gate sealed surface). Oil did not leave site. Contractor used spillkit consumables and a sweeper cart to remove residual hydrocarbons. Affected material was disposed of at a licensed waste facility.	Portion B Wave 1, Mororo Cutting, Mororo Forest Fire trail (Gate 10 entry) and south site exit acceleration lane.	Ground	no		yes	SW6-02 (approx. 1.7 km SSE)	no	
3-Nov-16	A Quarry trucks diesel cap loosened and fell off resulting in a diesel spill at 2 locations. A maximum of 10L of diesel was lost to the road.	Gate 130 exit on Watson Street. CH130,300 Offset - 680.	Ground	no		yes	SW8-02 (approx. 700 m SE)	no	

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8-Nov-16	While undertaking earthworks, the leading hand observed diesel stained soil around the pump of the clearing crew service truck. Approx. 100L of oil had spilled to the ground. The spill was 25m from the nearest sensitive receiver/watercourse. Immediately a spill kit was deployed and environmental crew notified.	CH 67150	Ground	yes	Waterway	na	SW3-23 (approx. 780 m NW)	no	
9-Nov-16	A water truck (used for copolymer soil binder application for erosion protection) was parked up overnight at the Chatsworth Compound. The truck had a leak. Subsequent wet weather washed leaked soil binder product from the hardstand into a nearby clean water drain within the Project Boundary. Affected water ponded in the drain within the site. The contractor estimates approximately 20L of soil binder leaked. The contractor pumped the affected water out for use as construction water on embankment fills.	Chatsworth Compound, hardstand area adjacent fill 6-9. Affected drain east-west clean water drain north end of fill 6-9.	Surface Water	no		yes	SW5-08 (approx. 1.3 km S)	no	
11-Nov-16	A hydraulic oil spill occurred during soil wick installation. It was noticed there was some damage to one of the hoses and there was approx. 1L of oil spilled to the rock fill material. The spill occurred 30m from the nearest cane drain.	CH80750 East of Highway	Ground	yes	Cane drain	na	SW4-06 (approx. 620 m S)	no	
15-Nov-16	Small hydraulic lead observed during daily pre-start inspection on the heavy plant. Operator observed environmental staff driving through cut and notified them. <1 L of hydraulic oil spilled to the ground, 60m from the closest clean water drain.	Approx. CH66815 514356 6728905	Ground	no		no	SW3-23 (approx. 1 km NW)	no	
16-Nov-16	A small oil leak was observed on excavator during clearing and mulching works. The operator had a tub nearby and placed under the machine to collect the remaining 3-5L that continued to leak whilst the hose was repaired. Approximately 300mL of hydraulic oil spilled to the ground, and <5L into the tub. The spill was 150m from a low lying wet area. The spill did not leave site.	Approx. CH64600	Ground	no		no			

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Date of Event	Summarise the Event Details	Exact Location	Affected environmental media / receptor	Incident located ≤50m to nearest waterway / drain	details of nearest waterway / drain	If incident involved hydrocarbon (or liquid waste) spill more than 50 m from a waterway/drain, was the spill greater than 5 L?	Closest surface water monitoring site (and approx. distance and bearing from spill)	WQMP Results of Interest (for relevant parameter) within 1 month following the incident?	Potential correlation between incident and WQMP Results of Interest?
