LOW-IMPACT HYDROPOWER POWER INSTITUTE RECERTIFICATION APPLICATION

Crocker Hydroelectric Project, LIHI #127

(FERC NO. 13237)

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1.0 FACILITY DESCRIPTION

The Crocker Dam Hydroelectric Project is located at river mile 2.5 of the Whitman River in Westminster in Worcester County, Massachusetts. The project is located at the existing Crocker Pond Dam, built in 1933 to provide water supply for the former Crocker Paper Company and predecessors for industrial purposes. FERC issued an Order Issuing License (Minor Project, FERC No. 13237) to the Project on September 5, 2012 and issued a two-year extension to commence construction on July 29, 2015. The project was required to commence construction by September 5, 2016 and be completed by September 5, 2019. Construction was completed but the project has not yet commenced commercial operation.

The project (Figures 1 – 3) consists of: (1) a 520-foot-long, 38.5-foot-high earthen embankment and masonry Crocker Pond dam with crest elevation of 750.5 feet above mean sea level (msl), a 120-foot-long arched spillway section currently topped with 26-inch-high wooden flashboards; (2) an impoundment with normal water surface elevation of 752.66 feet msl; an 8-foot-wide, 12-foot-high floodgate; (3) a 3-foot-wide, 3-foot-high mud gate; (4) a gate house equipped with a 47-foot-long, 42-inch-diameter penstock and 21.6-foot-high (at water line), 6.0-foot-wide metal trash rack with 1-inch-wide bar spacing; (5) a 42-inch-diameter penstock extension; (6) a powerhouse containing one 145-kW turbine generating unit; (7) a 20-foot-wide, 6-foot-deep, 35-foot-long tailrace; (8) a 240-foot-long, 480-volt (V) transmission line; and (9) appurtenant facilities.

Figure 1. Dam and Embankment Prior to Powerhouse construction

Figure 2. New Powerhouse

Figure 3. Overview of Pond and Dam

The project is a true "run-of-river" project. The designed powerhouse was located adjacent to the impoundment creating a very short (~59 ft.) bypass reach which consists of bedrock. The dam creates a 102.9 acre impoundment with a depth of 25 feet at the dam. The impoundment has a normal storage capacity of approximately 1,027 acre-feet and a maximum capacity of 1,835 acre-feet. The shorelines surrounding the reservoir consist of heavy vegetation including wood lands, brush and weedy thicket sub-growth and several house lots (9).

The Whitman River (Figure 4) is located in the Upper Worcester Plateau ecoregion of central Massachusetts and comprises part of the Nashua Watershed. The River originates at the outlet of Lake Wampanoag and drains southeasterly, flowing through Ashburnham, Westminster and Fitchburg, Massachusetts, traveling through several small ponds in Westminster including Crocker Pond, and ultimately merges with Flag Brook in West Fitchburg to form the North Nashua River. The North Nashua River flows to the Nashua River which then flows to the Merrimack River.

Topography is hilly throughout the sub-region, and streamflow has significant seasonal changes. The river is approximately 8.4 miles long with a drainage area of 21 square miles. The river supports a variety of resident fish and other aquatic resources, including freshwater mussels. There are no historical records of migratory fish at the project site, but state and federal resource agencies have ongoing efforts to restore migratory fish populations in the greater Nashua River watershed.

There are two upstream dams, Lake Wampanoag Dam, and Westminster Reservoir Dam, both of which are non-powered at this time and owned by the applicant. The only downstream dam on the Whitman River is Snows Mill Pond, also non-powered.

The only change at the project since the original LIHI certification in 2015 is that project construction has been completed although the project is still not yet operational due to delays in finalizing interconnection with National Grid's transmission system.

