

MEMO

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FROM	Matt Friend, Managing Technical Consultant, ERM Consultants Canada Ltd. Cameron Evans, Managing Technical Consultant, ERM Consultants Canada Ltd. Kirby Ottenbreit, Principal Technical Consultant, ERM Consultants Canada Ltd. Kevin Murphy, Project Manager, ERM Consultants Canada Ltd. Craig Neufeld, Partner, ERM Consultants Canada Ltd.
DATE	8 July 2025
REFERENCE	0738135
SUBJECT	Analysis of Increased Water Withdrawals at Hope Bay

1. INTRODUCTION

ERM Consultants Canada Ltd. (ERM) understands that Agnico Eagle Mines Limited (Agnico Eagle) seeks to restart operations at the Hope Bay Mine (the Mine) in the near future using underground mining methods. Agnico Eagle anticipates water needs of 2,856,940 m³/year, a volume that exceeds the currently permitted volume under Agnico Eagle's existing Water Licences. Three lakes have been identified as potential water sources; Doris Lake, Patch Lake, and Windy Lake. Each lake is located near the Mine area and Agnico Eagle has existing Water Licences associated with each lake. As Agnico Eagle prepares for the restart of operational activities at the Mine, Agnico Eagle seeks to understand additional water withdrawal capacity from Windy Lake, Patch Lake, and Doris Lake, and how those withdrawals would affect the hydrologic system and fish habitat of these three lakes and their outflows. Effects to other lakes and outflows have not been incorporated.

The intent of this memorandum is to assess how water withdrawals from Doris Lake, Patch Lake, and Windy Lake affect the hydrologic system by using a water balance and hydraulic models. Results of the hydrologic assessment are then used to assess how water withdrawals affect fish habitat using Fisheries and Oceans Canada (DFO) guidance and methods used during development of the Mine's Final Environmental Impact Statement (FEIS).

1.1 BACKGROUND

The Mine comprises the Doris North Mine and the Madrid-Boston project. The Mine is currently under Care and Maintenance. Miramar Resources Ltd. permitted Doris North in 2006 with Nunavut Impact Review Board (NIRB) Certificate 003 while TMAC Resources permitted Madrid-Boston in 2018 per NIRB Certificate 009. The Mine operates under a Framework Agreement with the Kitikmeot Inuit Association (KitIA) and Type A Water Licences, 2AM DOH1335 (for Doris and Madrid Developments), and 2AM BOS1835 (for Boston Development). In 2021, Agnico Eagle purchased the Mine. Approved water withdrawal volumes are provided in Table 1-1.

TABLE 1-1 APPROVED WATER WITHDRAWALS

Source	Approved Amount (m ³ /year)	Water Licence No.
Doris Lake	1,930,000	2AM-DOH1335
Patch Lake	103,000	2BB-MAE1727
Windy Lake	43,800	2AM-DOH1335
Total	2,076,800	NA

Water Licence No. 2AM-DOH1335 (Amendment No. 2) was issued to TMAC Resources Inc. Under this Water Licence, fresh water supplies from Windy Lake are permitted to be withdrawn at a volume not exceeding 43,800 cubic metres (m³) per year, with water to be used for domestic camp use. Also permitted under this Water Licence are fresh water supplies withdrawn at a volume not exceeding 1,930,000 m³ per year from Doris Lake for mining, milling, and associated industrial uses. Water Licence No. 2BB-MAE1727 (Amendment No. 2) allows for withdrawals of up to 103,000 m³ per year from Patch Lake for industrial use, including drilling (surface, underground, quarry), dust suppression, and ice roads.

2. HYDROLOGY ANALYSIS

2.1 METHODOLOGY

2.1.1 WATER BALANCE

ERM developed a water balance model to assess how proposed water withdrawals from Doris Lake, Patch Lake, and Windy Lake affect the storage volume and water level of each lake, and how those changes affect discharge rates in the lake outflows. The water balance model was constructed using GoldSim 14.0 modelling software. It was run on a daily timestep using site baseline hydrometric data collected as part of the Mine's baseline and compliance monitoring programs.

To compare how the withdrawals affect the assessed hydrologic parameters, ERM developed a "without Mine" and a "with Mine" version of the model. The without Mine version incorporates components of the natural system, while the Mine version builds on the natural system with components introduced by Mine development, specifically direct water withdrawals and losses to the underground Mine through the talik system.

The model is based on the principle of mass balance. A body of water is modelled by the "reservoir" element in the model. Water quantity mass balance is maintained: the change in volume of the body of water is equal to the difference between the sum of the inflows to the body of water and the sum of the outflows from it (GoldSim Technology Group 2021).

The water balance model was built to represent an average year, where lake inflows and outflows are assumed to be in equilibrium. This allows the 10-years of cumulative hydrometric data from the outflow to also be used to determine average net lake inflows. The relationship between lake water levels and outflow streamflow rates was established using rating curves developed as part

of the Aquatic Effects Monitoring Program (AEMP) (ERM 2023). In addition to the lake outflows, for the With Mine scenario, additional outputs from the lakes include losses to the underground Mine through the talik system and the pumping withdrawals for the Mine.

2.1.1.1 DATA INPUTS

Bathymetry

Lake volumes and respective lake water elevations were used in the model to track impacts from the different water withdrawal scenarios. Lake volumes were determined using subsurface contours for the lakes, created from bathymetric survey information collected in 2006 and 2008 (ERM 2023). Bathymetric elevation data was tied to a geodetic datum from available surveyed water level benchmarks, at hydrometric monitoring station benchmarks, that were geodetic referenced from 2016 to 2020.

Storage Elevation Curves

Storage elevation curves were used to determine the volume of water in the lakes at a known elevation of water. A linear fit equation was used to gap fill the volume to water level relationship from August of 2006 and 2008, when the bathymetric surveys were completed, until freshet. Equations are listed below in Table 2-1. Results from the equations are listed below, in Table 2-2.

TABLE 2-1 STORAGE ELEVATION EQUATIONS

Lake	Linear Fit Equation
Patch Lake	$y = 5.4246 \times - 119.22$ $R^2 = 0.9997$
Doris Lake	$y = 3.2609 \times - 43.865$ $R^2 = 0.9999$
Windy Lake	$y = 5.1995 \times - 35.958$ $R^2 = 1$



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TABLE 2-2 STORAGE ELEVATION CURVE GAP FILL RESULTS

Lake	Elevation (masl)	Volume (m ³)
Patch	26.60	25,074,360
	26.30	23,446,980
	26.05	22,090,830
	26.24	23,121,504
	26.50	24,531,900
	27.00	27,244,200
	27.50	29,956,500
	26.00	21,819,600
Doris	21.10	24,939,990
	21.40	25,918,260
	22.00	27,874,800
	22.50	29,505,250
	23.00	31,135,700
	23.50	32,766,150
Windy	18.13	58,308,935
	18.20	58,672,900
	18.28	59,088,860
	18.03	57,788,985
	18.15	58,397,327
	18.34	59,400,830
	18.50	60,232,750
	19.00	62,832,500
	19.50	65,432,250
	20.00	68,032,000
	20.50	70,631,750

Rating Curve Equations

Site-specific rating curve equations were used to establish the relationship between lake water levels and outflow streamflow rates at each of the three lakes, and to model flow during the open water season. The rating curves for Windy Lake and Patch Lake were developed from historical monitoring data as part of the Mine's Hydrology Compliance Monitoring Program. This data were reported in the 2023 AEMP (Table 2-3; ERM 2023).

Unlike Windy Lake and Patch Lake, the outflow of Doris Lake is monitored by a separate hydrometric station and therefore a rating curve for Doris Lake itself was not available from historical monitoring data. Therefore, a linear regression between the elevation of Doris Lake and flow in Doris Creek (TL-2) was used to estimate the elevation-outflow relationship for Doris Lake.

TABLE 2-3 RATING CURVE EQUATIONS

Station	Rating Equation ¹ $Q = C (h-a)^b$
Windy Outflow ¹	$Q = 5.322 (h - 18.147)^{1.869}$
Patch Outflow ¹	$Q = 2.261 (h - 25.998)^{1.765}$, when $h < 26.391$ $Q = 4.489 (h - 26.028)^{2.304}$, when $h > 26.391$
Doris Lake ²	$Q = 11.943 * h - 263.12$, when $h < 22.173$ $Q = 3.7129 * h - 80.632$, when $h > 22.173$

¹ Source: ERM 2023

² Regression between Doris Lake elevation and Doris Creek (TL-2) flow, with source data from ERM 2023.

Natural Inflow and Outflow

Outflow and assumed inflow streamflow data were calculated using historical data from hydrometric monitoring stations at the Doris, Patch and Windy Lake outflows (ERM 2023; Table 2-4). These data were used to develop mean daily discharges for each lake outflow, and are presented in Appendix A. Net daily inflows were calculated as the difference between the daily outflow volume and change in lake volume during baseline conditions. To mimic freeze-up conditions, natural inflows and outflows were stopped between January 01 to May 15 and November 01 to December 31.

TABLE 2-4 YEARS OF AVAILABLE MONITORED OUTFLOW DATA

Station	Years of Available data
Patch Lake Outflow	2009–2011, 2018–2023
Doris Lake Outflow	2009–2023
Windy Lake Outflow	2009–2010, 2012–2014, 2019–2023

Lake Loss to the Underground

Estimates for lake water losses through taliks were estimated as part of a hydrogeological characterization and modelling study (Gordon 2025). These estimates are included in Table 2-5.

TABLE 2-5 ESTIMATED WATER LOSSES FROM LAKE TO UNDERGROUND

Lake Name	Maximum Predicted Infiltration (m ³ /year)	Maximum Predicted Infiltration (m ³ /day)
Patch Lake	266,450	730
Windy Lake	3,431	9.4
Doris Lake	813,950	2,230

Source: Gordon 2025

2.1.1.2 WITHDRAWAL SCENARIOS

Agnico Eagle's anticipated water needs of 2,856,940 m³/year represents an increase of 823,140 m³/year above existing approved withdrawal volumes. To partition the increased water volume among Doris Lake, Patch Lake, and Windy Lake, ERM assessed multiple withdrawal scenarios using the water balance model in an iterative process. Withdrawal scenarios included different withdrawal rates using "constant-rate" year-round pumping that maximized the withdrawals from Doris Lake. This process was guided by several considerations, which were applied as applicable:

- Winter withdrawals do not exceed 10% of lake water volume; and
- Outflow streamflow rates do not decrease by more than 10%.

These considerations were not set as firm requirements, but with the understanding that exceeding them may require the need for more exhaustive assessments and/or fish habitat offsetting to obtain Water License amendments.

2.1.2 OUTFLOW MODELLING

To understand how streamflow rate changes affect hydrologic properties of the outflow, and therefore fish habitat indices, an existing HEC-RAS model was used. HEC-RAS is used to model the hydraulics of water flow through natural rivers and other channels (US ACE 2024). It can perform one-dimensional steady flow, one and two-dimensional unsteady flow calculations, sediment transport/mobile bed computations, and water temperature/water quality modelling. For this study, a one-dimension steady flow model was used.

Of the three lakes selected for proposed water withdrawals, Doris Lake and Patch Lake outflows have existing HEC-RAS models that were developed as part of the FEIS (ERM 2016a). Full details on the development of those models, including methodology and results, can be found in *Doris Lake, Doris Creek, and Little Roberts Outflow Fisheries Assessment – Hydraulic Modelling Results* (ERM 2015). Water withdrawals and other effects from the Mine were not anticipated at Windy Lake, therefore a HEC-RAS model was not developed for this location.

Based on updated water needs of the Mine, withdrawals from Doris Lake are proposed to increase, and new withdrawals from Windy Lake are proposed. Outflow modelling was performed using the results of the constant rate pumping scenario. A HEC-RAS model for the Windy Lake outflow was not developed for the FEIS, and there is insufficient data to develop one, therefore changes to hydrologic properties and fish habitat were not performed.

The existing HEC-RAS model for the Doris Lake outflow was updated with new steady flow data calculated in the water balance model. Mean monthly streamflows for the May through October open water season were input to the HEC-RAS model for baseline and constant rate, and a steady flow analysis was run for each streamflow value.

After the steady flow analyses were completed, a table of hydrologic properties required for the fish habitat assessment were extracted. These properties included wetted width, maximum water depth, and velocity, and were extracted for each transect in the model domain, and for each streamflow run through the model (i.e. mean monthly streamflow for baseline and constant rate).

2.2 RESULTS

Using total water requirements of the Mine, the iterative assessment of withdrawal volumes and pumping schemes ultimately resulted in withdrawal scenarios using constant rate schemes, as presented in Table 2-6.

The water balance model generated results for each of the three lakes included in this study (Doris Lake, Patch Lake, and Windy Lake), and for both without Mine (i.e. baseline) and with Mine (i.e. constant rate pumping) conditions. Results for modelled storage volume, water level, and outflow discharge rates were output and provided below.

TABLE 2-6 DORIS LAKE MODELLED MEAN MONTHLY CONSTANT RATE PUMPING RATES

Month	Doris Lake (m ³ /day)	Patch Lake (m ³ /day)	Windy Lake (m ³ /day)
January	7,225	164	438
February	7,225	164	438
March	7,225	164	438
April	7,225	164	438
May	7,225	164	438
June	7,225	164	438
July	7,225	164	438
August	7,225	164	438
September	7,225	164	438
October	7,225	164	438
November	7,225	164	438
December	7,225	164	438
Total Volume (m³/year)	2,637,125	59,860	159,870
Approved Amount (m³/year)	1,930,000	103,000	43,800
Additional Requirements (m³/year)	707,125	NA¹	116,070

Note:

¹ No change from approved amount.

2.2.1 CONSTANT RATE PUMPING

Results for the constant rate pumping scenario and can be found in Table 2-7 (Lake Volume Water Balance Results), Table 2-8 (Lake Water Level Water Balance Results), and Table 2-9 (Lake Outflow Discharge Rates Water Balance Results).

Winter lake water volume decreases were limited to less than 10% for all three lakes. Doris Lake experiences the largest decrease under the modelled scenario, where the maximum monthly volume

decrease of 9.1% occurs in May. Annually, the stored water volume decreases by 2.7%. At both Patch Lake and Windy Lake, lake volume decreases are less than 1% for all months (Table 2-7).

The annual discharge at the Doris Lake outflow decreases by 31.5%. The largest monthly decrease of 43.8% occurs in June, and is caused by winter pumping from the lake decreasing water levels and delaying the start of water movement in the Doris Lake outflow. Once water starts moving in the outflow, the decrease in streamflow rate is quickly reduced to less than 10%, with July streamflow being 8.9% lower than baseline, then again progressively increases through the remaining open-water season (Table 2-8).

The annual discharge at the Patch Lake outflow decreases by 8.1%, with the largest monthly decrease of 11.9% occurring in June, while annual discharge at the Windy Lake outflow decreases by 9.0%, with the largest monthly decrease of 15.5% occurring in June. Similar to the Doris Lake outflow, this decrease is caused by winter pumping from the lake decreasing water levels and delaying the start out water movement in the outflow. For all remaining months in the open water season, streamflow reductions are modelled to be less than 10% (Table 2-9).

TABLE 2-7 CONSTANT RATE PUMPING: LAKE VOLUME WATER BALANCE RESULTS

Month	Doris Lake					Patch Lake					Windy Lake				
	Baseline (m³) ¹	With Project (m³) ¹	Absolute Change (m³)	Relative Change (%)	Relative Change Under Ice (%) ²	Baseline (m³) ¹	With Project (m³) ¹	Absolute Change (m³)	Relative Change (%)	Relative Change Under Ice (%) ³	Baseline (m³) ¹	With Project (m³) ¹	Absolute Change (m³)	Relative Change (%)	Relative Change Under Ice (%) ⁴
January	27,036,230	26,220,707	-815,523	-3.0	-4.0	21,839,560	21,727,078	-112,482	-0.5	-1.0	58,399,060	58,342,794	-56,266	-0.1	-0.1
February	27,036,230	25,937,058	-1,099,172	-4.1	-5.3	21,839,560	21,700,258	-139,302	-0.6	-1.2	58,399,060	58,329,203	-69,857	-0.1	-0.1
March	27,036,230	25,653,407	-1,382,823	-5.1	-6.7	21,839,560	21,673,438	-166,122	-0.8	-1.4	58,399,060	58,315,614	-83,446	-0.1	-0.2
April	27,036,230	25,365,030	-1,671,200	-6.2	-8.1	21,839,560	21,646,171	-193,389	-0.9	-1.7	58,399,060	58,301,797	-97,263	-0.2	-0.2
May	27,133,605	25,242,975	-1,890,629	-7.0	-9.1	22,188,825	21,974,182	-214,643	-1.0	-1.8	58,403,175	58,292,103	-111,072	-0.2	-0.2
June	28,245,475	27,402,800	-842,674	-3.0	NA	23,787,105	23,638,528	-148,577	-0.6	NA	59,159,988	59,063,201	-96,787	-0.2	NA
July	28,055,934	27,977,888	-78,046	-0.3	NA	24,056,891	24,011,764	-45,127	-0.2	NA	59,384,070	59,345,968	-38,102	-0.1	NA
August	27,393,584	27,291,965	-101,619	-0.4	NA	23,122,407	23,085,594	-36,814	-0.2	NA	59,112,999	59,091,220	-21,779	0.0	NA
September	27,344,801	27,241,373	-103,428	-0.4	NA	22,986,848	22,946,131	-40,716	-0.2	NA	58,978,080	58,958,681	-19,399	0.0	NA
October	27,247,721	27,142,964	-104,757	-0.4	NA	22,886,500	22,843,344	-43,157	-0.2	NA	58,804,130	58,783,774	-20,356	0.0	NA
November	27,051,598	26,808,103	-243,495	-0.9	-1.2	22,100,664	22,042,269	-58,395	-0.3	-0.5	58,471,237	58,442,381	-28,856	0.0	-0.1
December	27,036,230	26,504,357	-531,873	-2.0	-2.6	21,839,560	21,753,898	-85,662	-0.4	-0.7	58,399,060	58,356,384	-42,676	-0.1	-0.1
Average	27,304,698	26,567,639	-737,058	-2.7	NA	22,529,358	22,422,537	-106,820	-0.5	NA	58,693,366	58,636,317	-57,048	-0.1	NA

¹ Includes volume frozen as ice during the winter.

² Doris Lake assumed max ice volume is 6,438,000 m³ which is excluded from under ice calculation.

