

APPENDIX A -SUMMARY OF SITE BACKGROUND INFORMATION

1.0 INTRODUCTION

1.1 THE SITE

The Duntroon Quarry is located on County Road 91, west of the village of Duntroon on Lot 25, Concession XII in the Township of Clearview, County of Simcoe. The existing quarry is located south of County Road 91 and the expansion quarry is located north of County Road 91 (see Figure 1).

The Duntroon Quarry has been in operation since the early 1960s on the south side of County Road 91 (existing quarry). Since 1995 the quarry has been operated by Walker Aggregates Inc. (WAI), a wholly owned subsidiary of Walker Industries Holdings Ltd. The licensed property of the existing quarry operates in accordance with Aggregate Resource Act (ARA) license number 3514. The expansion quarry is licenced to WAI under ARA licence number 607841, issued August 6, 2014.

The Adaptive Management Plan (AMP) annual summary report is a requirement of the Aggregate Resources Act licensing of the expansion quarry.

The high quality dolostone produced from the Duntroon Quarry is in demand as building material and also for use in agricultural, recreational and environmental projects. This demand initiated an expansion of the existing footprint of the quarry to include property north of County Road 91 (the expansion quarry). WAI received approval from the Consolidated Joint Board on June 18th, 2012, to expand their quarry operation into the expansion lands. The expansion quarry property comprises a licensed area of 65.9 ha (162.9 acres), within which 58.5 ha (144.5 acres) is approved for extraction. The total available aggregate resource within the expansion quarry is approximately 38.7 million tonnes. A sinking cut was made in early October 2015 and a tunnel was constructed under County Road 91 to link the existing and expansion quarry properties. Active extraction in the expansion quarry started on June 28, 2016.

The quarry is licenced to extract aggregate from above and below the water table on both the existing and expansion quarry properties, which results in the accumulation of water on the working floor of the quarry. Environmental Compliance Approval Number 1521-A4VJ4X was issued to allow discharge from sewage Works that collect the water that accumulates in the aggregate extraction area from direct precipitation, surface runoff, snow melt, and groundwater inflow. The sewage Works discharge to a wetland located at the west side of the existing quarry property, and then to twin culverts located on Grey Road 31 (designated as “SW1”) and eventually to the Beaver River South Tributary.

Historically, water management at the Duntroon Quarry has been handled under a Permit to Take Water (PTTW No.1168-665NHB), which dictated the limitations on flow rate at the twin culverts on Grey Road 31 (“SW1”). The historic PTTW, issued in 2005, stipulated seasonal flow limitations at surface water station SW1 as well as maximum takings for internal water use. The PTTW was amended on September 22, 2016 (PTTW No.7725-AACS54) and the ECA was issued on October 17, 2016. The Amended PTTW now dictates the maximum water taking from the quarry as measured in the discharge line with a flow meter, not at SW1. The ECA informs the limits on the sewage Works, including the total daily discharge rate and effluent limits based on water quality parameters.

The expansion quarry is located adjacent to the approved (August 24, 2012) MAQ Aggregates Inc. (MAQ) Highland Quarry, an independent third party. The Highland Quarry is operated by CBM St. Marys Cement under the name Osprey Quarry. Aggregate extraction at the Osprey Quarry began in 2014. WAI and MAQ have a data sharing agreement which supports the reporting requirements for the respective quarries. The locations of these quarry properties and of other lands owned by Walker Aggregates are shown on Figure 1.

1.2 MONITORING REQUIREMENTS

Walker Aggregates environmental commitment is to manage its lands so that in the long term, the ecology is healthier than its current condition. This will be accomplished through environmental initiatives detailed on the ARA Site Plans and the Adaptive Management Plan (AMP) to ensure that protection, mitigation, and enhancement measures sustain local environmental resource features and functions for future generations.

Aggregate extraction in Phase I of the expansion quarry began in late June 2016, and 2016 was the first year of reporting for the adaptive management plan.

The potential impacts for each phase of Quarry operations are outlined in the AMP with details on specific protection and monitoring measures. This annual summary report will focus on quarry operations in Phase 1 and the associated monitoring measures that were completed in support of the AMP in 2017.

Given the extraction that has occurred in the existing quarry, extraction in Phase I of the expansion quarry is not expected to result in any negative impacts to off-site water resources and/or ecological features and functions. Therefore, the monitoring and mitigation requirements during this phase of extraction are such that the response of the natural environment system will be monitored by means of the groundwater, surface water and wetland monitoring network, and results compared to predictions.

As outlined in Table 3.2 of the AMP, trigger monitoring criteria for water flows, water temperature and wetland water levels will apply during their respective trigger periods as soon as extraction proceeds beyond Phase 1. Interim trigger values have been developed for water flows and water temperature using historical monitoring data. These interim trigger values will be updated as further monitoring data become available during Phase 1.

1.3 COORDINATED MONITORING REPORT

The AMP consists of four component monitoring programs:

1. Performance Indicator Trigger Monitoring Program;
2. Long Term Trend Groundwater and Surface Water Monitoring Program;
3. Long Term Trend Ecological Monitoring Program;
4. Ecological Enhancement and Mitigation Monitoring Program.

The AMP annual summary report includes results, where available, from all four components of the AMP monitoring program.

1.4 WATERSHED AGGREGATE ACTIVITIES

1.4.1 DUNTROON EXPANSION QUARRY

Aggregate extraction activities at the expansion quarry began in late June 2016.

Table 2.3 in the AMP document summarizes the expected timing for extraction in each Phase. The phasing is also detailed on the Site Plan 2B of 4 Operational Plan. Phase 1, Phase 2a and Phase 2b are identified on Figure 2a – Site Sketch.

The aggregate extraction in the expansion quarry was initiated in Phase 1 of the licenced extraction area. The extraction of Phase 1 started with construction of the tunnel from the existing quarry to a sinking cut in the southwest corner of Phase 1, down to the quarry floor elevation of approximately 500 m ASL. The extraction has moved outward in a quasi-radial pattern from the southwest

corner to the north and east. This pattern of extraction will be maintained over a period of approximately 4.6 years. The extraction period is based on a projected average rate and will vary based on market demand.

Aggregate processing of the Phase 1 resources will be completed using the plant and equipment present on the floor of the existing quarry, until such time that there is sufficient room in the extracted footprint of the expansion quarry for processing equipment. The movement of aggregate resources between the existing and the expansion quarries is facilitated by the tunnel under County Road 91.

Water managed by the quarry reflects the direct precipitation, surface runoff, snow melt and groundwater inflow that accumulates in the extraction area of the quarry. This accumulated water is managed using the Works outlined below. For information on the current estimated limit of extraction, please see Figure 2a (site sketch). The site sketch is based on conditions in the summer of 2017. Figure 2b is the site plan, including the location of the sumps, flow meter and the tunnel to the expansion lands. Figure 2c is an updated aerial photo from an oblique view in the summer of 2017 which includes the existing and expansion quarries.