17-Nov-16	A minor leak from a hydraulic hose on a geotech rig operating on Watts Lane lead to a hydrocarbon spill of approximately less than 500ml. The spill went to the asphalt shoulder of the road and was contained and cleaned up using spill kit consumables. The spill did not leave site. The affected material was bagged for lawful disposal at a licensed waste facility.	Watts Lane, Chatsworth Island.	Ground	no		no			
19-Nov-16	Sub-contractor leading hand noticed diesel spill stain around a service truck whilst undertaking earth works. Spill was immediately contained and environmental team notified. Approx. 70L of diesel spilled to the ground, 25-30m from the nearest watercourse/sensitive receiver.	CH67150	Ground	yes	Waterway	na	SW3-23 (approx. 800 m NW)	no	
30-Nov-16	Diesel (<10lts) overtopped the internal bund within a trailer mounted six inch pump, dripping diesel onto the bitumen scattercoat. approx. 20m from waterways but did not enter.	Southern side of Tabbimoble floodway No.1 CH115280 (within the 50m OPP exclusion zone)	Ground	yes		na	SW7-04 (< 50 m N)	no	
17-Jan-17	Minor spill of hydraulic fluid (5L) to the ground from Moxy during the transportation of material to stockpiles due to burst hydraulic hose. No environmental harm resulted from the spill. The spill occurred more than 200m from the nearest farm drain.	Tyndale adjacent to stockpile #12, within the works footprint, project boundary and EPL boundary.	Ground	no		no			
17-Jan-17	A minor spill (5L) of hydraulic fluid to the ground from 8tn digger, due to a burst hydraulic hose. No environmental harm resulted from the spill. The spill occurred 500m from the Clarence River.	Gallaghers Lane, within the works footprint and project/EPL boundaries.	Ground	no		no			
18-Jan-17	A diesel leak was observed on the ground beneath an work ute parked in the car park. Approximately 15L of diesel had leaked. The spill was 52m to the nearest clean water drain.	Approx. 514407 / 6729293 CH67235	Ground	no		yes	SW3-23 (approx. 800 m NW)	no	
19-Jan-17	A 1L oil bottle identified to have been run over, leaving a small amount of oil residue (<0.5L) on the ground. Cleaned up the residue using spill absorbent pads and placed these pads, contaminated soil and container within a regulated waste bag. The spill occurred in a previously disturbed area away from drains or waterways.	Access track between main site compound and storage containers, within AFHJV project boundary. CH87500.	Ground	yes	Cane drain	na	SW5-06 (approx. 1.1 km S)	no	

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20-Jan-17	A hydraulic line failure occurred on a truck trailer when delivering fill for Main Site Compound Platform. Hydraulic hose failed when lowering trailer. Less than 5L of hydraulic oil was spilt and cleaned up immediately with spill absorbent material. Truck delivery driver secured hydraulic hose to prevent further spills and left site to repair hose.	Main site compound rock platform. Chainage 87600.	Ground	yes	Cane drain	na	SW5-06 (approx. 1.1 km S)	no	
24-Jan-17	Whilst undertaking haulage, a truck and dog oil sump was damaged, releasing 5-10L to the ground at Greenhills North. The truck and dog ran over a large rock, causing the spill. The operator identified the spill immediately. The spill occurred 100m from existing drainage feature, but ground slopes away from this drainage feature.	Greenhills Golding Cut CH76600	Ground	no		yes	SW4-04 (approx. 1.6 km S)	no	
24-Jan-17	A machine was shearing timber into smaller pieces before being loaded into the mulcher when a hydraulic hose burst. Approximately 5L of oil was released, with 2L spilling to the ground. The spill was 200m away from the nearest waterway or sensitive receiver.	CH 58500	Ground	no		no			
24-Jan-17	Up to 140L of hydraulic fluid leaked from a fill delivery truck along the length of the access road, following rupture at the frog hygiene wheel wash. The spill occurred 50m from the closest sensitive receiver/watercourse.	Between the frog hygiene wheel wash and entrance to the compound 29.35555 S & 153.246580 E TO 29.355690 S & 153.246920 E	Ground	yes	Waterway	na	SW5-11 (approx. 400 m S)	no	