³ Patch Lake assumed max ice volume is 10,268,000 m³ which is excluded from under ice calculation.

⁴ Windy Lake assumed max ice volume is 10,343,000 m³ which is excluded from under ice calculation.

TABLE 2-8 CONSTANT RATE PUMPING: LAKE WATER LEVEL WATER BALANCE RESULTS

Month	Doris Lake			Patch Lake			Windy Lake		
	Baseline (masl)	With Project (masl)	Absolute Change (m)	Baseline (masl)	With Project (masl)	Absolute Change (m)	Baseline (masl)	With Project (masl)	Absolute Change (m)
January	21.739	21.496	-0.243	26.004	25.983	-0.021	18.147	18.137	-0.011
February	21.739	21.411	-0.328	26.004	25.978	-0.026	18.147	18.134	-0.013
March	21.739	21.326	-0.413	26.004	25.973	-0.030	18.147	18.131	-0.016
April	21.739	21.239	-0.500	26.004	25.968	-0.035	18.147	18.129	-0.019
May	21.768	21.203	-0.566	26.068	26.029	-0.039	18.148	18.127	-0.021
June	22.113	21.856	-0.256	26.363	26.335	-0.027	18.294	18.275	-0.019
July	22.055	22.031	-0.024	26.412	26.404	-0.008	18.337	18.329	-0.007
August	21.848	21.816	-0.032	26.240	26.233	-0.007	18.285	18.280	-0.004
September	21.832	21.800	-0.032	26.215	26.208	-0.007	18.259	18.255	-0.004
October	21.802	21.771	-0.032	26.197	26.189	-0.008	18.225	18.221	-0.004
November	21.744	21.671	-0.072	26.052	26.041	-0.011	18.161	18.156	-0.006
December	21.739	21.581	-0.158	26.004	25.988	-0.016	18.147	18.139	-0.008
Average	21.821	21.601	-0.221	26.131	26.111	-0.020	18.204	18.193	-0.011

TABLE 2-9 CONSTANT RATE PUMPING: LAKE OUTFLOW DISCHARGE RATES WATER BALANCE RESULTS

Month	Doris Lake				Patch Lake				Windy Lake			
	Baseline (m³/day)	With Project (m³/day)	Absolute Change (m³/day)	Relative Change (%)	Baseline (m³/day)	With Project (m³/day)	Absolute Change (m³/day)	Relative Change (%)	Baseline (m³/day)	With Project (m³/day)	Absolute Change (m³/day)	Relative Change (%)
January	0	0	0	NA	0	0	0	NA	0	0	0	NA
February	0	0	0	NA	0	0	0	NA	0	0	0	NA
March	0	0	0	NA	0	0	0	NA	0	0	0	NA
April	0	0	0	NA	0	0	0	NA	0	0	0	NA
May	13,710	0	-13,710	NA ¹	3,503	2,281	-1,222	NA ¹	4	0	-4	NA ¹
June	160,228	90,056	-70,172	-43.8	42,314	37,276	-5,038	-11.9	15,976	13,498	-2,478	-15.5
July	112,761	102,735	-10,026	-8.9	45,608	43,510	-2,098	-4.6	20,672	19,191	-1,481	-7.2
August	41,967	31,836	-10,131	-24.1	16,092	15,313	-780	-4.8	11,418	10,779	-638	-5.6
September	37,009	26,710	-10,299	-27.8	13,201	12,407	-794	-6.0	7,656	7,186	-470	-6.1
October	27,440	17,330	-10,110	-36.8	11,378	10,596	-782	-6.9	4,031	3,675	-356	-8.8
November	0	0	0	NA	0	0	0	NA	0	0	0	NA
December	0	0	0	NA	0	0	0	NA	0	0	0	NA
Average	32,758	22,437	-10,321	-31.5	11,037	10,145	-892	-8.1	4,997	4,545	-452	-9.0

Notes:
¹ For months of partial frozen conditions (i.e., May and November), monthly-averaged flow is misleading and therefore reported as NA.

2.2.2 DORIS OUTFLOW MODELLING

Mean monthly discharge values calculated in the water balance for the baseline and constant rate pumping scheme at Doris Outflow are presented in Table 2-9 (constant rate), and were used as the input to the HEC-RAS model. Hydrologic characteristic results of the HEC-RAS Doris Lake outflow model are included in Appendix B. These results include wetted width, average velocity, and maximum depth for each modelled cross-section in the model.

2.2.3 COMPARISON TO FINAL ENVIRONMENTAL IMPACT STATEMENT

Results of this current assessment were compared to the Mine's FEIS effects assessment to evaluate how proposed changes to water withdrawals deviate from those originally anticipated. The FEIS effects assessment was limited to examining outflow streamflow rates, while lake levels and volumes were not considered. A comparison of mean monthly and annual streamflow rates for the FEIS and the current assessment are provided in Table 2-10 for Doris Outflow, Table 2-11 for Patch Outflow, and Table 2-12 for Windy Outflow.

TABLE 2-10 DORIS LAKE OUTFLOW: COMPARISON TO FINAL ENVIRONMENTAL IMPACT STATEMENT

Month	Final Environmental Impact Statement			Current Assessment		
	Baseline (m ³ /s)	With Project (m ³ /s)	Relative Change (%)	Baseline (m ³ /s)	With Project (m ³ /s)	Relative Change (%)
January	0.000	0.000	NA	0.000	0.000	NA
February	0.000	0.000	NA	0.000	0.000	NA
March	0.000	0.000	NA	0.000	0.000	NA
April	0.000	0.000	NA	0.000	0.000	NA
May	0.000	0.000	NA	0.159	0.000	NA
June	1.943	1.204	-39.9	1.854	1.042	-43.8
July	0.638	0.509	-19.2	1.305	1.189	-8.9
August	0.344	0.281	-18.0	0.486	0.368	-24.1
September	0.345	0.283	-18.4	0.428	0.309	-27.8
October	0.196	0.130	-34.8	0.318	0.201	-36.8
November	0.005	0.006	NA ¹	0.000	0.000	NA
December	0.000	0.000	NA	0.000	0.000	NA
Average	0.299	0.201	-31.9	0.379	0.260	-31.5

Notes:

¹ For months of partial frozen conditions (i.e., May and November), monthly-averaged flow is misleading and therefore reported as NA.

TABLE 2-11 PATCH LAKE OUTFLOW: COMPARISON TO FINAL ENVIRONMENTAL IMPACT STATEMENT

Month	Final Environmental Impact Statement			Current Assessment		
	Baseline (m ³ /s)	With Project (m ³ /s)	Relative Change (%)	Baseline (m ³ /s)	With Project (m ³ /s)	Relative Change (%)
January	0.000	0.000	NA	0.000	0.000	NA
February	0.000	0.000	NA	0.000	0.000	NA
March	0.000	0.000	NA	0.000	0.000	NA
April	0.000	0.000	NA	0.000	0.000	NA
May	0.000	0.000	0.0	0.041	0.026	NA ¹
June	0.427	0.322	-28.4	0.490	0.431	-11.9
July	0.230	0.181	-19.9	0.528	0.504	-4.6
August	0.122	0.097	-18.9	0.186	0.177	-4.8
September	0.104	0.084	-18.4	0.153	0.144	-6.0
October	0.000	0.000	NA	0.132	0.123	-6.9
November	0.000	0.000	NA	0.000	0.000	NA
December	0.000	0.000	NA	0.000	0.000	NA
Average	0.076	0.057	-23.8	0.128	0.117	-8.1

Notes:

¹ For months of partial frozen conditions (i.e., May and November), monthly-averaged flow is misleading and therefore reported as NA.

At Doris Lake, the updated assessment calculated the mean annual discharge to be 27% higher than what was calculated for the FEIS, likely due to improved understanding of the Mine's hydrologic system from the availability of a much longer monitoring record. Similarly, mean annual discharge is 68% higher at Patch Outflow, and 122% higher at Windy Lake.

TABLE 2-12 WINDY LAKE OUTFLOW: COMPARISON TO FINAL ENVIRONMENTAL IMPACT STATEMENT

Month	Final Environmental Impact Statement			Current Assessment		
	Baseline (m ³ /s)	With Project (m ³ /s)	Relative Change (%)	Baseline (m ³ /s)	With Project (m ³ /s)	Relative Change (%)
January	0.000	0.000	NA	0.000	0.000	NA
February	0.000	0.000	NA	0.000	0.000	NA
March	0.000	0.000	NA	0.000	0.000	NA
April	0.000	0.000	NA	0.000	0.000	NA
May	0.000	0.000	NA	0.000	0.000	NA
June	0.183	0.178	-7.4	0.185	0.156	-15.5
July	0.079	0.072	-6.5	0.239	0.222	-7.2
August	0.027	0.023	-9.2	0.132	0.125	-5.6
September	0.025	0.022	-9.4	0.089	0.083	-6.1
October	0.000	0.000	NA	0.047	0.043	-8.8
November	0.000	0.000	NA	0.000	0.000	NA
December	0.000	0.000	NA	0.000	0.000	NA
Average	0.026	0.024	-7.5	0.058	0.053	-9.0

The percent decrease in mean annual discharge at Doris Outflow is essentially the same between the FEIS and current assessment, with mean annual streamflow modelled to decrease by 31.9% in the FEIS and 31.5% under the current assessment. Larger differences exist among mean monthly discharges, with June freshet flows modelled to be smaller under the current assessment, with additional variability in the other months with August, September and October predicted to have lower flows.

With reduced water withdrawals from Patch Lake in the current assessment, streamflow in the Patch Outflow is modelled to be larger. Mean annual discharge was modelled to decrease by 23.8% in the FEIS, while in the current assessment was modelled to decrease by 8.1%. The predicted reduction is similar to the FEIS during June, with modelled reductions of 28.3% in the current assessment and 28.4% modelled during the FEIS. The predicted mean monthly flow rates for the remainder of the open water season are higher than the FEIS.

At Windy Outflow, the current assessment results in similar decreases to streamflow as the FEIS, with the FEIS modelling decreases to mean annual discharge of 7.5%, and 9.0% for the current assessment. June and July have greater reductions in flow than the FEIS, and lower reductions for the rest of the open water season.

3. FISHERIES ANALYSIS

Impacts to fish habitat must be considered for water withdrawals in both winter and the open water seasons. During the winter frozen period, lake inputs and outputs do not occur. DFO has issued a *Protocol for Winter Water Withdrawal from Ice-covered Waterbodies in the Northwest Territories and Nunavut* (DFO 2010). This protocol specifies that the “total water withdrawal from a single waterbody is not to exceed 10% of the available water volume” during one ice-covered season. This 10% allowable threshold has been applied to the stage-volume rating curve in this memo to determine allowable withdrawal volumes for each lake during the winter.

During the open water season there is no specific limit for determining allowable water withdrawals, however the impact to fish and aquatic life must be considered. The *Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada* (DFO 2013) recommends that a desktop hydrologic analysis is acceptable if water withdrawals do not reduce the instantaneous flow by more than 10%, or less than 30% of mean annual discharge (MAD). Reductions greater than this can be permitted but require a more rigorous assessment of impacts that can include hydraulic and habitat modelling.

3.1 LAKES

3.1.1 METHODS

Methods used to analyze the proposed increases in water withdrawals from Doris Lake and Windy Lake on fish habitat mirrored those used in the Madrid-Boston Project FEIS (ERM 2016a). Two initial steps were applied using modelled changes in lake volume and modelled under ice lake surface level:

1. Where a modelled change in average annual lake volume was greater than 10% of average annual baseline volume, the change was considered to be outside of the range of natural variation and further assessment was required.
2. Where a modelled annual change in under ice lake surface level resulted in lake level changes 10 cm or greater than the maximum annual change during baseline, the area of unusable fish habitat under the ice was considered to be outside of the natural range of water level change and further assessment was required.

If further assessment was deemed necessary following the two initial steps, additional analyses focused on spawning habitat due to the potential effects of lake surface elevation reductions on eggs incubating over winter in substrates in the littoral zone. Unlike fish that are mobile and capable of moving to deeper water with changes in surface elevation, the relatively static nature of incubating eggs and larvae makes them more susceptible to environmental fluctuations. The known presence and locations of high value spawning habitats were documented and compared with areas of potential habitat loss due to water withdrawal and use for the Mine.

3.1.2 RESULTS

3.1.2.1 WINDY LAKE

Lake Volume

Predicted changes in lake volume in Windy Lake were modelled using constant rate withdrawals of 438 m³/day up to a maximum of 160,000 m³ in a given year (see Section 2.2 above). Maximum modelled changes in lake volume at any stage are approximately 0.1 to 0.2% and therefore are lower than the $\leq 10\%$ threshold (DFO 2010) indicating the predicted changes are within the range of natural variation. Consequently, no further assessment is recommended as a result of predicted changes in lake volume in Windy Lake considering the 160,000 m³/year withdrawal scenario.

Lake Level

Predicted changes in lake level in Windy Lake were modelled using constant rate withdrawals of 438 m³/day up to a maximum of 160,000 m³ in a given year (see Section 2.2 above). Average modelled changes in lake level across all seasons is approximately 1 cm and the maximum modelled change is approximately 2.1 cm (Table 2-8). Modelled interannual change in lake is 20.2 cm as compared with 19.0 cm during modelled baseline conditions. The increase in interannual water level reduction of 1.2 cm is within the 10 cm threshold used in the FEIS as likely being within the natural range of water level variation, therefore the changes are considered within the range of natural variation in lake level and no further assessment is required.

3.1.2.2 DORIS LAKE

Lake Volume

Predicted changes in lake volume in Doris Lake were modelled using constant rate withdrawals of 7,225 m³/day up to a maximum of 2,637,000 m³ in a given year (see Section 2.2 above). Maximum modelled changes in under ice lake volume at any stage are approximately -9.1% in May, and therefore are lower than the $\leq 10\%$ threshold indicating the predicted changes are within the range of natural variation. Consequently, the changes are considered within the range of natural variation in lake level and no further assessment is required.

Lake Level

Predicted changes in lake level in Doris Lake were modelled using constant rate withdrawals of 7,225 m³/day up to a maximum of 2,637,125 m³ in a given year (see Section 2.2 above). Average modelled changes in lake level across all seasons is approximately -22.1 cm, while the maximum modelled change is approximately -56.6 cm (Table 2-8). Modelled interannual change in lake level is 82.8 cm as compared with 37.4 cm during modelled baseline conditions. Similar to the FEIS, the predicted increase in interannual water level change exceeds the 10 cm threshold established in the FEIS, therefore changes are considered to be outside the range of natural variation in lake level and further assessment is required.

Additional Assessment

Modelling results from the current assessment predict that under constant rate pumping, water level variations with average ice conditions will isolate 2.59 m of lake depth, while water level variations with extreme ice conditions will isolate 2.83 m of lake depth (Table 3-1).

TABLE 3-1 MODELLED INTERANNUAL CHANGES IN WATER LEVELS IN DORIS LAKE

Water Level Variation	Final Environmental Impact Statement				Current Assessment	
	Baseline: Average ¹	Baseline: Maximum ¹	With Project: Average ¹	With Project: Maximum ¹	Baseline	Constant Rate
Interannual Change in Water Elevation (m)	0.53	0.74	0.93	1.14	0.37	0.83
Interannual Change + Avg. Ice thickness (1.76 m) (m)	2.29	2.50	2.69	2.90	2.13	2.59
Interannual Change + Max. Ice thickness (2.0 m) (m)	2.53	2.74	2.93	3.14	2.37	2.83

Notes:

1: Refers to an average or maximum variation in baseline interannual water level

Detailed information on the distribution of spawning habitats for Lake Trout, Lake Whitefish, and Cisco in Doris Lake was collected for the FEIS in 2015 (ERM 2016b). The known presence and locations of high value spawning habitats were surveyed and mapped and compared with the areas of potential habitat loss due to water withdrawal. All habitats shallower than 1.84 m were categorized as unsuitable for spawning because this is the minimum depth of baseline ice penetration. All habitats between 1.84 and 2.74 m depth were categorized as unsuitable or of low quality because they were within the natural range of ice and drawdown, and therefore isolate this lake depth from use as fish habitat. Between 2.74 m and 4 m depth high quality habitat for Lake Trout and Lake Whitefish spawning was identified in five of 47 habitat units and high-quality habitat for Cisco spawning was identified in seven of 47 habitat units. Further, deep-water transect surveys identified extensive good-quality spawning habitats for Lake Trout and Lake Whitefish at depths of up to 10 m. Surveys completed for the FEIS determined high value spawning habitats were not present in the areas predicted to be affected by lake surface reductions up to 2.69 m depth under average water level variation and ice thickness conditions. Under extreme water level variation and ice thickness conditions, lake surface elevation reductions up to 3.14 m modelled during the FEIS were predicted unlikely to result in adverse effects on spawning in Doris Lake because high value spawning habitats were not limited to the shallowest 3.14 m (ERM 2016b).

Results from current modelling predict the isolated lake depth under average and extreme ice conditions (2.59 m and 2.83 m, respectively) are less than the 3.14 m considered in the FEIS, and are unlikely to cause adverse effects on spawning in Doris Lake.

3.2 OUTLET STREAMS

3.2.1 METHODS

Methods used to analyze the proposed increases in water withdrawals from Doris Lake mirrored those used in the Madrid-Boston Project FEIS (ERM 2016a). Hydrological analyses used 43 transects in Doris Creek, divided between upper, middle, and lower Doris Creek to determine effects of withdrawals on flow, depths, and wetted width during the five months of the open water season. The fisheries analysis focused on the passability of a shallow, riffle section marking the break between lower and middle Doris Creek referred to as the “boulder garden”. This is a point of difficult passage for fish that becomes impassable in late summer during baseline conditions. Sufficient data were not collected during the FEIS to quantify loss of wetted usable area of fish habitat or to quantify changes in fish habitat quality for fish species present in the Doris Creek outflow.

There are no transect data for the Windy Lake outflow, therefore, hydrological modelling and analysis of potential effects on fish habitat could not be completed for that watercourse.