Currently the water that collects in the expansion quarry area is either pumped or moved via gravity flow to the existing quarry, where the water is managed with the existing sewage Works. Eventually a sump (to be designated as Sump #3) will be located in the expansion area to facilitate the collection of excess water. Water from Sump 3 will be moved to either Sump 1 or Sump 2 and not discharged directly off-site.

During 2017, excess water on the expansion quarry floor was directed into Sump 2 via gravity flow, through the tunnel under County Road 91.

A secondary storage reservoir was also constructed in 2017 immediately east of the existing storage reservoir. The secondary storage reservoir is visible in the updated aerial photo (Figure 2c).

Given the extraction that has occurred in the Existing Quarry, extraction in Phase 1 of the expansion quarry is not expected to result in any negative impacts to off-site water resources and/or ecological functions.

1.4.2 DUNTROON EXISTING QUARRY

The Duntroon Quarry has been in operation since the 1960s. A majority of the existing quarry has been extracted to its licenced final floor elevation of 500 metres above sea level (m ASL). The sinking cut in the expansion quarry to facilitate tunnel construction between the two quarry properties was made in October 2015.

The water management system at the existing quarry property consists of two sumps (Sump 1 and Sump 2). Sump 2 is equipped with a submersible pump. Sump 2 has recently been moved to the east, to accommodate the addition of the secondary storage pond (see Figure 2b for the location of Sump 2). Water from Sump 2 is pumped into the main reservoir for storage. Water movement is controlled using dam boards to channel water as needed to return it to the main sump using a gravity sewer line to Sump 1 (main sump). Sump 1 is equipped with a submersible pump on a float switch and has a capacity of approximately 17,050 m³. The pump from Sump 1 discharges either directly off site or to the main reservoir. Water is primarily pumped off site, but if water is needed on-site or if there is an issue with water quality, the water is retained on site, in the main reservoir, until quality improves. The amount of flow moving into the reservoir or off-site is controlled with a valve (location noted on Figure 2b). The flow meter is installed downstream of the valve, on the discharge line where it moves off-site. The discharge line is a 10-inch line, which eventually discharges into the wetland located west of the existing quarry, upstream of SW1. A ball valve has been installed on the discharge line downstream of the flow meter to facilitate quarry discharge water sampling.

1.4.3 OTHER EXTRACTION OPERATIONS

1.4.3.1 MAQ Aggregates Highland Quarry



The expansion quarry is located adjacent to the approved (August 24, 2012) MAQ Aggregates Inc. (MAQ) Highland Quarry, an independent third party. The Highland Quarry is operated by CBM St. Marys Cement under the name Osprey Quarry. Aggregate extraction at the Osprey Quarry began in 2014. WAI and MAQ have a data sharing agreement which supports the reporting requirements for the respective quarries.

1.4.3.2 Other

WSP is not aware of any additional extraction operations in the immediate vicinity of the Duntroon expansion quarry during 2017.

1.5 MONITORING PROGRAM CONTACT NAMES

Matthew McMahon M.Sc. – Environmental Performance Lead, Walker Industries

David Charlton M.Sc. – Senior Environmental Consultant and Ecologist, Stantec

Sarah Watts M.Sc. – Environmental Consultant, WSP Canada Inc.

1.6 OTHER ACTIVITIES IN LOCAL WATERSHEDS

WSP is not aware of any other large scale activities in local watersheds in the vicinity of the Duntroon expansion property during 2017.

TABLE A-1
30 YEAR NORMAL 1971-2000 WATER BUDGET
THORNBURY SLAMA CLIMATOLOGICAL STATION
DUNTROON QUARRY - AMP SUMMARY REPORT (2017)
111-53312.00 A61

Month	Mean Temperature (°C)	Total Precipitation (mm)	Calculated Snow Melt (mm)	Pot. E (mm)	Act. E (mm)	WHC (mm)	Calculated Surplus (mm)	Calculated Deficit (mm)
JANUARY	-6.6	94.2	29.0	1.0	1.0	146.0	46.0	0.0
FEBRUARY	-6.1	63.8	42.0	2.0	2.0	150.0	53.0	0.0
MARCH	-1.6	63.5	86.0	8.0	8.0	150.0	117.0	0.0
APRIL	5.2	62.4	37.0	30.0	30.0	149.0	67.0	0.0
MAY	11.5	70.6	0.0	72.0	72.0	133.0	14.0	0.0
JUNE	16.6	75.7	0.0	106.0	105.0	101.0	2.0	0.0
JULY	19.7	80.9	0.0	128.0	121.0	58.0	3.0	7.0
AUGUST	19.0	85.8	0.0	114.0	103.0	41.0	0.0	11.0
SEPTEMBER	15.1	94.0	0.0	78.0	72.0	58.0	5.0	6.0
OCTOBER	9.0	81.0	0.0	42.0	40.0	93.0	6.0	2.0
NOVEMBER	2.9	97.2	12.0	14.0	14.0	137.0	33.0	0.0
DECEMBER	-3.1	97.0	25.0	3.0	3.0	146.0	42.0	0.0
TOTAL	6.8	966.1	231.0	598.0	571.0	SURPLUS: 395.1 mm		

- NOTES:**
- Mean Temperature and Total Precipitation Data as reported by Environment Canada
 - Calculated Snow Melt as calculated by Environment Canada
 - Pot. E - Potential Evapotranspiration as calculated by Environment Canada
 - Act. E - Actual Evapotranspiration as calculated by Environment Canada
 - WHC - Water Holding Capacity as calculated by Environment Canada
 - Calculated Surplus and Deficit as calculated by Environment Canada
 - Data from the Thornbury Slama Climatological Station located at 44°34'N 80°29'W/O, 213m

TABLE A-2
2015 WATER BUDGET
SHANTY BAY CLIMATOLOGICAL STATION
DUNTROON QUARRY - AMP SUMMARY REPORT (2017)
111-53312.00 A61

Month	Mean Temperature (°C)	Heat Index (unitless)	Evaporation (mm)	Daylight Factor (unitless)	Evaporation (adjusted) (mm)	Total Precipitation (mm)	WHC (mm)	Calculated Surplus (mm)	Calculated Deficit (mm)	ACTUAL SURPLUS (mm)	ACTUAL DEFICIT (mm)
JANUARY	-10.7	0.0	0.0	0.82	0.0	62	150	62	0	62	0.0
FEBRUARY	-14.9	0.0	0.0	0.82	0.0	53	150	53	0	53	0.0
MARCH	-3.5	0.0	0.0	1.03	0.0	24	150	24	0	24	0.0
APRIL	6.2	1.4	25.9	1.12	29.0	61	150	32	0	32	0.0
MAY	15.3	5.4	72.3	1.27	91.9	38	96	0	54	0	0.0
JUNE	17.2	6.5	82.6	1.28	105.8	154	144	48	0	0	0.0
JULY	20.2	8.2	99.2	1.30	128.9	37	52	0	92	0	52
AUGUST	19.5	7.8	95.3	1.20	114.3	106	44	0	8	0	0
SEPTEMBER	18.9	7.4	92.0	1.04	95.6	67	16	0	28	0	16
OCTOBER	9.0	2.4	39.6	0.95	37.6	84	62	46	0	0	0.0
NOVEMBER	6.0	1.3	25.0	0.81	20.2	61	103	41	0	0	0.0
DECEMBER	3.1	0.5	11.8	0.78	9.2	40	133	30	0	0	0.0
TOTAL	7.2	41.0			633	786		336	182	170	68
(POTENTIAL) NET WATER SURPLUS=										154 mm	
ACTUAL SURPLUS=										170 mm	