1-Feb-17	A routine water quality check was conducted on basin. Water noted to be pooling in a sump depression below the spillway. This had just filled and was holding water. The inspection confirmed no sediment loss outside project boundary.	CH66490 on the south side of cut 30	Surface Water	yes	Un-named dry drainage line	na	SW3-23 (approx. 1.4 km S)	no	
1-Feb-17	An oil leak from a grader was discovered when parked up on the main site compound rock platform. Less than 1L of hydraulic oil was leaked and cleaned up immediately with spill absorbent material. Grader was repaired to prevent further spills.	Main site compound rock platform. Ch87600.	Ground	yes	Cane drain	na	SW5-06 (approx. 1.2 km S)	no	

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2-Feb-17	During works to realign and install culverts an inspection identified a number of deceased fish in the adjacent cane drain. Water quality monitoring was undertaken throughout dewatering works (pre/post/during) and all dewatering/de-fishing works were supervised by the Project Aquatic Ecologist. De-fishing of the cane drain was not undertaken, as per advice from the Project Aquatic Ecologist. The ambient and water temperature was high on the day of the dewatering (approx 30 - 34C). Advice from the Aquatic Ecologist suggested that mobilization of monosulphidic black ooze (MBO) and subsequent deoxygenation of the water was the root cause for the incident.	The incident occurred in an unnamed cane drain within the Approved Project Boundary, located between CH 131,100 - 131,140.	Fauna	yes	Town drain	na	SW8-02 (approx. 900m SW)	Yes. 1-Feb-2017. DO = 4.7 mg/L (comments: outgoing tide, construction on northern side)	Possible that low DO at SW8-02 (Tuckombil Canal) may be linked with MBO event noted in column B. The drain in which the fish-kill / MBO event was observed is connected to the Tuckombil Canal which is tidal at this point.
3-Feb-17	During haulage along the haulage route through Byrons Lane, a Moxy burst a hose thought to be from wear and tear resulting in a 2L spill. The driver of the following moxy noticed the spill. Spill was to Haul Rd fill material. The spill occurred 630m from Crackers Drain.	South of Byron's Lane CH71000	Ground	no		no			
10-Feb-17	Spill from damaged fuel tank on Moxie, resulting in approx. 200L of diesel spilling to the ground. Spill contained and cleaned up.	Wave 3 Edwards drain X 519978 Y 6739402 CH 80140 Sth Edwards	Ground	yes	Edwards drain	na	SW4-06 (<100 m W)	no	
11-Feb-17	During bulk earthworks operations, a scrapper blew a hydraulic hose releasing approx. 40L of hydraulic oil. The spill was 15m from a clean water drain and 222m to the nearest basin. The spill did not leave site.	Fill 26 - Approx. CH63100	Ground	yes	Clean water drain	na	SW3-22 (approx. 3.5 km S)	no	
16-Feb-17	While undertaking haulage, minor loss of sediment (<1m3) from haul road to waters in Crackers Drain Waterway occurred. No sediment laden waters have left project boundaries.	Crackers Major Cane Drain CH70450 GDA94 MGA56 x:516527 Eastern side of drain within project alignment	Surface Water	yes	Crackers drain	na	SW3-23 (approx. 2.3 km SW)	no	

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27-Feb-17	During a rain inspection, oily residue was noticed to site surface waters at McIntyres Lane Compound Lay Down yard. The oily residue was absorbed using spill kit pads. No waters with oily residue left site. Less than 1L of oily residue was on the ground. No obvious spill to ground (no staining) was observed.	Main site compound lay down yard, McIntyres Lane Gulmarrad CH 76980 GDA94 MGA56 X 519474 Y 6736239	Surface Water	no		No			
3-Mar-17	Contractor was dewatering stormwater and discharging outside the project as dust suppression on a local gravel road. The contractor inspected the gravel road and there was no evidence of ponding / pooling or runoff of storm water into any local waterway.	Carroll's Lane West Ch 93300	Ground	yes	Table drain	na	SW5-10 (approx. 850 m N)	no	