3.2.2 RESULTS

3.2.2.1 FISH PASSABILITY

The hydraulic assessment of the Doris Creek outflow modelled reductions in mean monthly discharge was 16% as compared with the predicted 13% in the FEIS (Table 3-2). The largest reductions in discharge are observed during freshet high flows (43%) when fish passage through the boulder garden would not be impeded (Table 3-2). Changes in discharge during the summer and fall open water months are smaller in magnitude (-5 to -13% of baseline discharge) and represent reductions in maximum depths of 1 to 3 cm and reductions in wetted width of 0.08 to 0.57 m. This is similar to the modelled changes of 1 to 2 cm reductions in maximum depth modelled in the FEIS (Table 3-2). The conclusions made in the FEIS regarding the effects of flow reductions on the passability of the boulder garden to fish and the ultimate effects on fish in the Doris Creek outflow are as follows:

“...there is no accessible overwintering habitat upstream of this location due to a large waterfall, so adult anadromous fish do not typically run up the creek in fall. The hydraulic model predicted that potential reductions in connectivity through the riffle/ boulder garden feature of Doris Creek will have little or no impact throughout a majority of the open water season” (ERM 2016a).

3.2.2.2 OPEN WATER TIMING AND WETTED CHANNEL AREA

Hydrology modelling predicted delays in the spring open water season in Doris Creek as well as reductions in wetted width in upper, middle, and lower Doris Creek. These factors were not considered in the FEIS, but these changes have implications for fish and fish habitat in Doris Creek.

Predicted timing of open water in Doris Creek is June 13 in the constant rate withdrawal scenario as compared with May 14 under baseline conditions. The delays represent a 20% reduction in the open water period and may have implications for the timing of fish movement into Doris Creek and fish use in lower and middle Doris Creek. This represents a temporal loss of habitat for fish species in Doris Creek that may need to be considered in offsetting for the additional withdrawals.

Estimated changes in loss of wetted area associated with reductions in predicted reductions in wetted width of Doris Creek are provided in Table 3-3. Wetted area reductions in Table 3-3 represent gross area estimates and do not consider baseline and modelled changes in parameters such as depths, velocities, and habitat quality indices. Additional survey data and analysis would be required to determine the net loss of wetted usable habitat, if any, for life-cycles stages and habitat use for fish species in Doris Creek.

TABLE 3-2 MODELLED CHANGES IN DORIS LAKE OUTFLOW DISCHARGE, DEPTH, AND WETTED WIDTH COMPARED WITH BASELINE IN THE FEIS AND WITH ADDITIONAL PROPOSED WITHDRAWALS (JUNE TO OCTOBER)

Baseline								Modelled Changes												
								FEIS							Current Assessment					
Reach	Variable	June	July	Aug	Sept	Oct	Mean Monthly	Variable	June	July	Aug	Sept	Oct	Mean Monthly	June	July	Aug	Sept	Oct	Mean Monthly
Upper	Q (m³/s)	1.85	1.31	0.49	0.43	0.32	0.88	Δ Q (m³/s)	-0.30	-0.04	-0.04	-0.03	-0.02	-0.10	-0.95	-0.12	-0.12	-0.12	-0.12	-0.28
								Δ Q (%)	-16%	-3%	-8%	-7%	-6%	-10%	-51%	-9%	-24%	-28%	-37%	-32%
	Max Depth (m)	0.80	0.72	0.49	0.49	0.43	0.59	Δ Max Depth (m)	-0.07	-0.01	-0.01	-0.01	-0.01	-0.03	-0.17	-0.02	-0.04	-0.05	-0.06	-0.07
								Δ Max Depth (%)	-9%	-1%	-2%	-2%	-2%	-6%	-22%	-3%	-9%	-10%	-14%	-12%
	Top Width (m)	14.16	10.10	6.37	6.45	5.94	8.60	Δ Top Width (m)	-1.93	-0.29	-0.07	-0.07	-0.09	-0.51	-6.17	-1.07	-0.24	-0.35	-0.56	-1.68
								Δ Top Width (%)	-14%	-3%	-1%	-1%	-2%	-7%	-44%	-11%	-4%	-5%	-9%	-20%
Middle	Q (m³/s)	1.85	1.31	0.49	0.43	0.32	0.88	Δ Q (m³/s)	-0.30	-0.04	-0.04	-0.03	-0.02	-0.10	-0.95	-0.12	-0.12	-0.12	-0.12	-0.28
								Δ Q (%)	-16%	-3%	-8%	-7%	-6%	-10%	-51%	-9%	-24%	-28%	-37%	-32%
	Max Depth (m)	0.92	0.81	0.51	0.48	0.43	0.63	Δ Max Depth (m)	-0.07	-0.01	-0.02	-0.02	-0.01	-0.03	-0.23	-0.03	-0.06	-0.06	-0.07	-0.09
								Δ Max Depth (%)	-8%	-1%	-4%	-4%	-2%	-7%	-25%	-3%	-11%	-13%	-17%	-14%
	Top Width (m)	18.11	14.11	11.06	10.71	10.35	12.87	Δ Top Width (m)	-2.02	-0.24	-0.13	-0.17	-0.19	-0.58	-5.80	-0.70	-0.47	-0.54	-0.60	-1.62
								Δ Top Width (%)	-11%	-2%	-1%	-2%	-2%	-7%	-32%	-5%	-4%	-5%	-6%	-13%
Lower	Q (m³/s)	1.85	1.31	0.49	0.43	0.32	0.88	Δ Q (m³/s)	-0.30	-0.04	-0.04	-0.03	-0.02	-0.10	-0.95	-0.12	-0.12	-0.12	-0.12	-0.28
								Δ Q (%)	-16%	-3%	-8%	-7%	-6%	-10%	-51%	-9%	-24%	-28%	-37%	-32%
	Max Depth (m)	1.39	1.26	0.92	0.88	0.82	1.05	Δ Max Depth (m)	-0.09	-0.01	-0.02	-0.03	-0.01	-0.04	-0.27	-0.03	-0.07	-0.08	-0.08	-0.11
								Δ Max Depth (%)	-6%	-1%	-2%	-3%	-1%	-6%	-19%	-3%	-8%	-9%	-10%	-10%
	Top Width (m)	14.75	9.99	6.93	6.88	6.38	8.99	Δ Top Width (m)	-1.42	-0.15	-0.13	-0.12	-0.07	-0.40	-6.44	-0.67	-0.39	-0.39	-0.35	-1.65
								Δ Top Width (%)	-10%	-2%	-2%	-2%	-1%	-4%	-39%	-7%	-7%	-7%	-6%	-13%
Entire Length	Q (m³/s)	1.85	1.31	0.49	0.43	0.32	0.88	Δ Q (m³/s)	-0.30	-0.04	-0.04	-0.03	-0.02	-0.09	-0.95	-0.12	-0.12	-0.12	-0.12	-0.28
								Δ Q (%)	-16%	-3%	-8%	-7%	-6%	-10%	-51%	-9%	-24%	-28%	-37%	-32%
	Max Depth (m)	1.04	0.94	0.64	0.61	0.55	0.76	Δ Max Depth (m)	-0.08	-0.01	-0.02	-0.02	-0.01	-0.03	-0.22	-0.03	-0.06	-0.06	-0.07	-0.09
								Δ Max Depth (%)	-7%	-1%	-3%	-3%	-2%	-4%	-21%	-3%	-9%	-10%	-13%	-12%
	Top Width (m)	16.32	12.07	8.89	8.74	8.28	10.86	Δ Top Width (m)	-1.79	-0.23	-0.11	-0.12	-0.12	-0.50	-6.14	-0.81	-0.37	-0.43	-0.51	-1.65
								Δ Top Width (%)	-11%	-2%	-1%	-1%	-1%	-4%	-38%	-7%	-4%	-5%	-6%	-15%

TABLE 3-3 MODELLED CHANGES IN WETTED CHANNEL AREA IN DORIS CREEK

Reach	Length (m)	Modelled Mean Monthly Reduction in Wetted Area of Channel (m ²)						
		May	Jun	Jul	Aug	Sep	Oct	Mean Monthly
Upper Doris Creek	395	2,054	2,437	403	63	67	138	860
Middle Doris Creek	350	3,308	2,030	231	109	119	126	987
Lower Doris Creek	3,735	21,924	24,053	2,390	1,008	934	822	8,522
Totals	4,480	27,286	28,521	3,024	1,180	1,120	1,086	10,369

4. CONCLUSION

Using the constant rate water withdrawal scenario, winter lake water volume decreases were limited to less than 10%. Doris Lake experiences the largest annual decrease in water volume of 2.7%, while at both Patch Lake and Windy Lake volume decreases are less than 1%. The annual discharge at the Doris Lake outflow decreases by 31.5%, with the largest monthly decrease of 43.8% occurring in June due to a delayed start of water movement in the Doris Lake outflow. Once water starts moving in the outflow, the decrease in streamflow rate is reduced to 8.9% in July. Outflow discharges from Patch Lake and Windy Lake are limited to less than 10%, the annual discharge at the Patch Lake outflow decreases by 8.1%, with the largest monthly decrease of 11.9% occurring in June, while annual discharge at the Windy Lake outflow decreases by 9.0%, with the largest monthly decrease of 15.5% occurring in June.

Applying the same methods of analysis used in the FEIS to assess the effects of water withdrawals on fish and fish habitat, the current assessment water withdrawals presented in the hydrology section are not likely to have adverse effects on fish and the ability of them to utilize habitats in Windy and Doris Lake. The same can be said for predicted effects of the current assessment water withdrawals on fish passability in the Doris Creek outflow. Analysis in the FEIS focused on the fish passability of the boulder garden located at the boundary of upper and middle Doris Creek. Under the updated current assessment withdrawal scenario discussed above, there is no predicted change from the conclusions provided in the FEIS. Changes in the timing of flows in Doris Creek (i.e., modelled 4-week delay in the beginning of the open water season) may have implications for fish use in Doris Creek and represents a temporal loss of fish habitat. Additional survey data and analyses would be required to assess the effects of changes in open water timing and loss of wetted usable area in Doris Creek on fish.

The potential effects of the current assessment water withdrawals on fish and fish habitat could not be assessed for the Windy Lake outflow due to an absence of flow transect and fish habitat data. It is recommended that similar field surveys and hydrological analysis is completed for the Windy Lake outflow as was completed for Doris Creek downstream of Doris Lake.

5. REFERENCES

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APPENDIX A

HISTORICAL MEAN DAILY DISCHARGE
TABLES

TABLE A1 PATCH LAKE OUTFLOW, HISTORICAL MEAN DAILY DISCHARGE

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	0.123	0.715	0.229	0.145	0.159	0.053	-
2	-	-	-	-	-	0.134	0.721	0.223	0.141	0.164	0.041	-
3	-	-	-	-	-	0.140	0.709	0.219	0.139	0.160	0.032	-
4	-	-	-	-	-	0.151	0.689	0.211	0.138	0.159	0.025	-
5	-	-	-	-	-	0.163	0.663	0.205	0.142	0.156	0.020	-
6	-	-	-	-	-	0.164	0.636	0.200	0.143	0.157	0.016	-
7	-	-	-	-	-	0.178	0.611	0.197	0.149	0.154	0.013	-
8	-	-	-	-	-	0.183	0.590	0.195	0.154	0.156	0.010	-
9	-	-	-	-	-	0.185	0.568	0.191	0.158	0.154	0.008	-
10	-	-	-	-	-	0.196	0.545	0.192	0.161	0.147	0.007	-
11	-	-	-	-	-	0.197	0.534	0.187	0.161	0.141	0.006	-
12	-	-	-	-	-	0.245	0.516	0.188	0.161	0.139	0.004	-
13	-	-	-	-	-	0.362	0.489	0.186	0.162	0.131	0.003	-
14	-	-	-	-	-	0.642	0.473	0.183	0.163	0.129	0.003	-
15	-	-	-	-	-	0.630	0.450	0.176	0.164	0.129	0.003	-
16	-	-	-	-	-	0.772	0.434	0.173	0.161	0.131	0.003	-
17	-	-	-	-	0.017	0.851	0.418	0.170	0.161	0.124	0.002	-
18	-	-	-	-	0.048	0.927	0.401	0.170	0.161	0.122	0.002	-
19	-	-	-	-	0.137	0.960	0.386	0.164	0.162	0.115	0.002	-
20	-	-	-	-	0.141	0.975	0.372	0.160	0.161	0.110	-	-
21	-	-	-	-	0.142	0.945	0.356	0.156	0.160	0.103	-	-
22	-	-	-	-	0.138	0.935	0.340	0.157	0.162	0.101	-	-
23	-	-	-	-	0.127	0.914	0.327	0.150	0.166	0.098	-	-
24	-	-	-	-	0.130	0.895	0.311	0.150	0.167	0.094	-	-
25	-	-	-	-	0.121	0.871	0.299	0.147	0.165	0.091	-	-
26	-	-	-	-	0.127	0.842	0.293	0.147	0.162	0.087	-	-
27	-	-	-	-	0.108	0.809	0.279	0.146	0.164	0.082	-	-
28	-	-	-	-	0.133	0.780	0.263	0.149	0.164	0.078	-	-
29	-	-	-	-	0.133	0.745	0.253	0.147	0.161	0.077	-	-
30	-	-	-	-	0.135	0.727	0.246	0.145	0.159	0.069	-	-

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	-	-	-	-	0.142	-	0.238	0.145	-	0.062	-	-
Mean	-	-	-	-	0.118	0.555	0.456	0.176	0.157	0.122	0.013	-
Max	-	-	-	-	0.142	0.975	0.721	0.229	0.167	0.164	0.053	-
Min		-	-	-	0.017	0.123	0.238	0.145	0.138	0.062	0.002	-

Note:

Mean daily discharge data used from 2009 through 2023

TABLE A2 DORIS LAKE OUTFLOW, HISTORICAL MEAN DAILY DISCHARGE

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	0.000	0.521	2.204	0.753	0.376	0.434	0.144	0.005
2	-	-	-	-	0.000	0.556	2.170	0.723	0.377	0.432	0.121	0.005
3	-	-	-	-	0.000	0.569	2.104	0.701	0.379	0.420	0.102	0.005
4	-	-	-	-	0.000	0.580	2.039	0.675	0.379	0.418	0.085	0.005
5	-	-	-	-	0.000	0.605	1.958	0.651	0.384	0.414	0.073	0.004
6	-	-	-	-	0.000	0.630	1.866	0.623	0.392	0.412	0.063	0.004
7	-	-	-	-	0.000	0.662	1.761	0.600	0.404	0.403	0.054	0.004
8	-	-	-	-	0.000	0.711	1.678	0.582	0.421	0.404	0.047	0.004
9	-	-	-	-	0.000	0.930	1.605	0.563	0.430	0.397	0.041	0.004
10	-	-	-	-	0.001	1.026	1.516	0.543	0.435	0.372	0.036	0.004
11	-	-	-	-	0.001	1.150	1.441	0.524	0.438	0.359	0.031	0.004
12	-	-	-	-	0.001	1.210	1.373	0.506	0.440	0.365	0.027	0.003
13	-	-	-	-	0.001	1.365	1.307	0.492	0.445	0.346	0.023	0.003
14	-	-	-	-	0.002	1.595	1.242	0.481	0.450	0.344	0.023	0.003
15	-	-	-	-	0.003	1.826	1.181	0.471	0.450	0.339	0.021	0.003
16	-	-	-	-	0.005	2.217	1.132	0.458	0.454	0.339	0.019	0.003
17	-	-	-	-	0.016	2.485	1.106	0.450	0.456	0.326	0.017	0.003
18	-	-	-	-	0.053	2.762	1.069	0.443	0.455	0.295	0.014	0.003
19	-	-	-	-	0.220	2.884	1.033	0.434	0.455	0.278	0.013	0.003
20	-	-	-	-	0.238	3.015	0.994	0.422	0.451	0.274	0.011	0.003
21	-	-	-	-	0.248	3.069	0.957	0.413	0.449	0.250	0.009	0.003
22	-	-	-	-	0.250	3.077	0.938	0.410	0.446	0.246	0.008	0.002
23	-	-	-	-	0.244	3.010	0.924	0.404	0.447	0.241	0.007	0.002

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
24	-	-	-	-	0.258	2.931	0.916	0.398	0.448	0.234	0.007	0.002
25	-	-	-	-	0.259	2.837	0.913	0.392	0.448	0.226	0.006	0.002
26	-	-	-	-	0.303	2.727	0.903	0.387	0.444	0.222	0.006	0.002
27	-	-	-	-	0.363	2.609	0.886	0.387	0.444	0.211	0.006	0.002
28	-	-	-	-	0.467	2.491	0.866	0.386	0.442	0.201	0.006	0.002
29	-	-	-	-	0.528	2.378	0.838	0.386	0.438	0.203	0.006	0.002
30	-	-	-	-	0.559	2.286	0.813	0.386	0.438	0.179	0.005	0.002
31	-	-	-	-	0.586	-	0.782	0.382	-	0.160	-	-
Mean	-	-	-	-	0.149	1.824	1.307	0.498	0.431	0.314	0.034	0.003
Max	-	-	-	-	0.586	3.077	2.204	0.753	0.456	0.434	0.144	0.005
Min	-	-	-	-	0.000	0.521	0.782	0.382	0.376	0.160	0.005	0.000

Note:

Mean daily discharge data used from 2009 through 2023

TABLE A3 WINDY LAKE OUTFLOW, HISTORICAL MEAN DAILY DISCHARGE

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	0.001	0.287	0.181	0.092	0.071	0.018	-
2	-	-	-	-	-	0.002	0.285	0.178	0.091	0.069	0.015	-
3	-	-	-	-	-	0.003	0.279	0.177	0.091	0.069	0.012	-
4	-	-	-	-	-	0.005	0.274	0.172	0.094	0.068	0.010	-
5	-	-	-	-	-	0.008	0.268	0.168	0.096	0.066	0.008	-
6	-	-	-	-	-	0.015	0.264	0.162	0.093	0.064	0.007	-
7	-	-	-	-	-	0.035	0.260	0.160	0.096	0.062	0.005	-
8	-	-	-	-	-	0.052	0.259	0.156	0.097	0.061	0.004	-
9	-	-	-	-	-	0.065	0.257	0.153	0.096	0.060	0.003	-
10	-	-	-	-	-	0.088	0.253	0.149	0.098	0.058	0.003	-
11	-	-	-	-	-	0.155	0.248	0.145	0.098	0.055	0.002	-
12	-	-	-	-	-	0.163	0.246	0.140	0.096	0.052	0.001	-
13	-	-	-	-	-	0.173	0.242	0.137	0.095	0.049	0.001	-
14	-	-	-	-	-	0.175	0.236	0.132	0.095	0.047	0.001	-
15	-	-	-	-	-	0.198	0.230	0.127	0.093	0.045	0.000	-
16	-	-	-	-	-	0.266	0.230	0.123	0.093	0.043	0.000	-