NOTES:

- WHC - Water Holding Capacity
- Data from the Shanty Bay Climatological Station located at 4424°N 79°37.8'W/O, 250.0m

FIGURE A-1: SHANTY BAY CLIMATOLOGICAL STATION
 2015 AND 30 YEAR NORMAL 1971-2000 (THORNBURY SLAMA)
 MONTHLY PRECIPITATION AND WATER SURPLUS

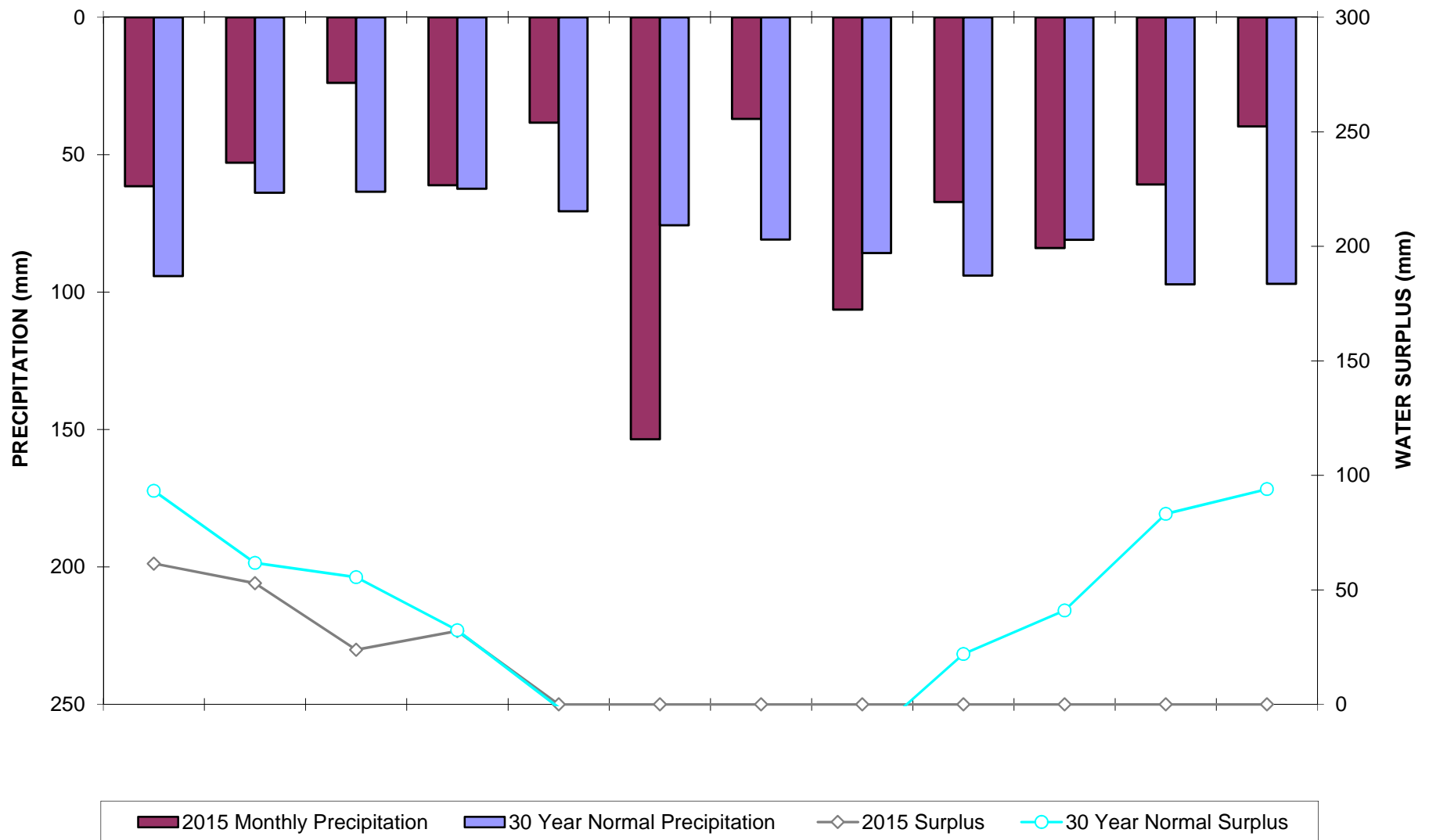


TABLE A-3
2016 WATER BUDGET
SHANTY BAY CLIMATOLOGICAL STATION
DUNTROON QUARRY - AMP SUMMARY REPORT (2017)
111-53312.00 A61

Month	Mean Temperature (°C)	Heat Index (unitless)	Evaporation (mm)	Daylight Factor (unitless)	Evaporation (adjusted) (mm)	Total Precipitation (mm)	WHC (mm)	Calculated Surplus (mm)	Calculated Deficit (mm)	ACTUAL SURPLUS (mm)	ACTUAL DEFICIT (mm)
JANUARY	-5.7	0.0	0.0	0.82	0.0	116	150	116	0	116	0.0
FEBRUARY	-5.0	0.0	0.0	0.82	0.0	50	150	50	0	50	0.0
MARCH	0.5	0.0	1.4	1.03	1.4	156	150	155	0	155	0.0
APRIL	3.8	0.7	14.4	1.12	16.1	65	150	49	0	49	0.0
MAY	13.5	4.5	62.1	1.27	78.8	51	122	0	28	0	0.0
JUNE	18.0	6.9	86.4	1.28	110.7	39	50	0	72	0	49.9
JULY	21.9	9.3	108.4	1.30	140.9	54	0	0	87	0	37
AUGUST	22.4	9.6	111.2	1.20	133.5	118	0	0	15	0	15
SEPTEMBER	17.6	6.7	84.2	1.04	87.6	38	0	0	50	0	50
OCTOBER	10.8	3.2	48.0	0.95	45.6	79	33	33	0	0	0.0
NOVEMBER	5.6	1.2	22.5	0.81	18.2	52	66	33	0	0	0.0
DECEMBER	-2.7	0.0	0.0	0.78	0.0	124	150	124	0	40	0.0
TOTAL	8.4	42.1			633	941		560	252	410	152
(POTENTIAL) NET WATER SURPLUS=										308	mm
ACTUAL SURPLUS=										410	mm

NOTES:

- WHC - Water Holding Capacity
- Data from the Shanty Bay Climatological Station located at 4424'N 79°37.8'W/O, 250.0m