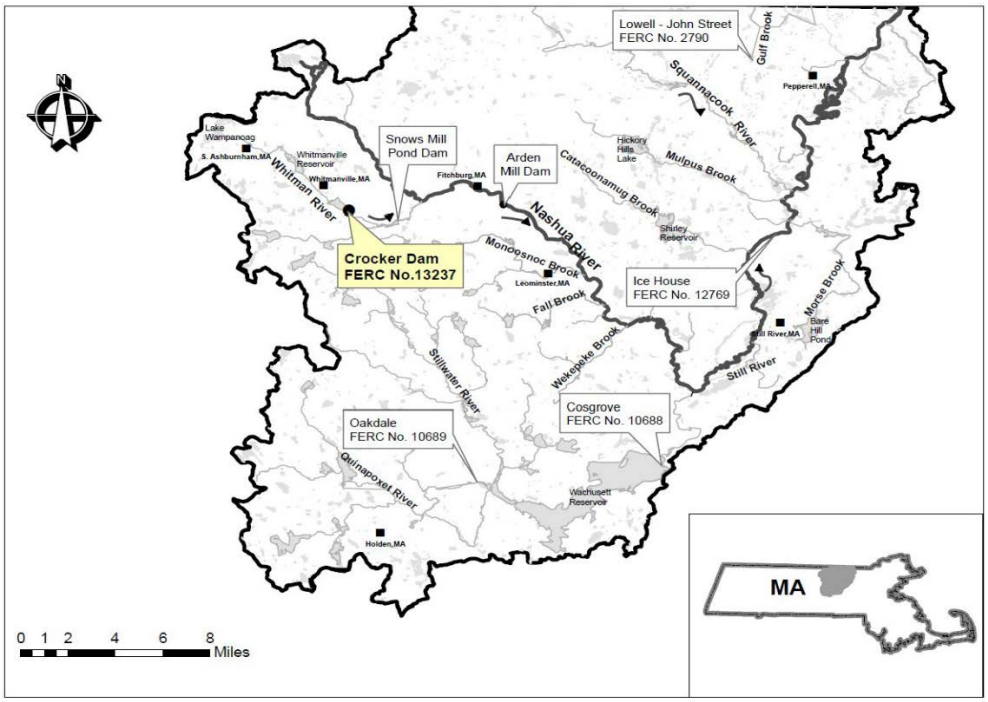


Figure 4. Project Location and Watershed

Table 1. Facility Description

Item	*Information Requested*	*Response (include references to further details)*
Name of the Facility	Facility name (use FERC project name or other legal name)	P-13237-MA Crocker Pond
Reason for applying for LIHI Certification	. To participate in state RPS program . and specify the state and the total MW/MWh associated with that participation (value and % of facility total Mw/MWh). . To participate in voluntary REC market (e.g., Green-e) . To satisfy a direct energy buyer's purchasing requirement . To satisfy the facility's own corporate sustainability goals . For the facility's corporate marketing purposes . Other (describe)	Project was required to achieve LIHI status to qualify for the State Grant program and the RPS Class I Qualification
	If applicable, amount of annual generation (MWh and % of total generation) for which RECs are currently received or are expected to be received upon LIHI Certification	The project estimated annual generation is 887 MWh, and all generation will produce hydro REC's.
Location	River name (USGS proper name)	Whitman River
	Watershed name - Select region, click on the area of interest until the 8-digit HUC number appears. Then identify watershed name and HUC-8 number from the map at: https://water.usgs.gov/wsc/map_index.html	Whitman River 01070004
	Nearest town(s), county(ies), and state(s) to dam	Westminster, Worcester County, MA
	River mile of dam above mouth	2.5
	Geographic latitude of dam	42.569057
	Geographic longitude of dam	-71.881045
Facility Owner	Application contact names (Complete the Contact Form in Section B-4 also):	Robert Francis
	Facility owner company and authorized owner representative name. **For recertification: If ownership has changed since last certification, provide the effective date of the change.**	Whitman River Dam Inc. Robert Francis, President

Item	*Information Requested*	*Response (include references to further details)*
	FERC licensee company name (if different from owner)	n/a
Regulatory Status	FERC Project Number (e.g., P-13237), issuance and expiration dates, or date of exemption	P-13237 issued 09/05/2012, expires 08/31/2052
	FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional")	Minor license
	Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments.	No identifier, issued 02/04/2011
	Hyperlinks to key electronic records on FERC e-library website or other publicly accessible data repositories	FERC license: https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=13111242 FERC Environmental Assessment: https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=13023022 Water Quality Certificate Included in license application: https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=12562845
Powerhouse	Date of initial operation (past or future for pre-operational applications) Total installed capacity (MW) **For recertification: Indicate if installed capacity has changed since last certification**	The Crocker Pond Dam hydroelectric facility is still not in commercial operation. We expect to be running in the next 30 days (September 1, 2020) The installed capacity is 174 kW.
	Average annual generation (MWh) and period of record used **For recertification: Indicate if average annual generation has changed since last certification**	The "estimated" annual generation is 887 MWh No Change
	Mode of operation (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.) **For recertification: Indicate if mode of operation has changed since last certification**	The facility will be run-of-river. No Change
	Number, type, and size of turbine/generators, including maximum and minimum hydraulic capacity and maximum and minimum output of each turbine and generator unit	1 Horizontal Kaplan with a maximum Discharge of 60/cfs @ 38.4/ft./net head. Output range from 6kW to 175kW. A horizontal air-cooled 3 ph. /480v generator is connected.
	Trash rack clear spacing (inches) for each trash rack	1 inch spacing on a single trash rack.