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
17	-	-	-	-	-	0.290	0.235	0.121	0.093	0.043	0.000	-
18	-	-	-	-	-	0.303	0.234	0.117	0.092	0.041	0.000	-
19	-	-	-	-	-	0.310	0.229	0.116	0.091	0.041	0.000	-
20	-	-	-	-	-	0.316	0.226	0.113	0.088	0.039	0.000	-
21	-	-	-	-	-	0.317	0.222	0.110	0.086	0.037	0.000	-
22	-	-	-	-	-	0.318	0.216	0.108	0.087	0.036	-	-
23	-	-	-	-	-	0.315	0.211	0.107	0.084	0.034	-	-
24	-	-	-	-	-	0.311	0.205	0.105	0.083	0.032	-	-
25	-	-	-	-	-	0.308	0.206	0.103	0.080	0.031	-	-
26	-	-	-	-	-	0.303	0.203	0.103	0.078	0.029	-	-
27	-	-	-	-	-	0.298	0.197	0.100	0.077	0.028	-	-
28	-	-	-	-	-	0.293	0.194	0.100	0.075	0.027	-	-
29	-	-	-	-	-	0.289	0.189	0.099	0.073	0.025	-	-
30	-	-	-	-	-	0.288	0.188	0.097	0.072	0.024	-	-
31	-	-	-	-	-		0.183	0.095		0.020	-	-
Mean	-	-	-	-	-	0.189	0.234	0.131	0.089	0.046	0.004	-
Max	-	-	-	-	-	0.318	0.287	0.181	0.098	0.071	0.018	-
Min	-	-	-	-	-	0.001	0.183	0.095	0.072	0.020	0.000	-

Note:

Mean daily discharge data used from 2009 through 2023

APPENDIX B

DORIS LAKE OUTFLOW: CONSTANT RATE
HYDROLOGIC PROPERTIES

TABLE B1 JUNE DORIS LAKE OUTFLOW: CONSTANT RATE HEC-RAS OUTPUT

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
43	1.854	0.19	27.52	0.65	1.042	0.15	19.01	0.52	-0.812	-44%	-0.04	-23%	-8.51	-31%	-0.13	-20%
42	1.854	0.31	25.01	0.74	1.042	0.25	11.90	0.61	-0.812	-44%	-0.06	-20%	-13.11	-52%	-0.13	-17%
41	1.854	0.31	12.40	0.83	1.042	0.23	11.47	0.70	-0.812	-44%	-0.08	-25%	-0.93	-7%	-0.13	-15%
40	1.854	0.35	17.06	0.63	1.042	0.31	14.28	0.51	-0.812	-44%	-0.04	-11%	-2.78	-16%	-0.13	-20%
39	1.854	0.35	12.43	0.91	1.042	0.28	11.29	0.78	-0.812	-44%	-0.07	-21%	-1.14	-9%	-0.13	-15%
38.5*	1.854	0.35	11.19	0.92	1.042	0.25	9.24	0.79	-0.812	-44%	-0.09	-27%	-1.95	-17%	-0.13	-14%
38	1.854	0.55	9.91	0.92	1.042	0.43	7.02	0.79	-0.812	-44%	-0.12	-22%	-2.89	-29%	-0.13	-14%
37	1.854	0.84	14.38	0.50	1.042	0.72	5.11	0.37	-0.812	-44%	-0.12	-14%	-9.28	-64%	-0.13	-26%
36	1.854	0.55	32.80	0.68	1.042	0.58	5.07	0.52	-0.812	-44%	0.03	6%	-27.73	-85%	-0.16	-23%
35	1.854	0.42	9.75	1.17	1.042	0.32	6.76	1.02	-0.812	-44%	-0.11	-25%	-2.99	-31%	-0.15	-13%
34	1.854	0.41	8.33	1.14	1.042	0.30	6.93	0.99	-0.812	-44%	-0.11	-27%	-1.40	-17%	-0.15	-13%
33	1.854	0.38	16.81	0.87	1.042	0.30	8.76	0.73	-0.812	-44%	-0.08	-22%	-8.05	-48%	-0.14	-16%
32	1.854	0.46	13.04	0.88	1.042	0.39	8.53	0.73	-0.812	-44%	-0.07	-14%	-4.51	-35%	-0.14	-16%
31.8333*	1.854	0.49	12.42	0.84	1.042	0.42	8.06	0.70	-0.812	-44%	-0.07	-14%	-4.36	-35%	-0.14	-17%
31.6666*	1.854	0.52	11.83	0.81	1.042	0.45	7.49	0.67	-0.812	-44%	-0.07	-14%	-4.34	-37%	-0.14	-18%
31.5*	1.854	0.57	11.25	0.78	1.042	0.49	6.83	0.64	-0.812	-44%	-0.08	-14%	-4.43	-39%	-0.15	-19%
31.3333*	1.854	0.63	10.60	0.76	1.042	0.56	6.01	0.62	-0.812	-44%	-0.08	-12%	-4.59	-43%	-0.15	-19%
31.1666*	1.854	0.77	9.17	0.72	1.042	0.69	4.86	0.57	-0.812	-44%	-0.08	-11%	-4.32	-47%	-0.15	-21%
31	1.854	1.80	3.11	0.47	1.042	1.53	2.86	0.35	-0.812	-44%	-0.27	-15%	-0.25	-8%	-0.12	-25%
30.8*	1.854	4.14	2.80	0.25	1.042	3.48	2.74	0.20	-0.812	-44%	-0.67	-16%	-0.06	-2%	-0.05	-21%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
30.6*	1.854	2.25	3.02	0.37	1.042	1.77	2.88	0.29	-0.812	-44%	-0.48	-21%	-0.13	-4%	-0.08	-22%
30.4*	1.854	3.12	2.92	0.27	1.042	2.72	2.82	0.20	-0.812	-44%	-0.40	-13%	-0.10	-3%	-0.07	-27%
30.2*	1.854	2.40	3.15	0.34	1.042	1.88	2.95	0.27	-0.812	-44%	-0.52	-22%	-0.20	-6%	-0.07	-21%
30	1.854	0.39	7.58	0.92	1.042	0.31	5.88	0.70	-0.812	-44%	-0.08	-21%	-1.70	-22%	-0.23	-25%
29	1.854	0.50	16.71	0.97	1.042	0.44	4.59	0.74	-0.812	-44%	-0.06	-13%	-12.12	-73%	-0.22	-23%
28.8*	1.854	0.51	8.27	0.97	1.042	0.43	4.67	0.75	-0.812	-44%	-0.08	-16%	-3.59	-43%	-0.23	-23%
28.6*	1.854	0.48	6.53	1.02	1.042	0.39	4.97	0.80	-0.812	-44%	-0.09	-19%	-1.56	-24%	-0.22	-22%
28.4*	1.854	0.41	7.48	1.12	1.042	0.32	5.40	0.91	-0.812	-44%	-0.10	-23%	-2.08	-28%	-0.21	-19%
28.2*	1.854	0.35	10.81	1.25	1.042	0.26	5.86	1.05	-0.812	-44%	-0.09	-26%	-4.95	-46%	-0.20	-16%
28	1.854	0.26	10.99	1.40	1.042	0.19	8.68	1.20	-0.812	-44%	-0.06	-25%	-2.31	-21%	-0.20	-14%
27	1.854	0.28	9.52	1.24	1.042	0.21	7.71	1.05	-0.812	-44%	-0.07	-26%	-1.82	-19%	-0.19	-16%
26	1.854	0.37	10.28	1.02	1.042	0.31	8.02	0.83	-0.812	-44%	-0.06	-16%	-2.27	-22%	-0.19	-19%
25	1.854	0.29	9.61	1.23	1.042	0.21	8.53	1.04	-0.812	-44%	-0.07	-25%	-1.09	-11%	-0.19	-15%
24.8333*	1.854	0.26	10.67	1.20	1.042	0.19	9.21	1.01	-0.812	-44%	-0.07	-26%	-1.46	-14%	-0.19	-16%
24.6666*	1.854	0.24	11.74	1.17	1.042	0.17	9.89	0.98	-0.812	-44%	-0.06	-26%	-1.84	-16%	-0.19	-16%
24.5*	1.854	0.22	13.02	1.13	1.042	0.16	10.58	0.95	-0.812	-44%	-0.06	-26%	-2.45	-19%	-0.19	-16%
24.3333*	1.854	0.20	14.71	1.10	1.042	0.15	11.26	0.91	-0.812	-44%	-0.05	-26%	-3.46	-23%	-0.19	-17%
24.1666*	1.854	0.19	17.40	1.06	1.042	0.14	11.94	0.88	-0.812	-44%	-0.05	-27%	-5.46	-31%	-0.18	-17%
24	1.854	0.18	22.70	1.03	1.042	0.13	12.59	0.84	-0.812	-44%	-0.05	-26%	-10.12	-45%	-0.18	-18%
23.8*	1.854	0.19	19.92	1.02	1.042	0.14	12.07	0.84	-0.812	-44%	-0.05	-27%	-7.85	-39%	-0.18	-18%
23.6*	1.854	0.19	17.92	1.01	1.042	0.14	11.53	0.83	-0.812	-44%	-0.05	-27%	-6.39	-36%	-0.18	-17%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
23.4*	1.854	0.20	16.75	1.00	1.042	0.15	10.98	0.83	-0.812	-44%	-0.06	-28%	-5.77	-34%	-0.17	-17%
23.2*	1.854	0.22	16.74	1.04	1.042	0.15	10.43	0.87	-0.812	-44%	-0.06	-28%	-6.31	-38%	-0.17	-16%
23	1.854	0.32	19.54	1.08	1.042	0.26	9.78	0.92	-0.812	-44%	-0.06	-19%	-9.77	-50%	-0.16	-15%
22.8*	1.854	0.30	20.67	1.03	1.042	0.26	11.17	0.85	-0.812	-44%	-0.04	-13%	-9.50	-46%	-0.18	-17%
22.6*	1.854	0.27	19.12	0.94	1.042	0.25	12.21	0.73	-0.812	-44%	-0.02	-7%	-6.91	-36%	-0.21	-22%
22.4*	1.854	0.33	15.43	0.80	1.042	0.31	13.10	0.58	-0.812	-44%	-0.02	-6%	-2.33	-15%	-0.22	-27%
22.2*	1.854	0.33	15.68	0.72	1.042	0.28	14.71	0.56	-0.812	-44%	-0.06	-17%	-0.98	-6%	-0.17	-23%
22	1.854	0.15	24.95	0.89	1.042	0.11	17.10	0.72	-0.812	-44%	-0.04	-26%	-7.85	-31%	-0.17	-19%
21.8*	1.854	0.16	24.21	0.88	1.042	0.12	16.76	0.71	-0.812	-44%	-0.04	-26%	-7.45	-31%	-0.17	-19%
21.6*	1.854	0.16	23.67	0.87	1.042	0.12	16.42	0.70	-0.812	-44%	-0.04	-25%	-7.25	-31%	-0.17	-19%
21.4*	1.854	0.17	23.22	0.85	1.042	0.13	16.08	0.69	-0.812	-44%	-0.04	-24%	-7.14	-31%	-0.17	-20%
21.2*	1.854	0.19	22.44	0.83	1.042	0.14	15.71	0.67	-0.812	-44%	-0.04	-23%	-6.73	-30%	-0.17	-20%
21	1.854	0.22	20.12	0.78	1.042	0.17	15.19	0.62	-0.812	-44%	-0.04	-20%	-4.93	-24%	-0.16	-21%
20.9*	1.854	0.23	21.06	0.79	1.042	0.19	16.06	0.62	-0.812	-44%	-0.04	-16%	-4.99	-24%	-0.17	-21%
20.8*	1.854	0.21	22.05	0.80	1.042	0.18	16.90	0.62	-0.812	-44%	-0.03	-14%	-5.15	-23%	-0.17	-22%
20.7*	1.854	0.21	22.93	0.81	1.042	0.19	17.68	0.61	-0.812	-44%	-0.02	-8%	-5.25	-23%	-0.19	-24%
20.6*	1.854	0.23	23.15	0.80	1.042	0.21	18.37	0.59	-0.812	-44%	-0.02	-8%	-4.77	-21%	-0.21	-26%
20.5*	1.854	0.22	22.95	0.78	1.042	0.18	19.14	0.59	-0.812	-44%	-0.04	-16%	-3.81	-17%	-0.19	-24%
20.4*	1.854	0.19	23.47	0.78	1.042	0.17	19.95	0.60	-0.812	-44%	-0.02	-11%	-3.51	-15%	-0.18	-23%
20.3*	1.854	0.17	24.76	0.80	1.042	0.15	20.75	0.62	-0.812	-44%	-0.02	-11%	-4.00	-16%	-0.19	-23%
20.2*	1.854	0.16	26.35	0.88	1.042	0.14	21.61	0.69	-0.812	-44%	-0.02	-12%	-4.74	-18%	-0.19	-21%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
20.1*	1.854	0.15	27.86	0.96	1.042	0.13	22.64	0.78	-0.812	-44%	-0.02	-15%	-5.22	-19%	-0.18	-19%
20	1.854	0.09	29.81	1.07	1.042	0.07	23.93	0.88	-0.812	-44%	-0.03	-27%	-5.88	-20%	-0.18	-17%
19.8333*	1.854	0.11	28.78	1.03	1.042	0.08	22.22	0.85	-0.812	-44%	-0.03	-25%	-6.55	-23%	-0.18	-18%
19.6666*	1.854	0.12	27.94	0.99	1.042	0.09	20.51	0.81	-0.812	-44%	-0.03	-25%	-7.43	-27%	-0.18	-18%
19.5*	1.854	0.14	27.46	0.95	1.042	0.11	18.77	0.77	-0.812	-44%	-0.03	-23%	-8.69	-32%	-0.18	-19%
19.3333*	1.854	0.16	27.72	0.92	1.042	0.12	17.00	0.74	-0.812	-44%	-0.04	-22%	-10.71	-39%	-0.18	-20%
19.1666*	1.854	0.19	30.08	0.87	1.042	0.15	15.16	0.69	-0.812	-44%	-0.04	-20%	-14.92	-50%	-0.18	-21%
19	1.854	0.22	37.08	0.82	1.042	0.18	12.87	0.64	-0.812	-44%	-0.04	-16%	-24.21	-65%	-0.18	-22%
18.98*	1.854	0.22	37.12	0.82	1.042	0.18	12.91	0.64	-0.812	-44%	-0.03	-16%	-24.21	-65%	-0.18	-22%
18.96*	1.854	0.23	35.99	0.79	1.042	0.20	12.30	0.61	-0.812	-44%	-0.04	-16%	-23.69	-66%	-0.18	-23%
18.94*	1.854	0.26	23.91	0.75	1.042	0.21	11.40	0.58	-0.812	-44%	-0.04	-17%	-12.51	-52%	-0.17	-23%
18.92*	1.854	0.27	18.25	0.73	1.042	0.21	11.40	0.58	-0.812	-44%	-0.06	-21%	-6.84	-38%	-0.15	-21%
18.9	1.854	0.23	35.99	0.79	1.042	0.18	13.30	0.64	-0.812	-44%	-0.05	-21%	-22.69	-63%	-0.15	-19%
18	1.854	0.65	13.33	1.01	1.042	0.65	4.07	0.79	-0.812	-44%	-0.01	-1%	-9.26	-69%	-0.22	-21%
17	1.854	0.23	16.71	1.68	1.042	0.20	12.02	1.46	-0.812	-44%	-0.03	-14%	-4.70	-28%	-0.22	-13%
16	1.854	0.24	17.20	1.74	1.042	0.20	11.08	1.53	-0.812	-44%	-0.04	-17%	-6.12	-36%	-0.22	-12%
15	1.854	0.42	9.86	1.31	1.042	0.33	5.32	1.09	-0.812	-44%	-0.09	-21%	-4.54	-46%	-0.21	-16%
14	1.854	0.82	8.51	0.97	1.042	0.78	3.37	0.76	-0.812	-44%	-0.04	-5%	-5.14	-60%	-0.22	-22%
13	1.854	0.11	21.60	2.36	1.042	0.08	15.63	2.14	-0.812	-44%	-0.03	-29%	-5.97	-28%	-0.21	-9%
12	1.854	0.14	15.76	1.90	1.042	0.10	13.32	1.69	-0.812	-44%	-0.04	-28%	-2.44	-15%	-0.21	-11%
11	1.854	0.52	8.14	1.25	1.042	0.41	4.64	1.04	-0.812	-44%	-0.11	-20%	-3.50	-43%	-0.21	-17%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
10.8333*	1.854	0.51	8.20	1.22	1.042	0.41	4.78	1.01	-0.812	-44%	-0.10	-20%	-3.42	-42%	-0.21	-17%
10.6666*	1.854	0.51	8.28	1.20	1.042	0.41	4.92	0.99	-0.812	-44%	-0.10	-20%	-3.37	-41%	-0.21	-17%
10.5*	1.854	0.51	8.36	1.17	1.042	0.41	5.05	0.96	-0.812	-44%	-0.09	-19%	-3.31	-40%	-0.21	-18%
10.3333*	1.854	0.52	8.37	1.13	1.042	0.43	5.16	0.92	-0.812	-44%	-0.09	-17%	-3.21	-38%	-0.21	-19%
10.1666*	1.854	0.54	8.32	1.10	1.042	0.46	5.24	0.88	-0.812	-44%	-0.07	-14%	-3.08	-37%	-0.21	-20%
10	1.854	0.57	7.88	1.04	1.042	0.53	5.25	0.82	-0.812	-44%	-0.04	-7%	-2.62	-33%	-0.23	-22%
9.8*	1.854	0.39	8.83	1.35	1.042	0.34	6.58	1.13	-0.812	-44%	-0.06	-15%	-2.25	-25%	-0.23	-17%
9.6*	1.854	0.31	9.97	1.66	1.042	0.26	7.94	1.44	-0.812	-44%	-0.05	-17%	-2.03	-20%	-0.23	-14%
9.4*	1.854	0.26	11.17	1.98	1.042	0.21	9.32	1.75	-0.812	-44%	-0.05	-18%	-1.86	-17%	-0.23	-12%
9.2*	1.854	0.22	12.41	2.29	1.042	0.18	10.71	2.06	-0.812	-44%	-0.04	-19%	-1.70	-14%	-0.23	-10%
9	1.854	0.16	13.65	2.60	1.042	0.12	12.11	2.37	-0.812	-44%	-0.04	-26%	-1.55	-11%	-0.23	-9%
8	1.854	0.18	15.05	2.60	1.042	0.14	12.91	2.37	-0.812	-44%	-0.04	-21%	-2.13	-14%	-0.23	-9%
7	1.854	0.20	16.04	2.23	1.042	0.16	11.84	2.01	-0.812	-44%	-0.04	-19%	-4.20	-26%	-0.23	-10%
6	1.854	0.39	8.54	1.09	1.042	0.34	6.95	0.86	-0.812	-44%	-0.05	-13%	-1.58	-19%	-0.23	-21%
5	1.854	0.47	9.08	1.07	1.042	0.40	4.86	0.83	-0.812	-44%	-0.08	-16%	-4.23	-47%	-0.24	-22%
4	1.854	0.33	9.47	1.06	1.042	0.29	7.89	0.81	-0.812	-44%	-0.03	-10%	-1.58	-17%	-0.25	-24%
3	1.854	0.35	10.74	1.09	1.042	0.32	6.76	0.84	-0.812	-44%	-0.04	-10%	-3.99	-37%	-0.26	-24%
2	1.854	0.14	22.42	1.26	1.042	0.11	13.77	1.00	-0.812	-44%	-0.03	-19%	-8.65	-39%	-0.26	-21%
1	1.854	0.27	13.01	1.31	1.042	0.22	7.70	1.05	-0.812	-44%	-0.05	-18%	-5.31	-41%	-0.26	-20%