FIGURE A-2: SHANTY BAY CLIMATOLOGICAL STATION
 2016 AND 30 YEAR NORMAL 1971-2000 (THORNBURY SLAMA)
 MONTHLY PRECIPITATION AND WATER SURPLUS

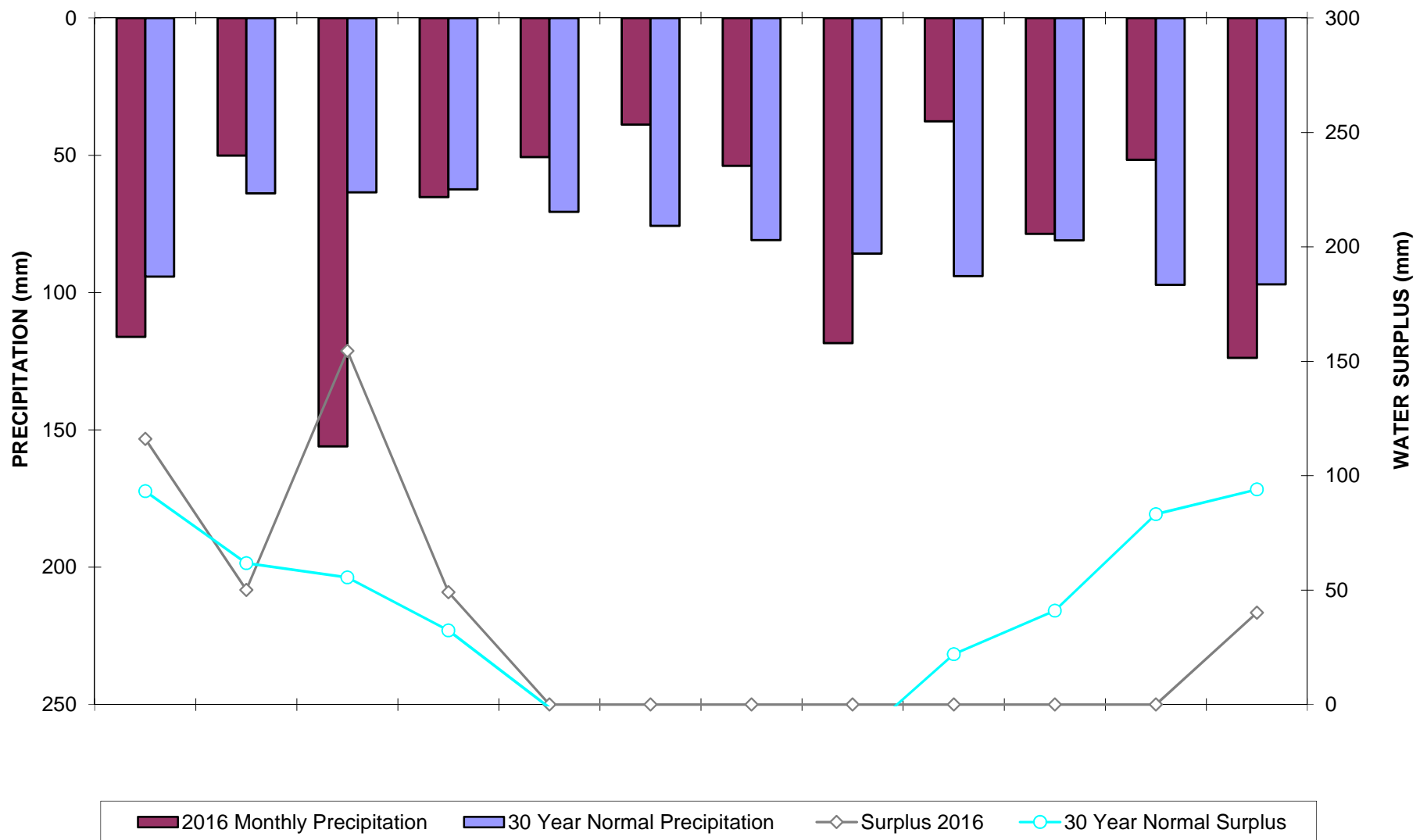


TABLE A-4
2016 WATER BUDGET
WALKER CLIMATOLOGICAL STATION
DUNTROON QUARRY - AMP SUMMARY REPORT (2017)
111-53312.00 A61

Month	Mean Temperature (°C)	Heat Index (unitless)	Evaporation (mm)	Daylight Factor (unitless)	Evaporation (adjusted) (mm)	Total Precipitation (mm)	WHC (mm)	Calculated Surplus (mm)	Calculated Deficit (mm)	ACTUAL SURPLUS (mm)	ACTUAL DEFICIT (mm)
JANUARY	-5.7	0.0	0.0	0.82	0.0	64	150	64	0	64	0.0
FEBRUARY	-6.2	0.0	0.0	0.82	0.0	67	150	67	0	67	0.0
MARCH	-0.6	0.0	0.0	1.03	0.0	170	150	170	0	170	0.0
APRIL	4.5	0.9	20.3	1.12	22.7	24	150	1	0	1	0.0
MAY	12.2	3.8	58.9	1.27	74.8	40	115	0	35	0	0.0
JUNE	16.5	6.1	81.4	1.28	104.1	42	53	0	62	0	52.9
JULY	19.9	8.1	99.4	1.30	129.2	28	0	0	102	0	49
AUGUST	20.7	8.5	103.7	1.20	124.4	28	0	0	96	0	96
SEPTEMBER	16.1	5.8	79.2	1.04	82.4	8	0	0	75	0	75
OCTOBER	9.0	2.4	42.6	0.95	40.4	7	0	0	33	0	33.2
NOVEMBER	4.4	0.8	19.8	0.81	16.0	54	38	38	0	0	0.0
DECEMBER	-4.9	0.0	0.0	0.78	0.0	25	63	25	0	0	0.0
TOTAL	7.2	36.5			594	556		364	403	301	306
(POTENTIAL) NET WATER SURPLUS=										-39 mm	
ACTUAL SURPLUS=										301 mm	

NOTES:

- WHC - Water Holding Capacity
- Data from the Walker Climatological Station. Located in proximity to the existing quarry, approx. 520 m asl.