29-Mar-17	A small oil leak of approx. 2-3L was observed beneath an Action Hire vehicle at the Tyndale Compound car park. The spill occurred 50m from the nearest clean water drain.	Tyndale Compound carpark - CH67240	Ground	yes	Clean water drain	na	SW3-23 (approx. 730 m N)	no	
3-Apr-17	A hydraulic oil spill of 15L occurred whilst setting up an impact hammer for piling. The oil spilled onto the test pile piling platform prior to lifting the impact hammer. There was a small amount of oil that remained within the hammer above the anvil from a previous project. This oil within the hammer was unknown and was in a location which could not be visibly inspected. The oil was immediately cleaned up. The spill occurred approx. 10m from a cane drain and 500m from the Clarence River.	Test piling platform, CH87200.	Ground	yes	Cane drain	na	SW5-06 (approx. 900 m N)	no	
5-Apr-17	During clearing of dense vegetation, a branch from a small tree hooked underneath the hose on the 4-in-1 bucket attachment of the skid steer. This resulted in cracking of the fitting and approx. 2L of hydraulic oil leaking to the ground. No harm or residual environmental impact was caused. The spill occurred approx. 400m from Tabbimoble Creek.	Western side of highway within clearing limits. CH102000	Ground	no		no			
13-Apr-17	Whilst undertaking cut to fill works, a hydraulic hose for the tail gate on a scraper blew releasing 25L of hydraulic oil to the ground. The spill occurred 40m from the nearest clean water channel.	Approx. CH60720 513442 & 6723228	Ground	yes	Clean water channel	na	SW3-22 (approx. 1.8 km S)	no	

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14-Apr-17	Whilst loading haul trucks, a power take off unit failed releasing 1 L of fluid to the ground. The spill occurred 75m from the nearest waterway.	CH67,700 Cut C3-31	Ground	no		no			
29-Apr-17	Whilst placing hardstand material, a diesel spill of approx. 4 L was identified on the Banana Road/Iluca Compound turn off. The spill was immediately contained and cleaned up appropriately. The spill occurred 89m to the nearest sensitive receiver.	Entrance to Banana Road/Iluca Compound, adjacent to the existing Pacific Highway at CH95120	Ground	no		no			
3-May-17	Whilst moving rolls of geo fabric, a hose blew on a back hoe, releasing 1-2L of oil to the ground. The spill occurred 26m from the nearest clean water drain. RMS cat 2.	57900 - in the middle of the alignment	Ground	yes	Clean water drain	na	SW3-20 (approx. 800 m S)	no	
3-May-17	During plant set up, a drive hose on a piling rig blew. This resulted in approx. 3L of biodegradable oil (Panolin) being spilt on the piling rig and some leakage onto the ground (hardstand). The spill occurred 65m north of Tabbimoble Creek Overflow and 8m East of drain	Davbridge Tabbimoble Creek Overflow Construction Site - CH 102900	Ground	yes	Drain	na	SW6-06 (approx. 100 m E)	no	
5-May-17	Whilst undertaking bulk earthworks, the cylinder apron arm hose blew on a scraper during cut to fill operations. Approx. 30 L of oil was released to the ground, 15m from a clean water channel.	Fill 24A CH60880 51344/6723339	Ground	yes	Clean water channel	na	SW3-22 (approx. 2 km S)	no	
5-May-17	Whilst vibratory piling for temporary jetty, 25-30mL of Panolin (biodegradable) oil leaked from the fitting on the barge. The spill entered the river and was contained within a previously installed oil containment boom. Leak was observed by spotter and works immediately shut down. All oil was contained and clean up immediately using absorbent pads.	Temporary Jetty across Clarence River, Portion E	Surface Water	yes		na	SW5-06 (< 500 m S)	no	
6-May-17	Whilst using ICE vibrator, a hydraulic hose leak was noticed. During removing hoses, approximately 0.2L of Panolin (biodegradable oil) leaked onto the ground (hardstand) and vibrator. The spill occurred approx. 20m north of Tabbimoble Creek overflow.	Davbridge Tabbimoble Creek Overflow Construction Site. CH 102900	Ground	yes	Waterway	na	SW6-06 (approx. 100 m NE)	no	