TABLE B2 JULY DORIS LAKE OUTFLOW: CONSTANT RATE HEC-RAS OUTPUT

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
43	1.305	0.16	20.37	0.57	1.189	0.15	19.60	0.55	-0.116	-9%	-0.01	-4%	-0.77	-4%	-0.02	-4%
42	1.305	0.27	13.28	0.66	1.189	0.26	12.29	0.64	-0.116	-9%	-0.01	-4%	-0.99	-7%	-0.02	-3%
41	1.305	0.25	11.68	0.75	1.189	0.24	11.59	0.73	-0.116	-9%	-0.01	-5%	-0.09	-1%	-0.02	-3%
40	1.305	0.32	15.08	0.56	1.189	0.32	14.96	0.53	-0.116	-9%	-0.01	-2%	-0.12	-1%	-0.02	-4%
39	1.305	0.30	11.53	0.83	1.189	0.29	11.43	0.81	-0.116	-9%	-0.01	-3%	-0.10	-1%	-0.02	-3%
38.5*	1.305	0.28	9.48	0.84	1.189	0.27	9.34	0.82	-0.116	-9%	-0.01	-5%	-0.13	-1%	-0.02	-3%
38	1.305	0.47	7.37	0.84	1.189	0.45	7.17	0.82	-0.116	-9%	-0.02	-4%	-0.20	-3%	-0.02	-3%
37	1.305	0.75	7.49	0.43	1.189	0.73	5.25	0.41	-0.116	-9%	-0.02	-2%	-2.24	-30%	-0.02	-5%
36	1.305	0.61	17.23	0.59	1.189	0.60	6.93	0.56	-0.116	-9%	-0.01	-2%	-10.30	-60%	-0.02	-4%
35	1.305	0.35	7.39	1.08	1.189	0.34	7.03	1.06	-0.116	-9%	-0.02	-5%	-0.36	-5%	-0.02	-2%
34	1.305	0.33	7.36	1.05	1.189	0.32	7.14	1.03	-0.116	-9%	-0.02	-5%	-0.22	-3%	-0.02	-2%
33	1.305	0.32	9.37	0.79	1.189	0.31	9.13	0.77	-0.116	-9%	-0.01	-4%	-0.24	-3%	-0.02	-3%
32	1.305	0.41	10.42	0.79	1.189	0.40	9.60	0.77	-0.116	-9%	-0.01	-2%	-0.82	-8%	-0.02	-3%
31.8333*	1.305	0.43	9.90	0.76	1.189	0.42	9.04	0.74	-0.116	-9%	-0.01	-2%	-0.85	-9%	-0.02	-3%
31.6666*	1.305	0.46	9.28	0.73	1.189	0.45	8.37	0.70	-0.116	-9%	-0.01	-2%	-0.91	-10%	-0.02	-3%
31.5*	1.305	0.51	8.53	0.70	1.189	0.50	7.59	0.67	-0.116	-9%	-0.01	-2%	-0.95	-11%	-0.02	-3%
31.3333*	1.305	0.57	7.37	0.68	1.189	0.57	6.67	0.65	-0.116	-9%	-0.01	-1%	-0.70	-10%	-0.02	-4%
31.1666*	1.305	0.71	5.79	0.63	1.189	0.70	5.40	0.61	-0.116	-9%	-0.01	-2%	-0.39	-7%	-0.02	-4%
31	1.305	1.63	2.91	0.39	1.189	1.59	2.89	0.37	-0.116	-9%	-0.04	-3%	-0.02	-1%	-0.02	-4%
30.8*	1.305	3.77	2.76	0.22	1.189	3.66	2.75	0.21	-0.116	-9%	-0.11	-3%	-0.01	0%	-0.01	-3%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
30.6*	1.305	1.94	2.92	0.32	1.189	1.87	2.90	0.30	-0.116	-9%	-0.07	-4%	-0.02	-1%	-0.01	-4%
30.4*	1.305	2.88	2.85	0.23	1.189	2.82	2.84	0.22	-0.116	-9%	-0.06	-2%	-0.02	-1%	-0.01	-4%
30.2*	1.305	2.07	3.01	0.29	1.189	1.99	2.98	0.28	-0.116	-9%	-0.08	-4%	-0.03	-1%	-0.01	-4%
30	1.305	0.33	6.32	0.79	1.189	0.32	6.08	0.75	-0.116	-9%	-0.01	-4%	-0.24	-4%	-0.04	-4%
29	1.305	0.46	5.79	0.84	1.189	0.45	5.08	0.80	-0.116	-9%	-0.01	-3%	-0.71	-12%	-0.04	-4%
28.8*	1.305	0.46	5.10	0.84	1.189	0.45	4.92	0.80	-0.116	-9%	-0.01	-3%	-0.18	-3%	-0.04	-4%
28.6*	1.305	0.42	5.29	0.89	1.189	0.40	5.16	0.85	-0.116	-9%	-0.01	-3%	-0.13	-2%	-0.03	-4%
28.4*	1.305	0.35	5.68	0.99	1.189	0.33	5.56	0.96	-0.116	-9%	-0.02	-4%	-0.12	-2%	-0.03	-3%
28.2*	1.305	0.29	6.13	1.13	1.189	0.27	6.03	1.10	-0.116	-9%	-0.02	-5%	-0.10	-2%	-0.03	-3%
28	1.305	0.21	9.56	1.28	1.189	0.20	9.16	1.25	-0.116	-9%	-0.01	-4%	-0.40	-4%	-0.03	-2%
27	1.305	0.23	8.25	1.12	1.189	0.22	8.04	1.09	-0.116	-9%	-0.01	-5%	-0.21	-3%	-0.03	-3%
26	1.305	0.32	9.00	0.90	1.189	0.32	8.63	0.87	-0.116	-9%	-0.01	-3%	-0.37	-4%	-0.03	-3%
25	1.305	0.24	8.95	1.12	1.189	0.23	8.75	1.09	-0.116	-9%	-0.01	-5%	-0.20	-2%	-0.03	-3%
24.8333*	1.305	0.21	9.68	1.08	1.189	0.20	9.46	1.06	-0.116	-9%	-0.01	-5%	-0.23	-2%	-0.03	-3%
24.6666*	1.305	0.19	10.48	1.05	1.189	0.18	10.18	1.02	-0.116	-9%	-0.01	-5%	-0.29	-3%	-0.03	-3%
24.5*	1.305	0.18	11.35	1.02	1.189	0.17	10.94	0.99	-0.116	-9%	-0.01	-5%	-0.40	-4%	-0.03	-3%
24.3333*	1.305	0.17	12.35	0.99	1.189	0.16	11.76	0.96	-0.116	-9%	-0.01	-5%	-0.59	-5%	-0.03	-3%
24.1666*	1.305	0.16	13.66	0.95	1.189	0.15	12.70	0.92	-0.116	-9%	-0.01	-5%	-0.96	-7%	-0.03	-3%
24	1.305	0.15	15.76	0.91	1.189	0.14	13.82	0.89	-0.116	-9%	-0.01	-5%	-1.94	-12%	-0.03	-3%
23.8*	1.305	0.15	14.75	0.91	1.189	0.14	13.28	0.88	-0.116	-9%	-0.01	-5%	-1.47	-10%	-0.03	-3%
23.6*	1.305	0.16	13.70	0.90	1.189	0.15	12.54	0.87	-0.116	-9%	-0.01	-6%	-1.16	-8%	-0.03	-3%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
23.4*	1.305	0.17	12.89	0.89	1.189	0.16	11.91	0.87	-0.116	-9%	-0.01	-5%	-0.98	-8%	-0.03	-3%
23.2*	1.305	0.18	12.43	0.94	1.189	0.17	11.39	0.91	-0.116	-9%	-0.01	-6%	-1.04	-8%	-0.03	-3%
23	1.305	0.28	12.72	0.98	1.189	0.27	10.64	0.96	-0.116	-9%	-0.01	-4%	-2.08	-16%	-0.02	-2%
22.8*	1.305	0.27	14.24	0.93	1.189	0.26	12.64	0.91	-0.116	-9%	-0.01	-3%	-1.60	-11%	-0.02	-2%
22.6*	1.305	0.25	12.74	0.82	1.189	0.25	12.59	0.79	-0.116	-9%	-0.01	-3%	-0.15	-1%	-0.02	-3%
22.4*	1.305	0.33	13.45	0.64	1.189	0.32	13.30	0.62	-0.116	-9%	-0.01	-3%	-0.15	-1%	-0.03	-4%
22.2*	1.305	0.30	15.05	0.62	1.189	0.29	14.91	0.59	-0.116	-9%	-0.01	-3%	-0.15	-1%	-0.03	-4%
22	1.305	0.12	19.71	0.78	1.189	0.12	18.60	0.76	-0.116	-9%	-0.01	-5%	-1.12	-6%	-0.03	-3%
21.8*	1.305	0.13	19.31	0.77	1.189	0.12	18.19	0.75	-0.116	-9%	-0.01	-5%	-1.12	-6%	-0.03	-3%
21.6*	1.305	0.14	18.90	0.76	1.189	0.13	17.78	0.73	-0.116	-9%	-0.01	-5%	-1.12	-6%	-0.03	-3%
21.4*	1.305	0.15	18.45	0.75	1.189	0.14	17.31	0.72	-0.116	-9%	-0.01	-5%	-1.14	-6%	-0.03	-3%
21.2*	1.305	0.16	17.63	0.72	1.189	0.15	16.48	0.70	-0.116	-9%	-0.01	-4%	-1.15	-7%	-0.02	-3%
21	1.305	0.19	15.44	0.67	1.189	0.18	15.34	0.65	-0.116	-9%	-0.01	-4%	-0.10	-1%	-0.02	-4%
20.9*	1.305	0.20	16.33	0.68	1.189	0.20	16.22	0.66	-0.116	-9%	-0.01	-3%	-0.11	-1%	-0.02	-3%
20.8*	1.305	0.19	17.20	0.68	1.189	0.18	17.08	0.66	-0.116	-9%	-0.01	-3%	-0.12	-1%	-0.02	-4%
20.7*	1.305	0.20	18.04	0.68	1.189	0.19	17.90	0.66	-0.116	-9%	0.00	-2%	-0.13	-1%	-0.03	-4%
20.6*	1.305	0.22	18.81	0.67	1.189	0.21	18.66	0.64	-0.116	-9%	-0.01	-3%	-0.15	-1%	-0.03	-4%
20.5*	1.305	0.19	19.65	0.67	1.189	0.18	19.50	0.65	-0.116	-9%	-0.01	-4%	-0.16	-1%	-0.03	-4%
20.4*	1.305	0.17	20.51	0.68	1.189	0.17	20.33	0.66	-0.116	-9%	0.00	-2%	-0.17	-1%	-0.03	-4%
20.3*	1.305	0.15	21.40	0.70	1.189	0.15	21.19	0.67	-0.116	-9%	0.00	-2%	-0.21	-1%	-0.03	-4%
20.2*	1.305	0.14	22.35	0.77	1.189	0.14	22.10	0.74	-0.116	-9%	0.00	-2%	-0.25	-1%	-0.03	-4%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
20.1*	1.305	0.13	23.46	0.86	1.189	0.13	23.16	0.83	-0.116	-9%	0.00	-2%	-0.30	-1%	-0.03	-3%
20	1.305	0.08	26.90	0.96	1.189	0.07	25.24	0.93	-0.116	-9%	0.00	-4%	-1.66	-6%	-0.03	-3%
19.8333*	1.305	0.09	25.31	0.93	1.189	0.08	23.72	0.90	-0.116	-9%	0.00	-5%	-1.58	-6%	-0.03	-3%
19.6666*	1.305	0.10	23.74	0.89	1.189	0.10	22.20	0.86	-0.116	-9%	0.00	-4%	-1.55	-7%	-0.03	-3%
19.5*	1.305	0.12	22.24	0.85	1.189	0.11	20.66	0.82	-0.116	-9%	-0.01	-4%	-1.58	-7%	-0.03	-3%
19.3333*	1.305	0.13	20.81	0.81	1.189	0.13	19.13	0.79	-0.116	-9%	-0.01	-4%	-1.68	-8%	-0.03	-4%
19.1666*	1.305	0.16	19.29	0.77	1.189	0.15	17.43	0.74	-0.116	-9%	-0.01	-3%	-1.86	-10%	-0.03	-4%
19	1.305	0.19	17.13	0.72	1.189	0.19	14.70	0.69	-0.116	-9%	-0.01	-3%	-2.42	-14%	-0.03	-4%
18.98*	1.305	0.19	17.27	0.72	1.189	0.19	14.94	0.69	-0.116	-9%	-0.01	-3%	-2.33	-13%	-0.03	-4%
18.96*	1.305	0.20	15.50	0.69	1.189	0.20	13.61	0.66	-0.116	-9%	-0.01	-2%	-1.89	-12%	-0.03	-4%
18.94*	1.305	0.22	13.45	0.65	1.189	0.22	12.67	0.63	-0.116	-9%	-0.01	-3%	-0.79	-6%	-0.03	-4%
18.92*	1.305	0.23	13.25	0.64	1.189	0.22	12.58	0.62	-0.116	-9%	-0.01	-4%	-0.67	-5%	-0.02	-4%
18.9	1.305	0.20	16.75	0.71	1.189	0.19	15.15	0.69	-0.116	-9%	-0.01	-4%	-1.60	-10%	-0.02	-3%
18	1.305	0.66	5.50	0.87	1.189	0.65	4.47	0.84	-0.116	-9%	-0.01	-2%	-1.03	-19%	-0.03	-4%
17	1.305	0.20	13.43	1.55	1.189	0.20	12.59	1.51	-0.116	-9%	0.00	-2%	-0.84	-6%	-0.03	-2%
16	1.305	0.21	12.09	1.61	1.189	0.20	11.41	1.58	-0.116	-9%	-0.01	-3%	-0.67	-6%	-0.03	-2%
15	1.305	0.36	6.23	1.18	1.189	0.34	5.69	1.14	-0.116	-9%	-0.01	-4%	-0.54	-9%	-0.03	-3%
14	1.305	0.80	4.70	0.84	1.189	0.78	3.68	0.81	-0.116	-9%	-0.01	-1%	-1.02	-22%	-0.03	-4%
13	1.305	0.09	17.58	2.23	1.189	0.09	16.29	2.19	-0.116	-9%	-0.01	-5%	-1.29	-7%	-0.03	-1%
12	1.305	0.11	13.86	1.77	1.189	0.11	13.63	1.73	-0.116	-9%	-0.01	-5%	-0.23	-2%	-0.03	-2%
11	1.305	0.45	5.43	1.12	1.189	0.43	5.02	1.09	-0.116	-9%	-0.02	-4%	-0.42	-8%	-0.03	-3%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
10.8333*	1.305	0.44	5.57	1.09	1.189	0.43	5.14	1.06	-0.116	-9%	-0.02	-4%	-0.43	-8%	-0.03	-3%
10.6666*	1.305	0.44	5.70	1.07	1.189	0.43	5.25	1.03	-0.116	-9%	-0.02	-3%	-0.45	-8%	-0.03	-3%
10.5*	1.305	0.45	5.80	1.04	1.189	0.43	5.34	1.01	-0.116	-9%	-0.02	-3%	-0.46	-8%	-0.03	-3%
10.3333*	1.305	0.46	5.83	1.00	1.189	0.44	5.35	0.97	-0.116	-9%	-0.01	-3%	-0.48	-8%	-0.03	-3%
10.1666*	1.305	0.48	5.75	0.96	1.189	0.47	5.41	0.93	-0.116	-9%	-0.01	-2%	-0.34	-6%	-0.03	-3%
10	1.305	0.54	5.55	0.91	1.189	0.53	5.43	0.87	-0.116	-9%	-0.01	-1%	-0.12	-2%	-0.04	-4%
9.8*	1.305	0.35	6.94	1.22	1.189	0.34	6.80	1.18	-0.116	-9%	-0.01	-2%	-0.14	-2%	-0.04	-3%
9.6*	1.305	0.27	8.37	1.53	1.189	0.27	8.20	1.49	-0.116	-9%	-0.01	-3%	-0.17	-2%	-0.03	-2%
9.4*	1.305	0.23	9.82	1.84	1.189	0.22	9.61	1.80	-0.116	-9%	-0.01	-3%	-0.21	-2%	-0.04	-2%
9.2*	1.305	0.19	11.27	2.15	1.189	0.19	11.03	2.11	-0.116	-9%	-0.01	-3%	-0.24	-2%	-0.04	-2%
9	1.305	0.13	12.69	2.46	1.189	0.13	12.47	2.43	-0.116	-9%	-0.01	-5%	-0.23	-2%	-0.04	-1%
8	1.305	0.15	13.28	2.47	1.189	0.15	13.09	2.43	-0.116	-9%	-0.01	-3%	-0.19	-1%	-0.04	-1%
7	1.305	0.17	13.03	2.10	1.189	0.17	12.20	2.06	-0.116	-9%	-0.01	-3%	-0.83	-6%	-0.04	-2%
6	1.305	0.35	7.63	0.95	1.189	0.34	7.28	0.92	-0.116	-9%	-0.01	-2%	-0.35	-5%	-0.03	-4%
5	1.305	0.42	5.52	0.93	1.189	0.41	5.08	0.89	-0.116	-9%	-0.01	-3%	-0.44	-8%	-0.04	-4%
4	1.305	0.30	8.62	0.91	1.189	0.29	8.35	0.87	-0.116	-9%	-0.01	-2%	-0.27	-3%	-0.04	-4%
3	1.305	0.32	7.74	0.94	1.189	0.31	7.30	0.90	-0.116	-9%	-0.01	-2%	-0.44	-6%	-0.04	-4%
2	1.305	0.12	16.53	1.11	1.189	0.12	14.87	1.07	-0.116	-9%	0.00	-3%	-1.66	-10%	-0.04	-4%
1	1.305	0.23	8.91	1.16	1.189	0.23	8.36	1.12	-0.116	-9%	-0.01	-3%	-0.55	-6%	-0.04	-3%