FIGURE A-3: WAI CLIMATOLOGICAL STATION
 2016 AND 30 YEAR NORMAL 1971-2000 (THORNBURY SLAMA)
 MONTHLY PRECIPITATION AND WATER SURPLUS

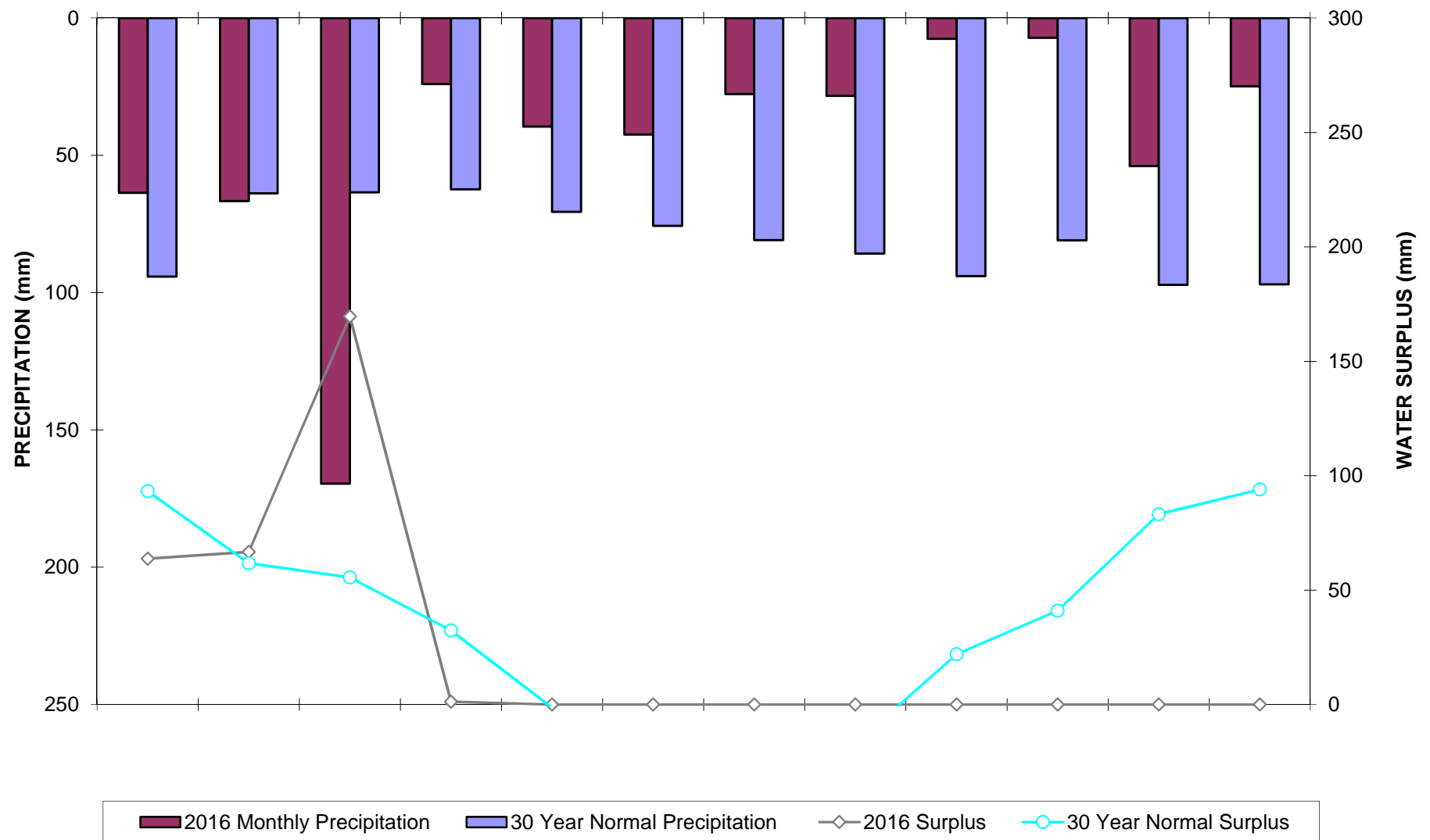


TABLE A-5
2017 WATER BUDGET
SHANTY BAY CLIMATOLOGICAL STATION
DUNTROON QUARRY - AMP SUMMARY REPORT (2017)
111-53312.00 A61

Month	Mean Temperature (°C)	Heat Index (unitless)	Evaporation (mm)	Daylight Factor (unitless)	Evaporation (adjusted) (mm)	Total Precipitation (mm)	WHC (mm)	Calculated Surplus (mm)	Calculated Deficit (mm)	ACTUAL SURPLUS (mm)	ACTUAL DEFICIT (mm)
JANUARY	-3.7	0.0	0.0	0.82	0.0	131	150	131	0	131	0.0
FEBRUARY	-2.2	0.0	0.0	0.82	0.0	101	150	101	0	101	0.0
MARCH	-0.3	0.0	0.0	1.03	0.0	75	150	75	0	75	0.0
APRIL	8.0	2.0	36.4	1.12	40.7	122	150	81	0	81	0.0
MAY	11.6	3.6	54.6	1.27	69.4	124	150	54	0	54	0.0
JUNE	17.4	6.6	85.2	1.28	109.0	120	150	11	0	11	0.0
JULY	20.0	8.1	99.2	1.30	129.0	65	86	0	64	0	0
AUGUST	18.8	7.4	92.7	1.20	111.2	74	49	0	37	0	0
SEPTEMBER	17.2	6.5	84.1	1.04	87.5	57	18	0	31	0	18
OCTOBER	12.2	3.8	57.7	0.95	54.8	77	41	23	0	0	0.0
NOVEMBER	2.0	0.3	8.0	0.81	6.5	81	116	75	0	0	0.0
DECEMBER	-6.8	0.0	0.0	0.78	0.0	88	150	88	0	54	0.0
TOTAL	7.9	38.2			608	1115		639	132	507	18
(POTENTIAL) NET WATER SURPLUS=										507	mm
ACTUAL SURPLUS=										507	mm

NOTES:

- WHC - Water Holding Capacity
- Data from the Shanty Bay Climatological Station located at 4424'N 79°37.8'W/O, 250.0m

FIGURE A-4: SHANTY BAY CLIMATOLOGICAL STATION
 2017 AND 30 YEAR NORMAL 1971-2000 (THORNBURY SLAMA)
 MONTHLY PRECIPITATION AND WATER SURPLUS