Item	*Information Requested*	*Response (include references to further details)*
	Approach water velocity (ft./s) at each intake if known	Approach velocity is estimated at 0.46 fps
	Dates and types of major equipment upgrades **For recertification: Indicate only those since last certification**	unchanged
	Dates, purpose, and type of any recent operational changes **For recertification: Indicate only those since last certification**	unchanged
	Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments	None
Dam or Diversion	Date of original dam or diversion construction and description and dates of subsequent dam or diversion structure modifications	1933
	Dam or diversion structure length, height including separately the height of any flashboards, inflatable dams, etc. and describe seasonal operation of flashboards and the like	520-foot-long, 38.5-foot-high earthen embankment and masonry Crocker Pond dam with a 120-foot-long ogee arched spillway section topped with 26-inch-high wooden flashboards
	Spillway maximum hydraulic capacity	13,740 cfs
	Length and type of each penstock and water conveyance structure between the impoundment and powerhouse	One penstock 42", 47 feet long
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	Originally water storage for process water at downstream paper mill
Conduit Facilities Only	Date of conduit construction and primary purpose of conduit	n/a
	Source water	Whitman River
	Receiving water and location of discharge	Whitman River
Impoundment and Watershed	Authorized maximum and minimum impoundment water surface elevations **For recertification: Indicate if these values have changed since last certification**	752.66 plus or minus 6 inches Has not changed
	Normal operating elevations and normal fluctuation range **For recertification: Indicate if these values have changed since last certification**	752.66 run of the river Has not changed

Item	*Information Requested*	*Response (include references to further details)*
	Gross storage volume and surface area at full pool **For recertification: Indicate if these values have changed since last certification**	102.9 acre feet at 752.66 Has not changed
	Usable storage volume and surface area **For recertification: Indicate if these values have changed since last certification**	n/a run of river Has not changed
	Describe requirements related to impoundment inflow and outflow, elevation restrictions (e.g., fluctuation limits, seasonality) up/down ramping and refill rate restrictions.	Refill rate is restricted to 10% refill and 90% flow passage.
	Upstream dams by name, ownership and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage.	Lake Wampanoag Dam, RM 8.4, non-powered Westminster Reservoir Dam, RM 4.8, non-powered
	Downstream dams by name, ownership, river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage	Snows Mill Pond Dam, RM 0.3, non-powered Fitchburg Wastewater Treatment Plant dam, RM 0.1, non-powered Ice House Dam, FERC exemption No. 12679 is the nearest dam on the Nashua River
	Operating agreements with upstream or downstream facilities that affect water availability and facility operation	The project is subject to water supply agreement with D/S paper mill (1994)
	Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control. Indicate locations and acres of flowage rights versus fee-owned property.	Crocker Pond = 102.9 acres Project land = 4.5 acres
Hydrologic Setting	Average annual flow at the dam, and period of record used	No records available
	Average monthly flows and period of record used	No records available
	Location and name of closest stream gaging stations above and below the facility	None on the Whitman River, the nearest downstream gage is USGS 01094400 NORTH NASHUA RIVER AT FITCHBURG, MA
	Watershed area at the dam (in square miles). Identify if this value is prorated from gage locations and provide the basis for proration calculation.	DA at the dam is 41.7 sm. Gage data us prorated as function of area.
	Other facility specific hydrologic information	No records available

Item	***Information Requested***	***Response (include references to further details)***
Designated Zones of Effect	Number of zones of effect	2
	Type of waterbody (river, impoundment, bypassed reach, etc.)	Zone 1: impoundment Zone 2: de minimuis bypass reach, tailrace, downstream reach
	Upstream and downstream locations by river miles	Zone 1: RM 3.25 to 2.5 Zone 2: RM 2.5 to ~ RM 2.3
	Delimiting structures or features	The dam is the delimiting structure
Pre-Operational Facilities Only		
Expected operational date	Date generation is expected to begin	August 2020
Dam, diversion structure or conduit modification	Description of modifications made to a pre-existing conduit, dam or diversion structure needed to accommodate facility generation. This includes installation of flashboards or raising the flashboard height. Date the modification is expected to be completed	Penstock length increased 17' to reach the inlet to the turbine unit in the new powerhouse downstream of dam. Project Construction was completed in January 2020.
Change in water flow regime	Description of any change in impoundment levels, water flows or operations required for new generation	License requires impoundment refill rate of 10% fill / 90% flow passage after drawdown.