10-May-17	Evidence of hydrocarbon staining to the ground, adjacent to the Ancillary Facility Compound area. Based on the size of the stain on the ground, approx. 50mL of hydrocarbon had been spilt to the ground. Spilled cleaned up.	Davbridge Tabbimoble Creek Overflow Construction Site CH102900	Ground	yes	Drainage line	na	SW6-06 (approx. 100 m NE)	no	

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11-May-17	An oil leak from the drum of the roller caused a 5L oil spill to the ground. The spill occurred 530m from the closest sensitive receiver on the opposite side of the highway.	Chatsworth South West on Western side of the Pacific Highway CH90800	Ground	no		no			
15-May-17	After a >5 day rain event, dewatering from the turkeys nest commenced into the irrigation line. The coupling connecting the 2 inch pump hose and the poly pipe irrigation line came away resulting in approximately 10kL of water running directly from the hose into an adjacent Telstra line track. This water travelled down the track and back onto site into the clean water drain into a nearby culvert. No offsite impacts or increase in parameters observed.	W2B, Portion C, Glencoe road, CH114,550.	Surface Water	yes	clean water drain	na	SW7-02 (approx. 685 m S)	no	
18-May-17	Whilst rolling fill material at Byrons Lane, a roller had a hose failure resulting in minor hydraulic fluid spill (<5L) to ground.	Byrons Lane CH 71070	Ground	no		no	SW4-02 (approx. 1.7 km NE)	no	
18-May-17	During the driving of piling liners, a hydraulic oil leak was noticed at the top of the hydraulic impact hammer. This resulted in approx. 50mL of Panolin (biodegradable oil) being spilt onto the temporary work platform (rock piling pad). The spill occurred 15m south of the Tabbimoble Creek Overflow.	At the Davbridge Tabbimoble Creek Overflow Construction Site, CH102900	Ground	yes	Waterway	na	SW6-06 (approx. 125 m NE)	no	
22-May-17	Whilst undertaking drainage works, a digger blew a hydraulic hose releasing approx. 5L of oil to the ground. The spill occurred 15 m from the nearest clean water drain. RMS cat 2.	CH 1050	Ground	yes	Clean water drain	na	n/a, chainage is in Project Section 1		
23-May-17	Whilst undertaking drainage works, a hydraulic hose burst releasing approx. 1L of oil to the ground. The spill occurred 5m from the nearest sensitive receiver. RMS cat 2.	Approx. CH 41450 506172 / 6708373	Ground	yes	Waterway	na	SW3-06 (approx. 1.16 km E)	no	
23-May-17	Hydraulic line burst on the underside of a bobcat when moving fill material at B1 roundabout surcharge mound. Approx. 2-3L of hydraulic fluid was spilt onto imported fill material and cleaned up immediately with spill absorbent. The spill occurred approx. 190m west of James Creek.	B1 roundabout surcharge - CH85900.	Ground	no		no			
24-May-17	A scraper blew a hydraulic hose during cut to fill operations. The spill was approx. 3-5L and occurred 70m from the nearest sensitive receiver. RMS Cat 2.	Cut 23 60700 513484 / 6723204	Ground	no		no			

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24-May-17	Whilst undertaking erosion and sediment controls, a fitting failed on a hydraulic hose of an excavator, releasing 500ml of oil. The spill occurred 22m from the nearest waterway. RMS cat 2.	47200 511318 / 6710333	Ground	yes	Waterway	na	SW3-12 (approx. 580 m SSW)	no	
27-May-17	Whilst undertaking vibration piling, oil fill cap of the vibrator become loose. The dogman was landing vibrator on the ground for an inspection when it spilt approx. 5L of oil into the piling pad. The spill occurred 100m from Watts Lane Table drain and 670m from the Clarence River.	Piling Pad at Pier 34, Ch 87400	Ground	no		no			
29-May-17	Whilst Parking up machinery in the North corridor, SS04 Fill, CH81000, Approximately 70L of Hydraulic Fluid was released to ground from failed machinery hose (775 truck), 800m North of Edwards Water Way.	800m North of Edwards Water Way, SS04 Fill, CH81000	Ground	no		yes	SW4-06 (approx. 850 SSW)	no	