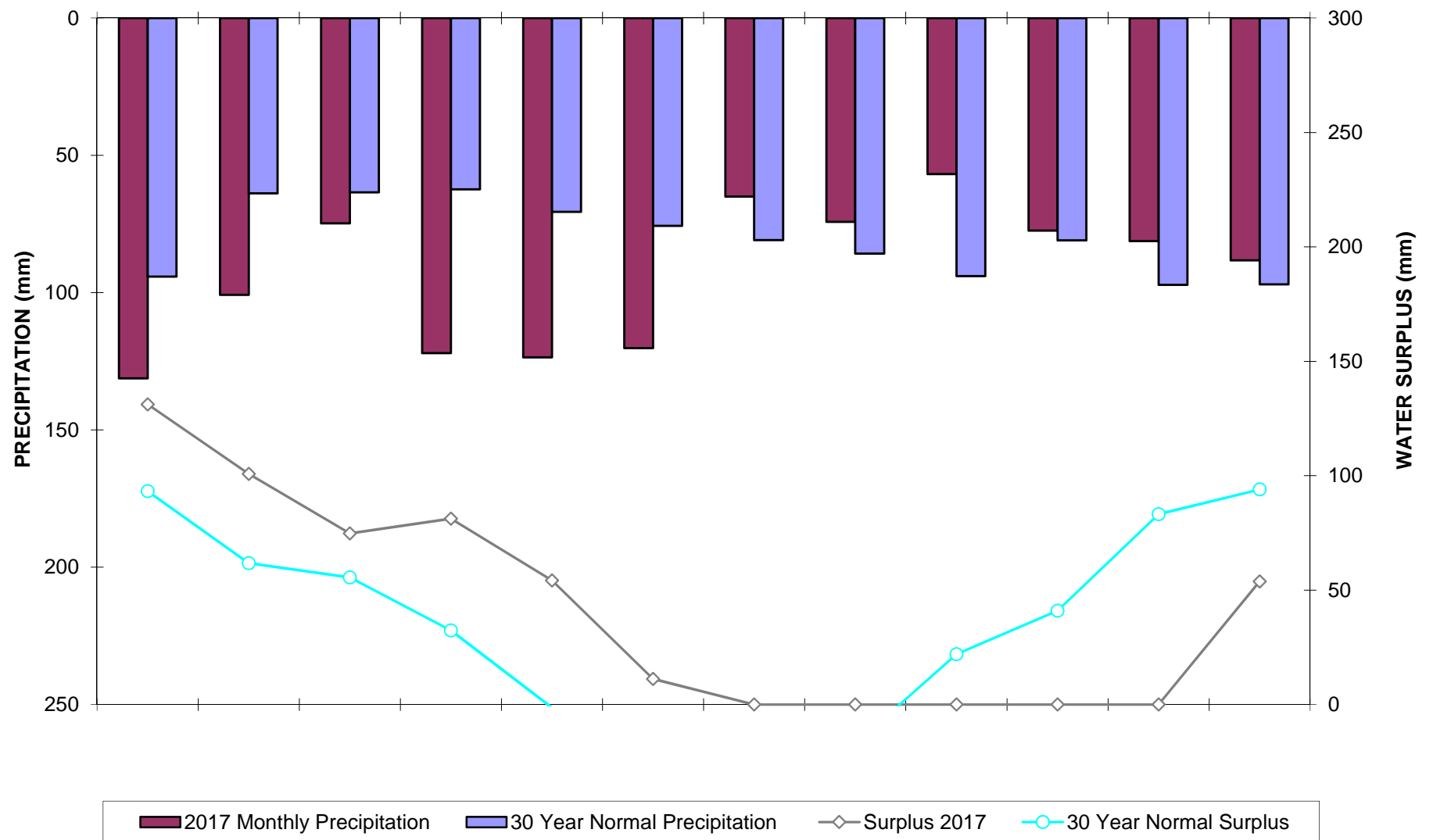


TABLE A-6
2017 WATER BUDGET
WALKER CLIMATOLOGICAL STATION
DUNTROON QUARRY - AMP SUMMARY REPORT (2017)
111-53312.00 A61

Month	Mean Temperature (°C)	Heat Index (unitless)	Evaporation (mm)	Daylight Factor (unitless)	Evaporation (adjusted) (mm)	Total Precipitation (mm)	WHC (mm)	Calculated Surplus (mm)	Calculated Deficit (mm)	ACTUAL SURPLUS (mm)	ACTUAL DEFICIT (mm)
JANUARY	-5.0	0.0	0.0	0.82	0.0	86	150	86	0	86	0.0
FEBRUARY	-3.3	0.0	0.0	0.82	0.0	44	150	44	0	44	0.0
MARCH	-3.4	0.0	0.0	1.03	0.0	55	150	55	0	55	0.0
APRIL	6.1	1.3	30.8	1.12	34.5	134	150	100	0	100	0.0
MAY	9.9	2.8	50.2	1.27	63.8	132	150	68	0	68	0.0
JUNE	16.0	5.8	81.6	1.28	104.5	131	150	27	0	27	0.0
JULY	18.2	7.0	92.5	1.30	120.3	58	87	0	63	0	0
AUGUST	16.7	6.2	85.0	1.20	102.0	66	51	0	36	0	0
SEPTEMBER	15.8	5.7	80.4	1.04	83.7	88	55	4	0	0	0
OCTOBER	10.5	3.1	53.4	0.95	50.8	90	94	39	0	0	0.0
NOVEMBER	0.0	0.0	0.0	0.81	0.0	89	150	89	0	33	0.0
DECEMBER (see note)	-7.9	0.0	0.0	0.78	0.0	46	150	46	0	46	0.0
TOTAL	6.1	31.9			559	1018		557	99	458	0
(POTENTIAL) NET WATER SURPLUS=										458	mm
ACTUAL SURPLUS=										458	mm

NOTES:

- WHC - Water Holding Capacity
- Data from the Walker Climatological Station. Located in proximity to the existing quarry, approx. 520 m asl.
- December 2017 precipitation data is missing from the second half of the month. The precipitation data is biased low.

FIGURE A-5: WAI CLIMATOLOGICAL STATION
 2017 AND 30 YEAR NORMAL 1971-2000 (THORNBURY SLAMA)
 MONTHLY PRECIPITATION AND WATER SURPLUS