TABLE B3 AUGUST DORIS LAKE OUTFLOW: CONSTANT RATE HEC-RAS OUTPUT

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
43	0.486	0.10	16.44	0.38	0.368	0.09	15.97	0.34	-0.118	-24%	-0.01	-14%	-0.47	-3%	-0.04	-10%
42	0.486	0.18	9.83	0.48	0.368	0.15	9.68	0.44	-0.118	-24%	-0.02	-13%	-0.16	-2%	-0.04	-8%
41	0.486	0.16	10.65	0.57	0.368	0.14	10.30	0.53	-0.118	-24%	-0.02	-13%	-0.35	-3%	-0.04	-7%
40	0.486	0.28	8.85	0.37	0.368	0.25	8.20	0.34	-0.118	-24%	-0.02	-8%	-0.64	-7%	-0.04	-10%
39	0.486	0.21	10.70	0.65	0.368	0.19	10.53	0.61	-0.118	-24%	-0.02	-8%	-0.18	-2%	-0.04	-6%
38.5*	0.486	0.16	8.79	0.66	0.368	0.14	8.66	0.62	-0.118	-24%	-0.02	-15%	-0.14	-2%	-0.04	-6%
38	0.486	0.30	6.40	0.67	0.368	0.26	5.88	0.63	-0.118	-24%	-0.04	-12%	-0.52	-8%	-0.04	-6%
37	0.486	0.78	4.41	0.20	0.368	0.77	4.27	0.16	-0.118	-24%	-0.01	-1%	-0.14	-3%	-0.03	-17%
36	0.486	0.55	3.29	0.30	0.368	0.53	3.10	0.24	-0.118	-24%	-0.03	-5%	-0.19	-6%	-0.06	-19%
35	0.486	0.25	5.24	0.80	0.368	0.22	4.95	0.74	-0.118	-24%	-0.03	-11%	-0.29	-5%	-0.06	-7%
34	0.486	0.23	5.74	0.77	0.368	0.21	5.44	0.72	-0.118	-24%	-0.03	-11%	-0.30	-5%	-0.06	-7%
33	0.486	0.25	5.35	0.51	0.368	0.22	5.12	0.46	-0.118	-24%	-0.03	-12%	-0.23	-4%	-0.05	-10%
32	0.486	0.33	4.02	0.53	0.368	0.29	3.76	0.48	-0.118	-24%	-0.04	-13%	-0.26	-7%	-0.05	-10%
31.8333*	0.486	0.36	4.14	0.50	0.368	0.31	3.81	0.45	-0.118	-24%	-0.04	-12%	-0.33	-8%	-0.05	-10%
31.6666*	0.486	0.38	3.97	0.47	0.368	0.34	3.84	0.42	-0.118	-24%	-0.04	-11%	-0.13	-3%	-0.05	-10%
31.5*	0.486	0.41	3.74	0.44	0.368	0.36	3.64	0.40	-0.118	-24%	-0.05	-11%	-0.10	-3%	-0.05	-10%
31.3333*	0.486	0.45	3.48	0.43	0.368	0.40	3.40	0.39	-0.118	-24%	-0.05	-12%	-0.08	-2%	-0.05	-10%
31.1666*	0.486	0.53	3.18	0.41	0.368	0.47	3.13	0.37	-0.118	-24%	-0.06	-12%	-0.06	-2%	-0.04	-10%
31	0.486	1.20	2.76	0.25	0.368	1.09	2.73	0.23	-0.118	-24%	-0.11	-9%	-0.03	-1%	-0.02	-10%
30.8*	0.486	2.63	2.66	0.16	0.368	2.39	2.64	0.15	-0.118	-24%	-0.24	-9%	-0.02	-1%	-0.01	-8%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
30.6*	0.486	1.30	2.79	0.21	0.368	1.16	2.77	0.19	-0.118	-24%	-0.14	-11%	-0.02	-1%	-0.02	-9%
30.4*	0.486	2.22	2.73	0.14	0.368	2.09	2.58	0.13	-0.118	-24%	-0.13	-6%	-0.15	-6%	-0.02	-11%
30.2*	0.486	1.35	2.83	0.20	0.368	1.20	2.79	0.18	-0.118	-24%	-0.15	-11%	-0.03	-1%	-0.02	-10%
30	0.486	0.25	5.15	0.44	0.368	0.22	4.97	0.38	-0.118	-24%	-0.02	-9%	-0.19	-4%	-0.07	-15%
29	0.486	0.35	3.44	0.49	0.368	0.32	3.37	0.42	-0.118	-24%	-0.03	-10%	-0.07	-2%	-0.07	-13%
28.8*	0.486	0.36	3.66	0.49	0.368	0.33	3.55	0.42	-0.118	-24%	-0.03	-8%	-0.11	-3%	-0.06	-13%
28.6*	0.486	0.35	4.10	0.52	0.368	0.33	3.83	0.44	-0.118	-24%	-0.02	-5%	-0.27	-7%	-0.07	-14%
28.4*	0.486	0.27	4.54	0.61	0.368	0.25	4.25	0.53	-0.118	-24%	-0.02	-7%	-0.29	-6%	-0.08	-13%
28.2*	0.486	0.20	4.99	0.75	0.368	0.18	4.70	0.67	-0.118	-24%	-0.02	-11%	-0.29	-6%	-0.08	-10%
28	0.486	0.15	5.76	0.90	0.368	0.13	5.15	0.83	-0.118	-24%	-0.02	-14%	-0.61	-11%	-0.08	-8%
27	0.486	0.16	6.14	0.75	0.368	0.14	5.85	0.68	-0.118	-24%	-0.02	-11%	-0.29	-5%	-0.07	-10%
26	0.486	0.29	4.32	0.53	0.368	0.26	3.90	0.46	-0.118	-24%	-0.02	-8%	-0.43	-10%	-0.07	-13%
25	0.486	0.18	5.73	0.75	0.368	0.16	5.46	0.68	-0.118	-24%	-0.02	-11%	-0.26	-5%	-0.07	-9%
24.8333*	0.486	0.16	7.31	0.72	0.368	0.15	6.26	0.65	-0.118	-24%	-0.02	-10%	-1.05	-14%	-0.07	-10%
24.6666*	0.486	0.15	8.47	0.68	0.368	0.14	7.77	0.62	-0.118	-24%	-0.01	-9%	-0.70	-8%	-0.07	-10%
24.5*	0.486	0.13	9.28	0.65	0.368	0.12	9.00	0.58	-0.118	-24%	-0.01	-8%	-0.29	-3%	-0.07	-11%
24.3333*	0.486	0.12	10.02	0.62	0.368	0.11	9.79	0.55	-0.118	-24%	-0.01	-8%	-0.23	-2%	-0.07	-11%
24.1666*	0.486	0.12	10.73	0.58	0.368	0.11	10.54	0.51	-0.118	-24%	-0.01	-9%	-0.20	-2%	-0.07	-12%
24	0.486	0.11	11.41	0.54	0.368	0.10	11.24	0.47	-0.118	-24%	-0.01	-8%	-0.17	-1%	-0.07	-13%
23.8*	0.486	0.11	10.83	0.53	0.368	0.10	10.66	0.46	-0.118	-24%	-0.01	-8%	-0.17	-2%	-0.07	-13%
23.6*	0.486	0.12	10.25	0.53	0.368	0.11	10.01	0.46	-0.118	-24%	-0.01	-9%	-0.23	-2%	-0.07	-13%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
23.4*	0.486	0.12	9.62	0.52	0.368	0.11	9.34	0.45	-0.118	-24%	-0.01	-9%	-0.29	-3%	-0.07	-14%
23.2*	0.486	0.13	8.99	0.56	0.368	0.12	8.76	0.49	-0.118	-24%	-0.01	-9%	-0.23	-3%	-0.07	-13%
23	0.486	0.24	8.39	0.61	0.368	0.22	8.21	0.54	-0.118	-24%	-0.02	-9%	-0.18	-2%	-0.07	-12%
22.8*	0.486	0.22	9.20	0.59	0.368	0.20	8.91	0.52	-0.118	-24%	-0.02	-10%	-0.29	-3%	-0.07	-11%
22.6*	0.486	0.20	10.20	0.53	0.368	0.18	9.81	0.47	-0.118	-24%	-0.02	-10%	-0.39	-4%	-0.06	-11%
22.4*	0.486	0.24	11.19	0.42	0.368	0.22	10.65	0.37	-0.118	-24%	-0.02	-9%	-0.54	-5%	-0.05	-11%
22.2*	0.486	0.24	13.06	0.37	0.368	0.22	12.43	0.33	-0.118	-24%	-0.02	-7%	-0.63	-5%	-0.05	-13%
22	0.486	0.07	16.10	0.54	0.368	0.06	15.84	0.49	-0.118	-24%	-0.01	-15%	-0.26	-2%	-0.05	-9%
21.8*	0.486	0.08	15.79	0.53	0.368	0.07	15.52	0.48	-0.118	-24%	-0.01	-15%	-0.27	-2%	-0.05	-9%
21.6*	0.486	0.09	15.50	0.52	0.368	0.08	15.24	0.47	-0.118	-24%	-0.01	-14%	-0.26	-2%	-0.05	-9%
21.4*	0.486	0.10	15.20	0.51	0.368	0.08	14.97	0.46	-0.118	-24%	-0.01	-13%	-0.23	-1%	-0.05	-9%
21.2*	0.486	0.11	14.88	0.49	0.368	0.10	14.67	0.44	-0.118	-24%	-0.01	-11%	-0.21	-1%	-0.05	-9%
21	0.486	0.14	14.40	0.44	0.368	0.14	13.62	0.39	-0.118	-24%	-0.01	-6%	-0.79	-5%	-0.05	-10%
20.9*	0.486	0.16	15.19	0.43	0.368	0.14	14.98	0.39	-0.118	-24%	-0.02	-9%	-0.21	-1%	-0.05	-11%
20.8*	0.486	0.16	15.99	0.43	0.368	0.14	15.67	0.39	-0.118	-24%	-0.02	-10%	-0.31	-2%	-0.05	-11%
20.7*	0.486	0.16	16.68	0.43	0.368	0.15	16.24	0.38	-0.118	-24%	-0.02	-9%	-0.44	-3%	-0.05	-11%
20.6*	0.486	0.17	17.06	0.41	0.368	0.16	16.58	0.36	-0.118	-24%	-0.01	-8%	-0.48	-3%	-0.05	-12%
20.5*	0.486	0.15	17.41	0.39	0.368	0.14	16.77	0.34	-0.118	-24%	-0.01	-6%	-0.64	-4%	-0.05	-14%
20.4*	0.486	0.15	17.77	0.38	0.368	0.14	16.62	0.32	-0.118	-24%	-0.01	-4%	-1.15	-6%	-0.06	-15%
20.3*	0.486	0.13	18.21	0.39	0.368	0.13	16.67	0.33	-0.118	-24%	-0.01	-5%	-1.54	-8%	-0.06	-16%
20.2*	0.486	0.12	18.78	0.46	0.368	0.11	17.14	0.41	-0.118	-24%	-0.01	-9%	-1.64	-9%	-0.06	-13%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
20.1*	0.486	0.10	19.88	0.56	0.368	0.09	18.08	0.50	-0.118	-24%	-0.01	-12%	-1.80	-9%	-0.06	-10%
20	0.486	0.05	21.04	0.66	0.368	0.04	19.57	0.61	-0.118	-24%	-0.01	-15%	-1.48	-7%	-0.06	-8%
19.8333*	0.486	0.06	19.18	0.63	0.368	0.05	17.78	0.57	-0.118	-24%	-0.01	-14%	-1.40	-7%	-0.06	-9%
19.6666*	0.486	0.07	16.84	0.59	0.368	0.06	16.23	0.53	-0.118	-24%	-0.01	-13%	-0.61	-4%	-0.05	-9%
19.5*	0.486	0.08	15.17	0.55	0.368	0.07	14.69	0.50	-0.118	-24%	-0.01	-13%	-0.48	-3%	-0.06	-10%
19.3333*	0.486	0.10	13.53	0.52	0.368	0.09	13.12	0.46	-0.118	-24%	-0.01	-11%	-0.41	-3%	-0.06	-11%
19.1666*	0.486	0.12	11.66	0.47	0.368	0.11	11.01	0.42	-0.118	-24%	-0.01	-11%	-0.65	-6%	-0.05	-11%
19	0.486	0.15	9.99	0.42	0.368	0.13	9.78	0.37	-0.118	-24%	-0.01	-10%	-0.20	-2%	-0.05	-13%
18.98*	0.486	0.15	10.01	0.43	0.368	0.13	9.81	0.38	-0.118	-24%	-0.02	-10%	-0.20	-2%	-0.05	-12%
18.96*	0.486	0.15	9.95	0.41	0.368	0.14	9.76	0.36	-0.118	-24%	-0.02	-11%	-0.18	-2%	-0.05	-12%
18.94*	0.486	0.17	9.81	0.38	0.368	0.15	9.64	0.33	-0.118	-24%	-0.02	-11%	-0.17	-2%	-0.05	-12%
18.92*	0.486	0.19	9.72	0.35	0.368	0.18	9.50	0.29	-0.118	-24%	-0.01	-4%	-0.22	-2%	-0.06	-16%
18.9	0.486	0.15	9.97	0.42	0.368	0.14	9.74	0.36	-0.118	-24%	-0.01	-7%	-0.23	-2%	-0.06	-14%
18	0.486	0.59	2.37	0.54	0.368	0.54	1.83	0.48	-0.118	-24%	-0.05	-9%	-0.53	-23%	-0.07	-12%
17	0.486	0.19	9.75	1.21	0.368	0.19	9.22	1.14	-0.118	-24%	0.00	2%	-0.52	-5%	-0.07	-6%
16	0.486	0.19	9.58	1.27	0.368	0.19	9.26	1.20	-0.118	-24%	0.01	3%	-0.32	-3%	-0.07	-6%
15	0.486	0.24	3.96	0.84	0.368	0.21	3.83	0.77	-0.118	-24%	-0.03	-12%	-0.13	-3%	-0.07	-9%
14	0.486	0.67	1.83	0.52	0.368	0.61	1.76	0.45	-0.118	-24%	-0.06	-9%	-0.07	-4%	-0.07	-13%
13	0.486	0.05	14.10	1.91	0.368	0.04	13.60	1.84	-0.118	-24%	-0.01	-16%	-0.49	-3%	-0.07	-4%
12	0.486	0.06	11.84	1.45	0.368	0.05	11.34	1.38	-0.118	-24%	-0.01	-16%	-0.50	-4%	-0.07	-5%
11	0.486	0.30	2.95	0.81	0.368	0.25	2.80	0.74	-0.118	-24%	-0.04	-15%	-0.14	-5%	-0.07	-8%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
10.8333*	0.486	0.30	3.09	0.79	0.368	0.26	2.98	0.72	-0.118	-24%	-0.04	-14%	-0.11	-4%	-0.07	-8%
10.6666*	0.486	0.31	3.48	0.76	0.368	0.27	3.14	0.70	-0.118	-24%	-0.04	-13%	-0.34	-10%	-0.06	-8%
10.5*	0.486	0.32	3.87	0.73	0.368	0.29	3.30	0.67	-0.118	-24%	-0.04	-11%	-0.57	-15%	-0.06	-9%
10.3333*	0.486	0.35	4.09	0.70	0.368	0.32	3.63	0.64	-0.118	-24%	-0.03	-8%	-0.46	-11%	-0.06	-9%
10.1666*	0.486	0.41	4.11	0.65	0.368	0.39	3.46	0.59	-0.118	-24%	-0.03	-6%	-0.65	-16%	-0.06	-9%
10	0.486	0.64	3.63	0.55	0.368	0.70	3.07	0.48	-0.118	-24%	0.06	10%	-0.56	-15%	-0.07	-13%
9.8*	0.486	0.33	5.28	0.85	0.368	0.33	4.69	0.78	-0.118	-24%	0.01	2%	-0.59	-11%	-0.08	-9%
9.6*	0.486	0.24	6.58	1.16	0.368	0.24	6.15	1.08	-0.118	-24%	0.00	0%	-0.44	-7%	-0.08	-7%
9.4*	0.486	0.19	7.96	1.47	0.368	0.19	7.49	1.39	-0.118	-24%	0.00	-1%	-0.46	-6%	-0.08	-5%
9.2*	0.486	0.16	9.29	1.78	0.368	0.16	8.88	1.70	-0.118	-24%	0.00	-1%	-0.40	-4%	-0.08	-4%
9	0.486	0.09	10.61	2.09	0.368	0.08	10.23	2.02	-0.118	-24%	-0.01	-10%	-0.38	-4%	-0.08	-4%
8	0.486	0.12	11.49	2.10	0.368	0.12	11.05	2.02	-0.118	-24%	0.00	-2%	-0.44	-4%	-0.08	-4%
7	0.486	0.14	9.82	1.73	0.368	0.14	9.57	1.65	-0.118	-24%	0.00	-3%	-0.25	-3%	-0.08	-5%
6	0.486	0.31	3.73	0.59	0.368	0.29	3.47	0.51	-0.118	-24%	-0.02	-7%	-0.26	-7%	-0.08	-13%
5	0.486	0.35	3.73	0.55	0.368	0.33	3.29	0.47	-0.118	-24%	-0.02	-6%	-0.43	-12%	-0.08	-14%
4	0.486	0.31	4.82	0.50	0.368	0.30	4.07	0.41	-0.118	-24%	-0.01	-2%	-0.76	-16%	-0.08	-17%
3	0.486	0.32	4.29	0.51	0.368	0.33	3.91	0.41	-0.118	-24%	0.01	2%	-0.38	-9%	-0.10	-19%
2	0.486	0.09	10.56	0.68	0.368	0.08	9.80	0.58	-0.118	-24%	-0.01	-8%	-0.76	-7%	-0.10	-14%
1	0.486	0.19	5.46	0.73	0.368	0.17	4.93	0.63	-0.118	-24%	-0.01	-7%	-0.54	-10%	-0.10	-13%