29-May-17	Hose on a scraper blew as last of material was pushed from the bowl, releasing 20L of oil to the ground. The spill occurred 43 m from the nearest sensitive receiver. RMS cat 2.	CH46060 510609 / 6709459	Ground	yes	Waterway	na	SW3-10 (approx. 400 m NE)	no	
29-May-17	A hydraulic seal leak on an Side Tipper was found when parked up after delivering rock for Crane Pad, adjacent to River Street. Less than 1L of hydraulic oil leaked onto the rock platform and was cleaned up immediately using spill absorbent material. The spill occurred 25m North of the Clarence River.	Piling Pad at Pier 24, CH86900	Ground	yes		na	SW5-06 (approx. 650 m S)	no	
30-May-17	Oil spill to ground (15L) when operator approached the machine in the morning prior to undertaking the daily prestart check. The spill occurred 27m from the nearest clean water channel. RMS cat 2.	67200 614472 / 6729235	Ground	yes	Clean water channel	na	SW3-23 (approx. 750 m N)	no	
30-May-17	During excavation of the crane/piling pad a hydraulic hose burst on an excavator spilling approximately 15 litres of oil onto the natural ground being excavated at the time. A small amount of oil (estimated < 0.25 litres) entered the isolated sump area.	BC51; CH134,600	Ground	yes		na	SW8-04 (approx. 700 m N)	no	
31-May-17	After completing a concrete pour, the concrete truck driver washed out the truck's concrete chute onto the ground in the middle of the alignment. The incident occurred approx. 19.5m to the nearest sensitive receiver. Approx. 100L of fluid was washed out of the concrete chute. RMS cat 2.	Cut 16, Approx. CH53500 512375/676315	Ground	yes	Clean water drain	na	SW3-18 (approx. 1.2 km N)	no	

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1-Jun-17	Hydraulic hose broke on a 13 tonne excavator due to general wear and tear. Approximately 0.5L of hydraulic oil spilt to the ground. The spill did not enter any waterways or drainage lines.	McAndrews Lane Ancillary Facility Site Compound Within the NE corner of the construction pad, 5m from the clean water diversion culvert.	Ground	no		no			
3-Jun-17	During vibratory driving of a pile casing experienced a small leak (approx. 1L) of hydraulic oil, in one section of the hydraulic hose connection between the hammer and the power pack. The spill occurred approx. 150m from the nearest sensitive receiver.	Pier 33 near the northern abutment	Ground	no		no			
5-Jun-17	Hydraulic hose broke on a 13 tonne excavator due to general wear and tear. Approx. 0.2L of fluid was spilt to the ground. The spill occurred 40m from the nearest sensitive receiver. No hydraulic fluid entered the clean water diversion culvert.	McAndrews Lane Ancillary Facility site compound, Pimlico. Within the south-east portion of the construction pad.	Ground	yes	Clean water diversion	na	SW10-08 (approx. 1.9 km S)	no	
6-Jun-17	Whilst undertaking bulk earthworks, a scraper blew a hydraulic hose during cut to fill operations. The spill of 60L of oil occurred approx. 200m from the closest sensitive receiver. The prestart was inspected and no issues were raised that related to this spill. The hose that blew was concealed and could not be checked as part of the daily prestart check. RMS Cat 2.	Approx. 49800 512288 / 6712707	Ground	no		yes	SW3-14 (approx. 510 m N)	no	
6-Jun-17	Minor fuel spill while reversion truck into site. The incident spill was approx. 5L to an area of 2m x 10m. The spill occurred 20m from the nearest table drain.	Davbridge Tabbimoble Creek Overflow Construction Site. Ch 102,900.	Ground	yes	Table drain	na	SW6-06 (approx. 120 m NE)	no	
7-Jun-17	Whilst undertaking bulk earthworks, a scraper blew a hose when retyrning to go line for the day, resulting in a 5L spill of oil. The spill occurred 235m from the basin and 328m from the nearest waterway. RMS cat 2.	CH55380 Approx 512901 / 6718113	Ground	no		no			

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20-Jun-17	Less than 1L of diesel was spilled onto the Pacific Highway southbound carriageway directly adjacent to the Woodburn Broadwater Service Road Northern Intersection construction area. All plant and machinery inspected and spill cleaned up. The source of the spill was not identified despite all plant and machinery being inspected. The closest waterway was approximately 15m from the spill.	Pacific Highway southbound carriageway at W2B Chainage 140,700.	Ground	yes		na	SW9-01 (approx. 200 m E)	no	