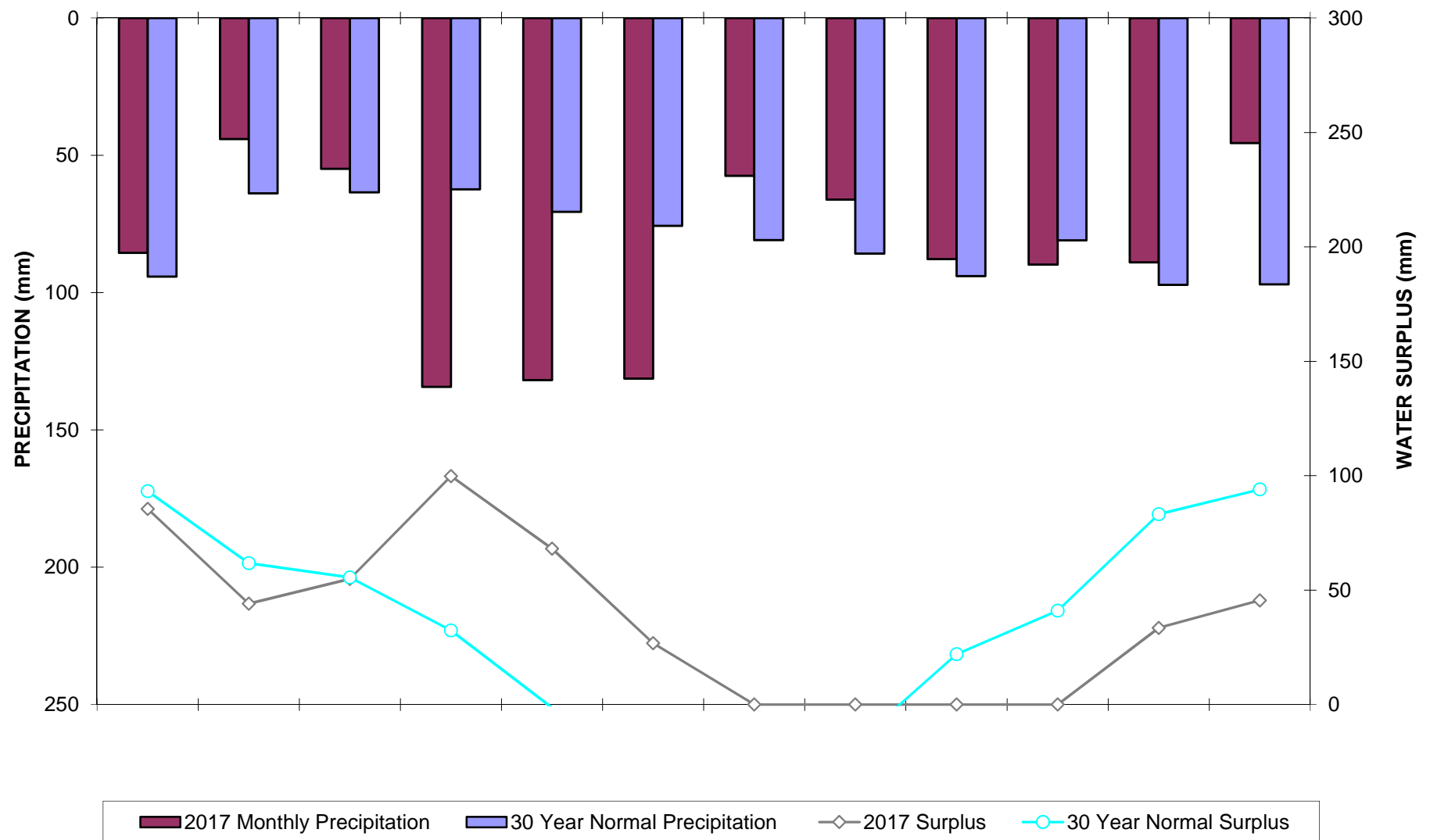


FIGURE A-6: MEAN MONTHLY TEMPERATURE
 2017 (SHANTY BAY & WAI STATIONS) vs. 30 YEAR NORMAL 1971-2000 (THORNBURY SLAMA)

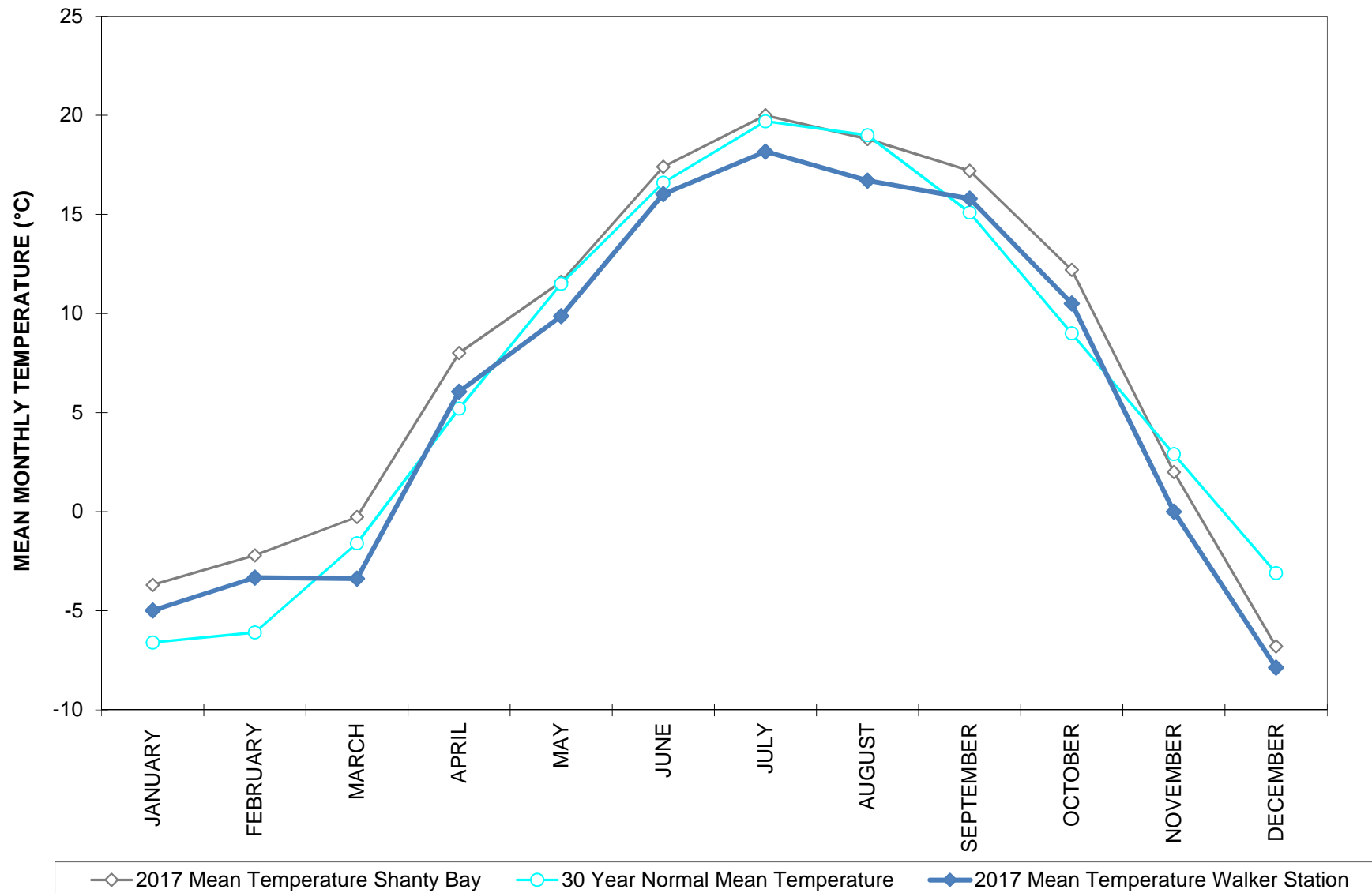


FIGURE A-7: TOTAL PRECIPITATION
 2017 (SHANTY BAY & WAI STATIONS) AND 30 YEAR NORMAL 1971-2000 (THORNBURY SLAMA)