TABLE B4 SEPTEMBER DORIS LAKE OUTFLOW: CONSTANT RATE HEC-RAS OUTPUT

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
43	0.428	0.10	16.22	0.36	0.309	0.08	15.65	0.32	-0.119	-28%	-0.01	-14%	-0.58	-4%	-0.05	-13%
42	0.428	0.17	9.76	0.46	0.309	0.14	9.57	0.42	-0.119	-28%	-0.02	-13%	-0.19	-2%	-0.05	-10%
41	0.428	0.15	10.49	0.55	0.309	0.13	10.10	0.51	-0.119	-28%	-0.02	-14%	-0.39	-4%	-0.05	-8%
40	0.428	0.27	8.55	0.36	0.309	0.25	7.56	0.31	-0.119	-28%	-0.02	-6%	-0.99	-12%	-0.05	-13%
39	0.428	0.20	10.63	0.63	0.309	0.18	9.25	0.59	-0.119	-28%	-0.02	-8%	-1.38	-13%	-0.05	-7%
38.5*	0.428	0.15	8.73	0.64	0.309	0.13	8.57	0.60	-0.119	-28%	-0.03	-17%	-0.16	-2%	-0.05	-7%
38	0.428	0.28	6.17	0.65	0.309	0.24	5.56	0.61	-0.119	-28%	-0.04	-13%	-0.61	-10%	-0.04	-7%
37	0.428	0.78	4.34	0.18	0.309	0.75	4.07	0.15	-0.119	-28%	-0.04	-4%	-0.27	-6%	-0.03	-17%
36	0.428	0.54	3.16	0.27	0.309	0.52	3.04	0.21	-0.119	-28%	-0.02	-4%	-0.12	-4%	-0.06	-23%
35	0.428	0.24	5.08	0.77	0.309	0.20	4.81	0.71	-0.119	-28%	-0.03	-13%	-0.27	-5%	-0.06	-8%
34	0.428	0.22	5.60	0.75	0.309	0.19	5.27	0.69	-0.119	-28%	-0.03	-13%	-0.33	-6%	-0.06	-8%
33	0.428	0.24	5.25	0.49	0.309	0.20	4.99	0.43	-0.119	-28%	-0.03	-14%	-0.25	-5%	-0.06	-12%
32	0.428	0.32	3.89	0.50	0.309	0.27	3.61	0.45	-0.119	-28%	-0.05	-15%	-0.27	-7%	-0.06	-11%
31.8333*	0.428	0.34	4.05	0.47	0.309	0.29	3.61	0.42	-0.119	-28%	-0.05	-14%	-0.44	-11%	-0.05	-11%
31.6666*	0.428	0.36	3.91	0.45	0.309	0.31	3.77	0.39	-0.119	-28%	-0.05	-13%	-0.14	-4%	-0.05	-12%
31.5*	0.428	0.39	3.69	0.42	0.309	0.34	3.58	0.37	-0.119	-28%	-0.05	-13%	-0.11	-3%	-0.05	-12%
31.3333*	0.428	0.43	3.44	0.41	0.309	0.37	3.36	0.36	-0.119	-28%	-0.06	-14%	-0.08	-2%	-0.05	-12%
31.1666*	0.428	0.50	3.16	0.39	0.309	0.43	3.10	0.34	-0.119	-28%	-0.07	-14%	-0.06	-2%	-0.05	-12%
31	0.428	1.15	2.74	0.24	0.309	1.04	2.71	0.21	-0.119	-28%	-0.11	-10%	-0.04	-1%	-0.03	-12%
30.8*	0.428	2.53	2.65	0.15	0.309	2.16	2.63	0.14	-0.119	-28%	-0.37	-15%	-0.02	-1%	-0.01	-7%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
30.6*	0.428	1.23	2.78	0.20	0.309	1.09	2.75	0.18	-0.119	-28%	-0.14	-12%	-0.03	-1%	-0.02	-12%
30.4*	0.428	2.15	2.72	0.13	0.309	2.01	2.37	0.12	-0.119	-28%	-0.15	-7%	-0.36	-13%	-0.02	-13%
30.2*	0.428	1.28	2.81	0.19	0.309	1.13	2.78	0.17	-0.119	-28%	-0.15	-12%	-0.04	-1%	-0.02	-12%
30	0.428	0.24	5.06	0.41	0.309	0.21	4.87	0.34	-0.119	-28%	-0.03	-11%	-0.20	-4%	-0.07	-17%
29	0.428	0.33	3.41	0.45	0.309	0.30	3.34	0.39	-0.119	-28%	-0.04	-12%	-0.07	-2%	-0.07	-15%
28.8*	0.428	0.35	3.59	0.46	0.309	0.31	3.50	0.39	-0.119	-28%	-0.04	-10%	-0.09	-2%	-0.07	-15%
28.6*	0.428	0.34	3.97	0.48	0.309	0.32	3.63	0.40	-0.119	-28%	-0.02	-5%	-0.34	-9%	-0.08	-16%
28.4*	0.428	0.26	4.42	0.57	0.309	0.24	4.03	0.49	-0.119	-28%	-0.02	-8%	-0.39	-9%	-0.08	-14%
28.2*	0.428	0.19	4.86	0.71	0.309	0.16	4.51	0.63	-0.119	-28%	-0.02	-13%	-0.34	-7%	-0.08	-12%
28	0.428	0.14	5.41	0.87	0.309	0.12	4.99	0.79	-0.119	-28%	-0.02	-17%	-0.42	-8%	-0.08	-9%
27	0.428	0.15	6.00	0.72	0.309	0.13	5.69	0.64	-0.119	-28%	-0.02	-14%	-0.32	-5%	-0.08	-11%
26	0.428	0.28	4.11	0.50	0.309	0.25	3.75	0.42	-0.119	-28%	-0.03	-11%	-0.36	-9%	-0.08	-15%
25	0.428	0.17	5.60	0.72	0.309	0.15	5.32	0.64	-0.119	-28%	-0.02	-14%	-0.28	-5%	-0.07	-10%
24.8333*	0.428	0.16	6.81	0.68	0.309	0.14	6.06	0.61	-0.119	-28%	-0.02	-13%	-0.76	-11%	-0.07	-11%
24.6666*	0.428	0.14	8.25	0.65	0.309	0.13	7.26	0.58	-0.119	-28%	-0.02	-11%	-0.99	-12%	-0.07	-11%
24.5*	0.428	0.13	9.15	0.62	0.309	0.12	8.58	0.54	-0.119	-28%	-0.01	-10%	-0.57	-6%	-0.07	-12%
24.3333*	0.428	0.12	9.91	0.58	0.309	0.11	9.67	0.51	-0.119	-28%	-0.01	-9%	-0.25	-2%	-0.07	-13%
24.1666*	0.428	0.11	10.64	0.55	0.309	0.10	10.43	0.48	-0.119	-28%	-0.01	-9%	-0.21	-2%	-0.07	-13%
24	0.428	0.11	11.32	0.51	0.309	0.10	11.14	0.44	-0.119	-28%	-0.01	-8%	-0.18	-2%	-0.08	-15%
23.8*	0.428	0.11	10.75	0.50	0.309	0.10	10.57	0.43	-0.119	-28%	-0.01	-9%	-0.18	-2%	-0.08	-15%
23.6*	0.428	0.11	10.16	0.49	0.309	0.10	9.80	0.42	-0.119	-28%	-0.01	-9%	-0.36	-4%	-0.08	-15%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
23.4*	0.428	0.12	9.49	0.49	0.309	0.11	9.18	0.41	-0.119	-28%	-0.01	-10%	-0.31	-3%	-0.08	-16%
23.2*	0.428	0.12	8.88	0.53	0.309	0.11	8.64	0.45	-0.119	-28%	-0.01	-11%	-0.24	-3%	-0.08	-15%
23	0.428	0.23	8.31	0.58	0.309	0.21	8.11	0.50	-0.119	-28%	-0.03	-11%	-0.20	-2%	-0.08	-13%
22.8*	0.428	0.21	9.06	0.56	0.309	0.19	8.74	0.48	-0.119	-28%	-0.02	-11%	-0.32	-3%	-0.07	-13%
22.6*	0.428	0.19	10.00	0.50	0.309	0.17	9.56	0.44	-0.119	-28%	-0.02	-11%	-0.44	-4%	-0.07	-13%
22.4*	0.428	0.23	10.90	0.40	0.309	0.20	10.43	0.35	-0.119	-28%	-0.03	-11%	-0.48	-4%	-0.05	-13%
22.2*	0.428	0.23	12.77	0.35	0.309	0.21	12.02	0.30	-0.119	-28%	-0.02	-7%	-0.75	-6%	-0.05	-15%
22	0.428	0.07	15.98	0.52	0.309	0.06	15.68	0.47	-0.119	-28%	-0.01	-17%	-0.30	-2%	-0.05	-10%
21.8*	0.428	0.07	15.66	0.51	0.309	0.06	15.36	0.45	-0.119	-28%	-0.01	-15%	-0.31	-2%	-0.05	-11%
21.6*	0.428	0.08	15.38	0.50	0.309	0.07	15.07	0.44	-0.119	-28%	-0.01	-15%	-0.32	-2%	-0.05	-11%
21.4*	0.428	0.09	15.10	0.48	0.309	0.08	14.81	0.43	-0.119	-28%	-0.01	-13%	-0.28	-2%	-0.05	-11%
21.2*	0.428	0.10	14.79	0.47	0.309	0.09	14.54	0.41	-0.119	-28%	-0.01	-12%	-0.24	-2%	-0.05	-11%
21	0.428	0.14	14.31	0.41	0.309	0.13	11.72	0.36	-0.119	-28%	-0.01	-6%	-2.60	-18%	-0.05	-12%
20.9*	0.428	0.15	15.09	0.41	0.309	0.14	14.80	0.36	-0.119	-28%	-0.02	-11%	-0.29	-2%	-0.05	-12%
20.8*	0.428	0.15	15.88	0.41	0.309	0.13	15.45	0.36	-0.119	-28%	-0.02	-11%	-0.43	-3%	-0.05	-12%
20.7*	0.428	0.15	16.46	0.41	0.309	0.14	16.00	0.36	-0.119	-28%	-0.02	-11%	-0.46	-3%	-0.05	-12%
20.6*	0.428	0.16	16.84	0.39	0.309	0.15	16.31	0.33	-0.119	-28%	-0.02	-9%	-0.52	-3%	-0.05	-13%
20.5*	0.428	0.15	17.15	0.37	0.309	0.14	16.17	0.31	-0.119	-28%	-0.01	-6%	-0.98	-6%	-0.06	-16%
20.4*	0.428	0.15	17.35	0.35	0.309	0.14	15.85	0.29	-0.119	-28%	-0.01	-5%	-1.50	-9%	-0.07	-18%
20.3*	0.428	0.13	17.49	0.36	0.309	0.12	15.94	0.30	-0.119	-28%	-0.01	-8%	-1.55	-9%	-0.07	-18%
20.2*	0.428	0.11	18.00	0.44	0.309	0.10	16.71	0.37	-0.119	-28%	-0.01	-12%	-1.30	-7%	-0.06	-15%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
20.1*	0.428	0.09	19.04	0.53	0.309	0.08	17.57	0.47	-0.119	-28%	-0.01	-15%	-1.47	-8%	-0.06	-11%
20	0.428	0.04	20.70	0.63	0.309	0.04	18.44	0.57	-0.119	-28%	-0.01	-16%	-2.26	-11%	-0.06	-9%
19.8333*	0.428	0.05	18.27	0.60	0.309	0.04	17.27	0.54	-0.119	-28%	-0.01	-15%	-0.99	-5%	-0.06	-10%
19.6666*	0.428	0.06	16.55	0.56	0.309	0.05	15.89	0.50	-0.119	-28%	-0.01	-15%	-0.66	-4%	-0.06	-11%
19.5*	0.428	0.08	14.94	0.53	0.309	0.06	14.42	0.47	-0.119	-28%	-0.01	-15%	-0.52	-3%	-0.06	-11%
19.3333*	0.428	0.09	13.33	0.49	0.309	0.08	12.81	0.43	-0.119	-28%	-0.01	-13%	-0.53	-4%	-0.06	-12%
19.1666*	0.428	0.11	11.35	0.45	0.309	0.10	10.80	0.39	-0.119	-28%	-0.02	-13%	-0.55	-5%	-0.06	-13%
19	0.428	0.14	9.89	0.40	0.309	0.12	9.67	0.34	-0.119	-28%	-0.02	-12%	-0.22	-2%	-0.06	-14%
18.98*	0.428	0.14	9.91	0.40	0.309	0.12	9.70	0.35	-0.119	-28%	-0.02	-12%	-0.22	-2%	-0.06	-14%
18.96*	0.428	0.15	9.86	0.39	0.309	0.13	9.66	0.34	-0.119	-28%	-0.02	-13%	-0.20	-2%	-0.05	-13%
18.94*	0.428	0.16	9.73	0.35	0.309	0.14	9.55	0.31	-0.119	-28%	-0.02	-12%	-0.18	-2%	-0.05	-13%
18.92*	0.428	0.18	9.61	0.32	0.309	0.18	9.38	0.26	-0.119	-28%	-0.01	-4%	-0.24	-2%	-0.06	-19%
18.9	0.428	0.14	9.86	0.39	0.309	0.13	9.62	0.33	-0.119	-28%	-0.01	-9%	-0.25	-2%	-0.06	-16%
18	0.428	0.57	2.11	0.51	0.309	0.49	1.72	0.44	-0.119	-28%	-0.08	-13%	-0.40	-19%	-0.07	-13%
17	0.428	0.19	9.50	1.17	0.309	0.20	9.00	1.10	-0.119	-28%	0.01	5%	-0.50	-5%	-0.08	-6%
16	0.428	0.19	9.43	1.24	0.309	0.20	9.08	1.16	-0.119	-28%	0.01	8%	-0.35	-4%	-0.08	-7%
15	0.428	0.22	3.87	0.80	0.309	0.19	3.80	0.72	-0.119	-28%	-0.03	-14%	-0.07	-2%	-0.08	-10%
14	0.428	0.64	1.80	0.49	0.309	0.57	1.72	0.42	-0.119	-28%	-0.07	-10%	-0.08	-4%	-0.07	-15%
13	0.428	0.05	13.87	1.88	0.309	0.04	13.32	1.80	-0.119	-28%	-0.01	-19%	-0.54	-4%	-0.08	-4%
12	0.428	0.06	11.61	1.42	0.309	0.05	11.05	1.34	-0.119	-28%	-0.01	-17%	-0.56	-5%	-0.08	-5%
11	0.428	0.27	2.84	0.78	0.309	0.23	2.77	0.70	-0.119	-28%	-0.05	-17%	-0.07	-3%	-0.07	-10%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
10.8333*	0.428	0.28	3.02	0.76	0.309	0.24	2.93	0.68	-0.119	-28%	-0.04	-16%	-0.08	-3%	-0.07	-10%
10.6666*	0.428	0.29	3.21	0.73	0.309	0.25	3.10	0.66	-0.119	-28%	-0.04	-15%	-0.11	-4%	-0.07	-10%
10.5*	0.428	0.31	3.61	0.71	0.309	0.27	3.24	0.63	-0.119	-28%	-0.04	-13%	-0.37	-10%	-0.07	-10%
10.3333*	0.428	0.34	3.94	0.67	0.309	0.30	3.26	0.60	-0.119	-28%	-0.03	-10%	-0.68	-17%	-0.07	-10%
10.1666*	0.428	0.40	3.83	0.63	0.309	0.37	3.06	0.56	-0.119	-28%	-0.04	-9%	-0.77	-20%	-0.06	-10%
10	0.428	0.66	3.37	0.52	0.309	0.74	2.85	0.44	-0.119	-28%	0.08	11%	-0.51	-15%	-0.07	-14%
9.8*	0.428	0.33	5.02	0.82	0.309	0.34	4.36	0.74	-0.119	-28%	0.01	2%	-0.66	-13%	-0.08	-10%
9.6*	0.428	0.24	6.41	1.12	0.309	0.24	5.88	1.04	-0.119	-28%	0.00	0%	-0.52	-8%	-0.08	-7%
9.4*	0.428	0.19	7.76	1.44	0.309	0.19	7.22	1.35	-0.119	-28%	0.00	-1%	-0.54	-7%	-0.08	-6%
9.2*	0.428	0.16	9.11	1.75	0.309	0.16	8.61	1.66	-0.119	-28%	0.00	-1%	-0.50	-5%	-0.08	-5%
9	0.428	0.08	10.43	2.06	0.309	0.07	9.99	1.97	-0.119	-28%	-0.01	-15%	-0.44	-4%	-0.08	-4%
8	0.428	0.12	11.26	2.06	0.309	0.12	10.84	1.98	-0.119	-28%	0.00	-2%	-0.42	-4%	-0.08	-4%
7	0.428	0.14	9.68	1.69	0.309	0.14	9.46	1.61	-0.119	-28%	0.00	-2%	-0.23	-2%	-0.08	-5%
6	0.428	0.30	3.61	0.55	0.309	0.28	3.33	0.47	-0.119	-28%	-0.03	-9%	-0.28	-8%	-0.08	-15%
5	0.428	0.34	3.52	0.51	0.309	0.31	3.07	0.43	-0.119	-28%	-0.03	-8%	-0.45	-13%	-0.08	-16%
4	0.428	0.30	4.44	0.46	0.309	0.29	3.87	0.37	-0.119	-28%	-0.01	-4%	-0.57	-13%	-0.09	-19%
3	0.428	0.32	4.05	0.46	0.309	0.34	3.75	0.36	-0.119	-28%	0.01	4%	-0.29	-7%	-0.10	-22%
2	0.428	0.09	10.17	0.63	0.309	0.08	9.39	0.53	-0.119	-28%	-0.01	-9%	-0.79	-8%	-0.10	-16%
1	0.428	0.18	5.20	0.68	0.309	0.17	4.62	0.58	-0.119	-28%	-0.01	-8%	-0.58	-11%	-0.10	-15%