21-Jun-17	Installation of erosion and sediment controls outside of contractor clearing limits resulted in disturbance of approximately 20m ² within an environmental no-go zone (Mapped SEPP 14 wetland). The disturbance remained within the RMS road boundary. The incident occurred 45m from Emigrant Creek. The disturbed area has been inspected by the Project Ecologist and assessed to have caused negligible environmental harm.	The disturbance occurred at chainage 124100 on the northern side of Emigrant Creek. Refer to attached diagram.	Technical Breach	yes		na	SW7-08 (approx. 340 m N)	no	
22-Jun-17	Whilst undertaking bulk earthworks, a 65T excavator blew a hose on main lift ram whilst working in Cut 30, moving crushed rock. The incident resulted in a spill of <3L of oil. The spill occurred 137m from the nearest clean water drain.	Approx. CH 66840 514318 / 6728924	Ground	no		no			
22-Jun-17	Whilst undertaking bulk earthworks, a scraper blew a hydraulic hose whilst heading back to cut from emptying load. The incident resulted in a spill of approx. 5L. The spill occurred approx./ 124m from the nearest clean water drain.	CH59850 513825 / 6722437	Ground	no		no			
23-Jun-17	An excavator was installing the final treatment of the clean water drain and the shaker bucket was being used to shake off residual fines prior to placing rock into the fabric lined drain. A small breach had occurred in onsite controls causing turbid water to escape. Due to the sandy soils of the area, the turbid water (approx. 100L) was absorbed into the subsoil before it reached the project boundary.	CH63600, Clean water Drain 513175 / 6725908	Surface Water	yes	Site drainage lines	na	SW3-23 (approx. 4.3 km NNE)	no	
23-Jun-17	Septic tanks for compound toilet block overflowed to ground (approx.100L). Did not leave site or enter waterway. The spill occurred approx. 40m from the closest waterway.	CH67290 514400 / 6729349	Ground	yes	Waterway	na	SW3-23 (approx. 625 m N)	no	

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23-Jun-17	Hydraulic hose on a street sweeper burst while the sweeper cart was cleaning the pavement at Gate 138, resulting in less than 5 litres of hydraulic oil being spilt to ground. The spill was cleaned up and the hydraulic hose repaired. Closest waterway is the roadside drain approx. 15m away	Gate 138 construction entrance at CH138,620 of the W2B Project Corridor.	Ground	yes	Roadside drain	na	SW9-01 (approx. 2.15 km NE)	no	
23-Jun-17	Approx. 1L of hydraulic oil was spilt onto the main site compound platform at the precast area, whilst a delivery truck was lowering ramps to offload a forklift. The leak was contained within a portable bund and cleaned up immediately with spill absorbent material. The spill occurred 800m from the Clarence River and 50m from Watts Lane Table drain.	Main Site Compound, Precast Area CH 87700	Ground	yes	Table drain	na	SW5-06 (approx. 1.4 km S)	no	
27-Jun-17	Hydraulic hose burst on a 20T excavator resulting in a 5L spill of hydraulic fluid. The spill occurred approx. 7m from a paperbark swamp coastal lowland EEC, being cleared. An unexpected hydraulic hose failure on the excavator arm was identified by the operator. Excavator immediately shut down minimizing quantity of hydraulic fluid loss. Spill contained on area of sheeted rock platform.	150m north of construction entrance gate 5a, CH 85400 west	Ground	yes	Paperbark swamp coastal lowland EEC	na	SW5-04 (approx 300 m NE)	no	
30-Jun-17	Minor hydrocarbon spill from vehicle in Iluka compound car park (less than 2L). The spill occurred approx. 200m to the nearest waterway and 80m from the nearest drain.	Iluka Compound, Gate 95.1 - Pacific Highway Iluka - Directly out the front of the consumables containers at the rear of office building no.1.	Ground	No		no			