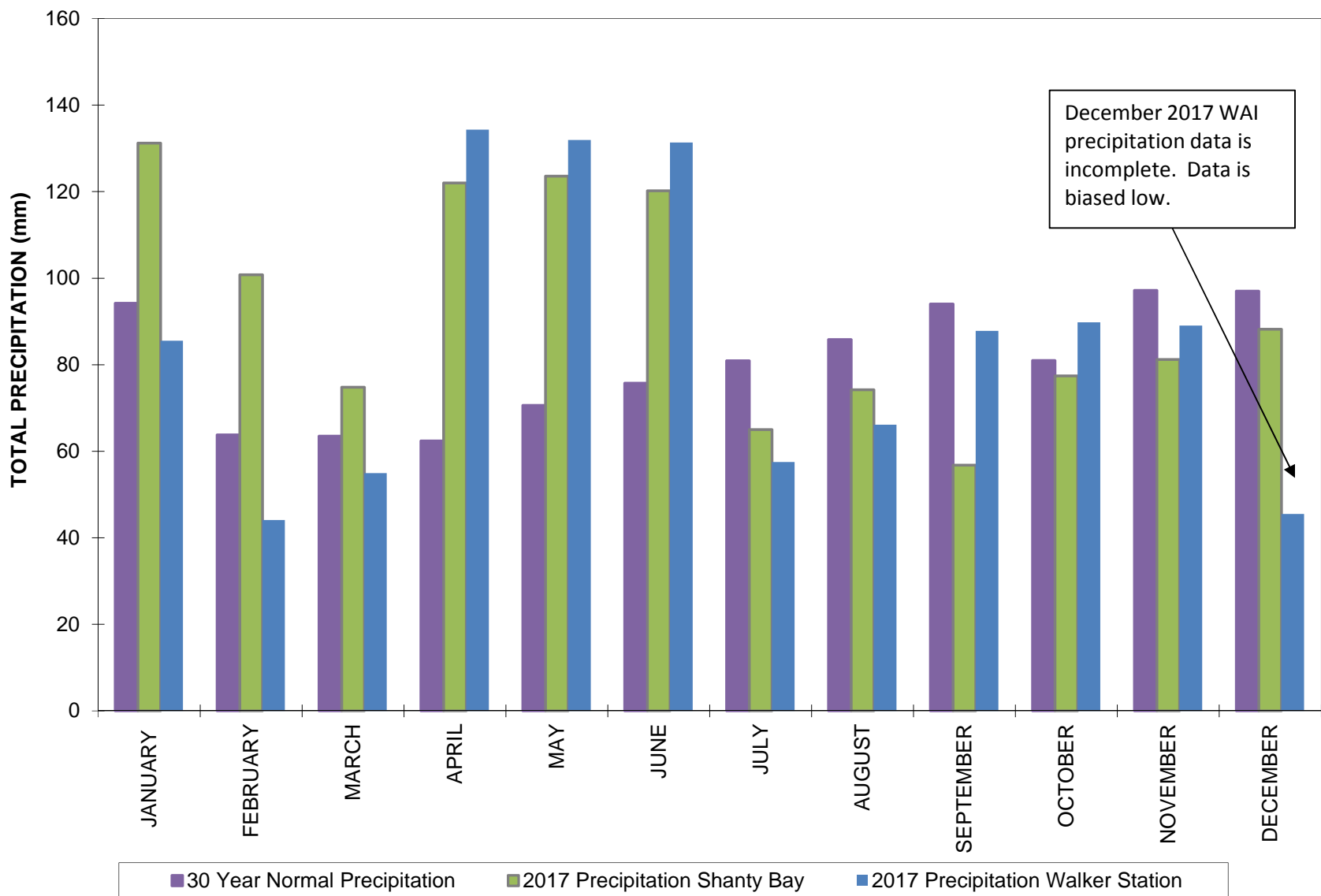


FIGURE A-8

SURFACE WATER HYDROGRAPH
Mad River at Avening
Environment Canada Station 02ED015

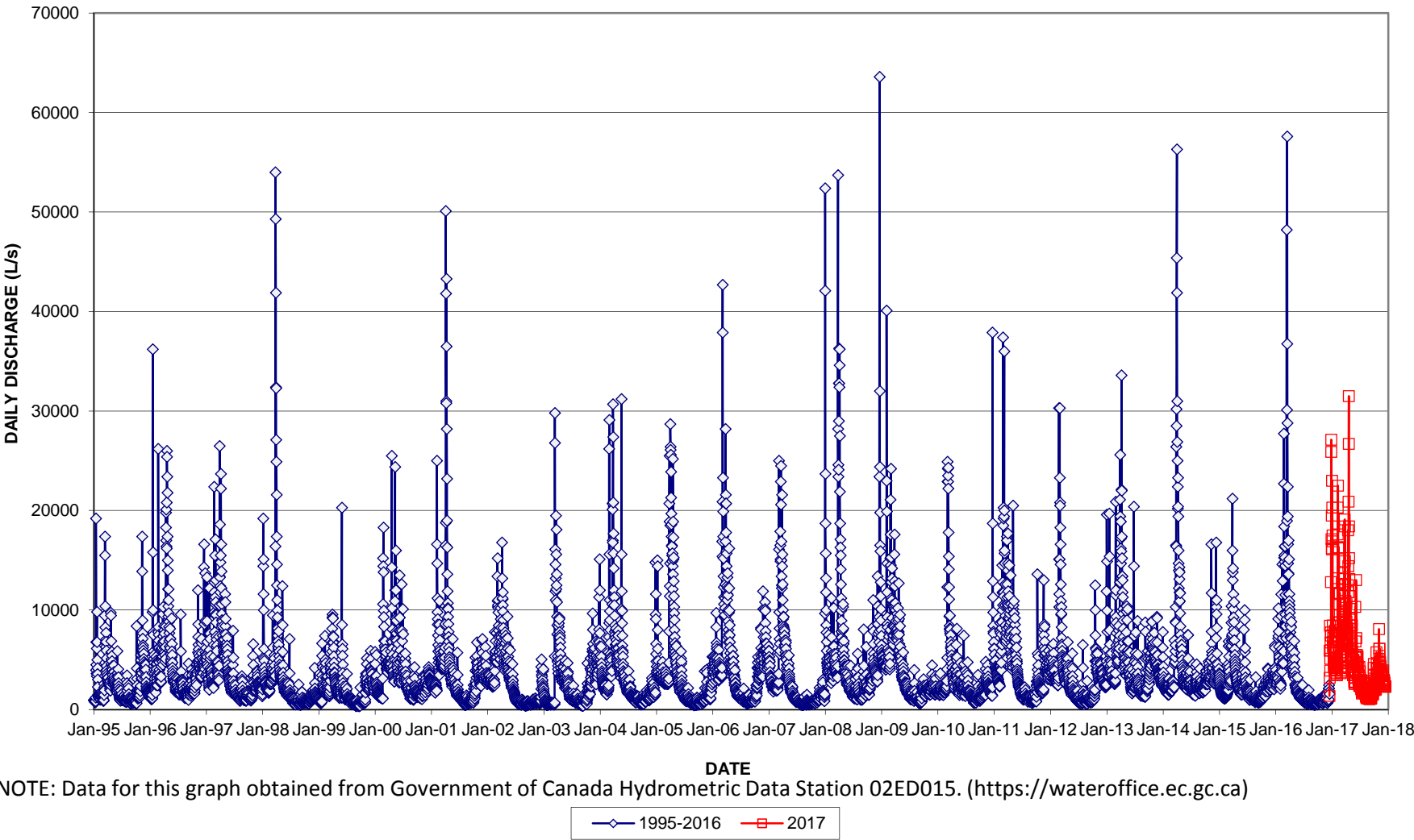


FIGURE A-9

SURFACE WATER HYDROGRAPH
Pretty River at Collingwood
Environment Canada Station 02ED031