TABLE B5 OCTOBER DORIS LAKE OUTFLOW: CONSTANT RATE HEC-RAS OUTPUT

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
43	0.318	0.08	15.70	0.32	0.201	0.07	14.87	0.26	-0.117	-37%	-0.01	-13%	-0.83	-5%	-0.07	-20%
42	0.318	0.15	9.59	0.42	0.201	0.13	8.64	0.35	-0.117	-37%	-0.02	-12%	-0.95	-10%	-0.07	-16%
41	0.318	0.13	10.11	0.51	0.201	0.11	9.99	0.44	-0.117	-37%	-0.02	-14%	-0.12	-1%	-0.07	-13%
40	0.318	0.25	7.71	0.32	0.201	0.24	5.46	0.25	-0.117	-37%	-0.01	-4%	-2.26	-29%	-0.07	-21%
39	0.318	0.18	9.49	0.59	0.201	0.16	6.67	0.53	-0.117	-37%	-0.03	-15%	-2.82	-30%	-0.06	-10%
38.5*	0.318	0.13	8.59	0.60	0.201	0.10	8.38	0.55	-0.117	-37%	-0.03	-22%	-0.20	-2%	-0.06	-9%
38	0.318	0.25	5.61	0.61	0.201	0.20	5.14	0.56	-0.117	-37%	-0.05	-18%	-0.47	-8%	-0.05	-9%
37	0.318	0.75	4.11	0.15	0.201	0.65	3.64	0.12	-0.117	-37%	-0.10	-14%	-0.47	-11%	-0.03	-19%
36	0.318	0.52	3.05	0.22	0.201	0.52	2.91	0.14	-0.117	-37%	0.00	-1%	-0.15	-5%	-0.08	-35%
35	0.318	0.21	4.83	0.71	0.201	0.17	4.51	0.64	-0.117	-37%	-0.04	-19%	-0.33	-7%	-0.07	-10%
34	0.318	0.19	5.30	0.69	0.201	0.16	4.95	0.62	-0.117	-37%	-0.04	-19%	-0.35	-7%	-0.07	-10%
33	0.318	0.21	5.02	0.44	0.201	0.17	4.72	0.37	-0.117	-37%	-0.04	-20%	-0.30	-6%	-0.07	-16%
32	0.318	0.27	3.64	0.45	0.201	0.21	3.32	0.39	-0.117	-37%	-0.06	-22%	-0.32	-9%	-0.07	-14%
31.8333*	0.318	0.29	3.63	0.43	0.201	0.23	3.29	0.36	-0.117	-37%	-0.06	-21%	-0.34	-9%	-0.06	-15%
31.6666*	0.318	0.31	3.78	0.40	0.201	0.25	3.32	0.34	-0.117	-37%	-0.06	-19%	-0.46	-12%	-0.06	-15%
31.5*	0.318	0.34	3.60	0.38	0.201	0.28	3.47	0.32	-0.117	-37%	-0.06	-19%	-0.12	-3%	-0.06	-15%
31.3333*	0.318	0.37	3.37	0.37	0.201	0.30	3.27	0.31	-0.117	-37%	-0.07	-19%	-0.09	-3%	-0.06	-15%
31.1666*	0.318	0.44	3.10	0.35	0.201	0.35	3.04	0.30	-0.117	-37%	-0.08	-19%	-0.07	-2%	-0.05	-15%
31	0.318	1.06	2.71	0.21	0.201	0.90	2.66	0.19	-0.117	-37%	-0.15	-14%	-0.05	-2%	-0.03	-14%
30.8*	0.318	2.14	2.64	0.14	0.201	1.84	2.27	0.13	-0.117	-37%	-0.30	-14%	-0.37	-14%	-0.02	-10%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
30.6*	0.318	1.11	2.75	0.18	0.201	0.93	2.71	0.15	-0.117	-37%	-0.17	-16%	-0.04	-2%	-0.03	-15%
30.4*	0.318	1.99	2.43	0.12	0.201	1.94	1.56	0.09	-0.117	-37%	-0.04	-2%	-0.87	-36%	-0.03	-25%
30.2*	0.318	1.15	2.78	0.17	0.201	1.04	2.30	0.14	-0.117	-37%	-0.11	-10%	-0.48	-17%	-0.03	-19%
30	0.318	0.21	4.88	0.35	0.201	0.18	4.65	0.27	-0.117	-37%	-0.03	-15%	-0.23	-5%	-0.08	-23%
29	0.318	0.30	3.34	0.39	0.201	0.25	3.26	0.31	-0.117	-37%	-0.05	-16%	-0.08	-2%	-0.08	-20%
28.8*	0.318	0.32	3.51	0.39	0.201	0.27	3.41	0.32	-0.117	-37%	-0.05	-14%	-0.10	-3%	-0.08	-19%
28.6*	0.318	0.32	3.67	0.41	0.201	0.30	3.20	0.31	-0.117	-37%	-0.02	-6%	-0.47	-13%	-0.09	-23%
28.4*	0.318	0.24	4.07	0.50	0.201	0.22	3.51	0.40	-0.117	-37%	-0.03	-12%	-0.56	-14%	-0.10	-20%
28.2*	0.318	0.17	4.54	0.64	0.201	0.13	4.12	0.54	-0.117	-37%	-0.03	-19%	-0.42	-9%	-0.10	-15%
28	0.318	0.12	5.01	0.79	0.201	0.09	4.65	0.70	-0.117	-37%	-0.03	-24%	-0.36	-7%	-0.10	-12%
27	0.318	0.13	5.71	0.65	0.201	0.11	5.35	0.56	-0.117	-37%	-0.03	-20%	-0.37	-6%	-0.09	-14%
26	0.318	0.25	3.77	0.43	0.201	0.21	3.43	0.34	-0.117	-37%	-0.04	-16%	-0.34	-9%	-0.09	-21%
25	0.318	0.15	5.34	0.65	0.201	0.12	5.01	0.56	-0.117	-37%	-0.03	-20%	-0.33	-6%	-0.09	-13%
24.8333*	0.318	0.14	6.08	0.62	0.201	0.11	5.70	0.53	-0.117	-37%	-0.03	-19%	-0.38	-6%	-0.08	-14%
24.6666*	0.318	0.13	7.34	0.58	0.201	0.11	6.42	0.50	-0.117	-37%	-0.02	-18%	-0.92	-13%	-0.09	-15%
24.5*	0.318	0.12	8.65	0.55	0.201	0.10	7.57	0.47	-0.117	-37%	-0.02	-15%	-1.09	-13%	-0.09	-15%
24.3333*	0.318	0.11	9.69	0.52	0.201	0.09	8.77	0.43	-0.117	-37%	-0.01	-13%	-0.92	-9%	-0.08	-16%
24.1666*	0.318	0.10	10.44	0.48	0.201	0.09	9.89	0.40	-0.117	-37%	-0.01	-13%	-0.55	-5%	-0.09	-18%
24	0.318	0.10	11.16	0.44	0.201	0.09	10.83	0.36	-0.117	-37%	-0.01	-10%	-0.33	-3%	-0.09	-19%
23.8*	0.318	0.10	10.59	0.43	0.201	0.09	9.95	0.34	-0.117	-37%	-0.01	-12%	-0.63	-6%	-0.09	-20%
23.6*	0.318	0.10	9.84	0.42	0.201	0.09	9.37	0.34	-0.117	-37%	-0.01	-13%	-0.47	-5%	-0.09	-21%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
23.4*	0.318	0.11	9.20	0.42	0.201	0.09	8.85	0.33	-0.117	-37%	-0.02	-14%	-0.36	-4%	-0.09	-21%
23.2*	0.318	0.11	8.66	0.46	0.201	0.09	8.37	0.37	-0.117	-37%	-0.02	-15%	-0.28	-3%	-0.09	-20%
23	0.318	0.21	8.12	0.51	0.201	0.18	7.89	0.42	-0.117	-37%	-0.03	-15%	-0.23	-3%	-0.09	-18%
22.8*	0.318	0.19	8.77	0.49	0.201	0.16	8.39	0.40	-0.117	-37%	-0.03	-15%	-0.38	-4%	-0.09	-18%
22.6*	0.318	0.17	9.60	0.44	0.201	0.14	9.02	0.36	-0.117	-37%	-0.03	-15%	-0.58	-6%	-0.08	-18%
22.4*	0.318	0.20	10.48	0.35	0.201	0.17	9.69	0.29	-0.117	-37%	-0.03	-16%	-0.79	-8%	-0.06	-17%
22.2*	0.318	0.22	12.09	0.30	0.201	0.19	11.28	0.24	-0.117	-37%	-0.02	-10%	-0.81	-7%	-0.06	-21%
22	0.318	0.06	15.71	0.47	0.201	0.05	15.27	0.41	-0.117	-37%	-0.01	-22%	-0.44	-3%	-0.06	-13%
21.8*	0.318	0.06	15.38	0.46	0.201	0.05	14.97	0.40	-0.117	-37%	-0.01	-22%	-0.41	-3%	-0.06	-14%
21.6*	0.318	0.07	15.09	0.45	0.201	0.06	14.69	0.39	-0.117	-37%	-0.01	-20%	-0.40	-3%	-0.06	-14%
21.4*	0.318	0.08	14.84	0.44	0.201	0.06	14.44	0.37	-0.117	-37%	-0.01	-18%	-0.41	-3%	-0.06	-14%
21.2*	0.318	0.09	14.56	0.42	0.201	0.08	14.19	0.36	-0.117	-37%	-0.01	-15%	-0.38	-3%	-0.06	-15%
21	0.318	0.13	12.03	0.37	0.201	0.11	10.24	0.31	-0.117	-37%	-0.02	-14%	-1.79	-15%	-0.06	-17%
20.9*	0.318	0.14	14.83	0.37	0.201	0.12	11.43	0.31	-0.117	-37%	-0.02	-15%	-3.40	-23%	-0.06	-16%
20.8*	0.318	0.14	15.48	0.37	0.201	0.11	14.93	0.31	-0.117	-37%	-0.02	-16%	-0.56	-4%	-0.06	-16%
20.7*	0.318	0.14	16.03	0.36	0.201	0.12	15.49	0.30	-0.117	-37%	-0.02	-15%	-0.54	-3%	-0.06	-16%
20.6*	0.318	0.15	16.36	0.34	0.201	0.13	15.36	0.28	-0.117	-37%	-0.02	-13%	-0.99	-6%	-0.06	-18%
20.5*	0.318	0.14	16.28	0.31	0.201	0.13	14.84	0.25	-0.117	-37%	-0.02	-11%	-1.43	-9%	-0.06	-20%
20.4*	0.318	0.14	15.97	0.29	0.201	0.13	14.80	0.23	-0.117	-37%	-0.02	-11%	-1.17	-7%	-0.07	-23%
20.3*	0.318	0.12	15.97	0.30	0.201	0.11	15.44	0.23	-0.117	-37%	-0.02	-12%	-0.54	-3%	-0.07	-24%
20.2*	0.318	0.10	16.74	0.38	0.201	0.08	16.30	0.31	-0.117	-37%	-0.02	-18%	-0.43	-3%	-0.07	-19%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
20.1*	0.318	0.08	17.60	0.47	0.201	0.06	17.26	0.40	-0.117	-37%	-0.02	-23%	-0.34	-2%	-0.07	-15%
20	0.318	0.04	18.52	0.58	0.201	0.03	18.19	0.51	-0.117	-37%	-0.01	-24%	-0.33	-2%	-0.07	-12%
19.8333*	0.318	0.04	17.35	0.54	0.201	0.03	16.76	0.48	-0.117	-37%	-0.01	-23%	-0.59	-3%	-0.07	-13%
19.6666*	0.318	0.05	15.94	0.51	0.201	0.04	15.32	0.44	-0.117	-37%	-0.01	-23%	-0.62	-4%	-0.07	-14%
19.5*	0.318	0.07	14.47	0.47	0.201	0.05	13.87	0.40	-0.117	-37%	-0.01	-22%	-0.60	-4%	-0.07	-14%
19.3333*	0.318	0.08	12.88	0.44	0.201	0.06	11.79	0.37	-0.117	-37%	-0.02	-20%	-1.10	-9%	-0.07	-16%
19.1666*	0.318	0.10	10.82	0.40	0.201	0.08	10.45	0.33	-0.117	-37%	-0.02	-18%	-0.37	-3%	-0.07	-17%
19	0.318	0.13	9.69	0.34	0.201	0.11	9.44	0.28	-0.117	-37%	-0.02	-16%	-0.25	-3%	-0.07	-19%
18.98*	0.318	0.12	9.72	0.35	0.201	0.10	9.47	0.29	-0.117	-37%	-0.02	-17%	-0.25	-3%	-0.07	-19%
18.96*	0.318	0.13	9.67	0.34	0.201	0.11	9.44	0.28	-0.117	-37%	-0.02	-18%	-0.23	-2%	-0.06	-18%
18.94*	0.318	0.14	9.56	0.31	0.201	0.12	9.37	0.26	-0.117	-37%	-0.03	-20%	-0.19	-2%	-0.05	-15%
18.92*	0.318	0.18	9.40	0.27	0.201	0.17	9.13	0.20	-0.117	-37%	-0.01	-3%	-0.26	-3%	-0.07	-25%
18.9	0.318	0.13	9.64	0.33	0.201	0.12	9.36	0.26	-0.117	-37%	-0.02	-11%	-0.28	-3%	-0.07	-22%
18	0.318	0.50	1.72	0.45	0.201	0.38	1.67	0.39	-0.117	-37%	-0.12	-24%	-0.05	-3%	-0.06	-14%
17	0.318	0.20	9.04	1.10	0.201	0.20	8.62	1.03	-0.117	-37%	0.01	4%	-0.41	-5%	-0.07	-7%
16	0.318	0.20	9.11	1.16	0.201	0.25	8.84	1.07	-0.117	-37%	0.05	24%	-0.27	-3%	-0.09	-8%
15	0.318	0.20	3.81	0.73	0.201	0.16	3.73	0.64	-0.117	-37%	-0.04	-21%	-0.07	-2%	-0.09	-12%
14	0.318	0.58	1.72	0.42	0.201	0.48	1.64	0.34	-0.117	-37%	-0.10	-17%	-0.08	-5%	-0.08	-18%
13	0.318	0.04	13.37	1.81	0.201	0.03	12.85	1.73	-0.117	-37%	-0.01	-28%	-0.52	-4%	-0.08	-4%
12	0.318	0.05	11.10	1.35	0.201	0.04	10.57	1.27	-0.117	-37%	-0.01	-29%	-0.52	-5%	-0.08	-6%
11	0.318	0.23	2.77	0.71	0.201	0.17	2.70	0.63	-0.117	-37%	-0.06	-25%	-0.08	-3%	-0.08	-11%

River Station	HEC-RAS Output: Without Project Conditions				HEC-RAS Output: With Project Conditions				Change							
	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Average Velocity (m/s)	Top Width (m)	Maximum Depth (m)	Discharge (m³/s)	Discharge (%)	Average Velocity (m/s)	Average Velocity (%)	Top Width (m)	Top Width (%)	Maximum Depth (m)	Maximum Depth (%)
10.8333*	0.318	0.24	2.94	0.69	0.201	0.18	2.86	0.61	-0.117	-37%	-0.06	-24%	-0.09	-3%	-0.08	-11%
10.6666*	0.318	0.25	3.10	0.67	0.201	0.19	3.00	0.59	-0.117	-37%	-0.06	-23%	-0.10	-3%	-0.07	-11%
10.5*	0.318	0.27	3.25	0.64	0.201	0.21	3.08	0.57	-0.117	-37%	-0.06	-21%	-0.18	-5%	-0.07	-11%
10.3333*	0.318	0.31	3.31	0.61	0.201	0.24	2.88	0.54	-0.117	-37%	-0.06	-21%	-0.43	-13%	-0.07	-11%
10.1666*	0.318	0.37	3.13	0.57	0.201	0.30	2.94	0.50	-0.117	-37%	-0.07	-19%	-0.19	-6%	-0.06	-11%
10	0.318	0.73	2.88	0.45	0.201	0.83	2.58	0.38	-0.117	-37%	0.10	14%	-0.30	-10%	-0.07	-16%
9.8*	0.318	0.34	4.41	0.74	0.201	0.33	3.76	0.66	-0.117	-37%	0.00	-1%	-0.65	-15%	-0.08	-11%
9.6*	0.318	0.24	5.93	1.05	0.201	0.24	5.35	0.96	-0.117	-37%	0.00	1%	-0.57	-10%	-0.09	-8%
9.4*	0.318	0.19	7.26	1.36	0.201	0.19	6.73	1.27	-0.117	-37%	0.00	2%	-0.52	-7%	-0.09	-7%
9.2*	0.318	0.16	8.65	1.67	0.201	0.16	8.03	1.58	-0.117	-37%	0.00	3%	-0.62	-7%	-0.09	-5%
9	0.318	0.07	10.04	1.98	0.201	0.06	9.45	1.89	-0.117	-37%	-0.02	-21%	-0.59	-6%	-0.09	-5%
8	0.318	0.12	10.87	1.99	0.201	0.12	10.42	1.89	-0.117	-37%	0.00	-1%	-0.46	-4%	-0.09	-5%
7	0.318	0.14	9.48	1.61	0.201	0.14	9.22	1.52	-0.117	-37%	0.00	1%	-0.25	-3%	-0.09	-6%
6	0.318	0.28	3.35	0.47	0.201	0.24	3.04	0.38	-0.117	-37%	-0.04	-14%	-0.31	-9%	-0.09	-20%
5	0.318	0.31	3.10	0.44	0.201	0.26	2.81	0.35	-0.117	-37%	-0.05	-16%	-0.29	-9%	-0.09	-20%
4	0.318	0.29	3.90	0.38	0.201	0.26	3.50	0.29	-0.117	-37%	-0.03	-11%	-0.40	-10%	-0.09	-23%
3	0.318	0.33	3.78	0.37	0.201	0.39	3.17	0.24	-0.117	-37%	0.06	17%	-0.61	-16%	-0.12	-34%
2	0.318	0.08	9.45	0.54	0.201	0.07	8.53	0.42	-0.117	-37%	-0.01	-12%	-0.92	-10%	-0.12	-23%
1	0.318	0.17	4.67	0.59	0.201	0.15	4.09	0.46	-0.117	-37%	-0.02	-12%	-0.58	-13%	-0.12	-21%