The impoundment and tailrace/downstream Zones of Effect are shown in Figure 5. The impoundment extends approximately 0.75 miles upstream from the dam to the upstream end of Crocker Pond. The bypass/tailrace/downstream zone extends approximately 0.2 miles downstream from the dam.

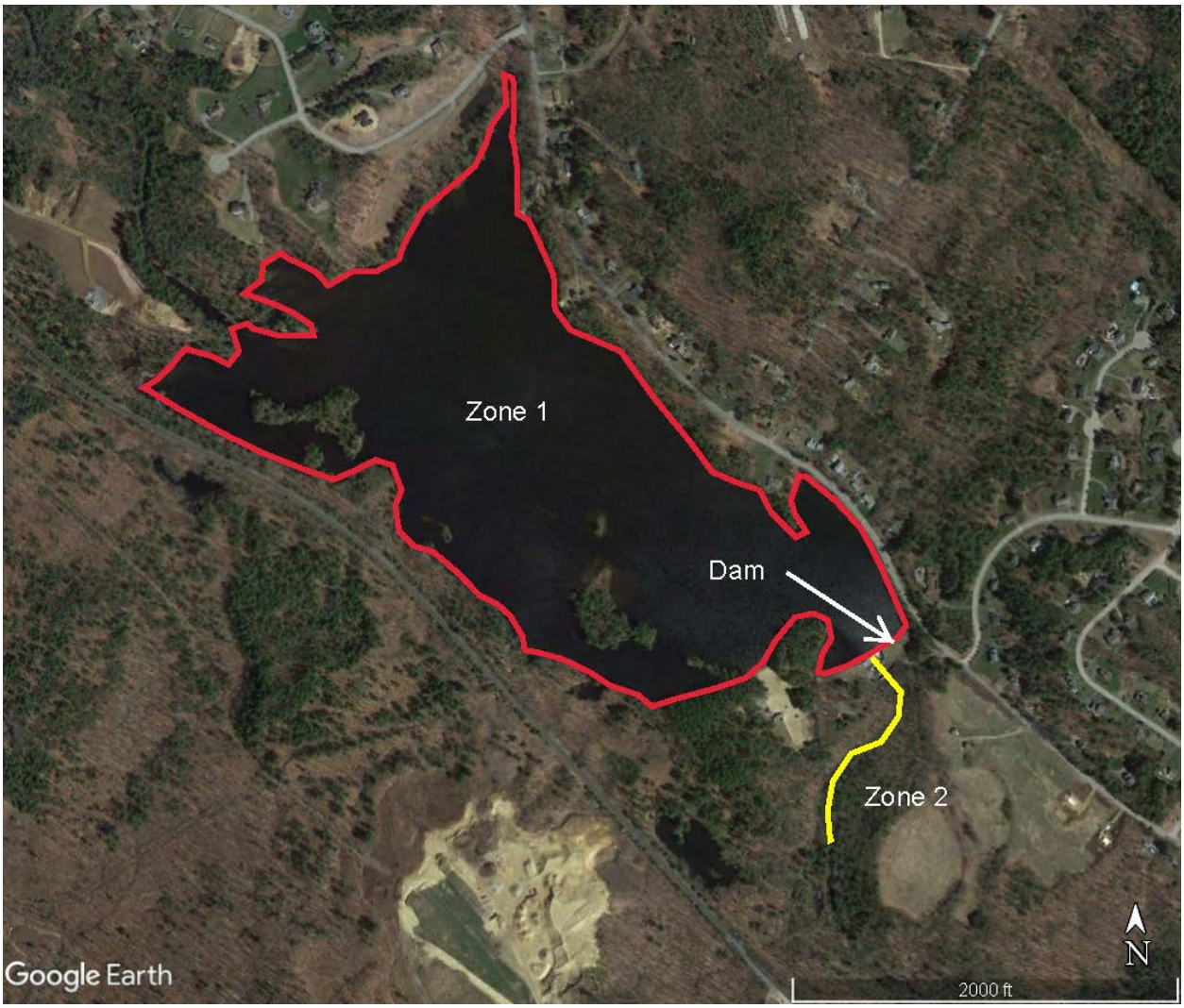


Figure 5. Zones of Effect

2.0 STANDARDS MATRICES

Zone of Effect #1: Impoundment Zone

CRITERION		ALTERNATIVE STANDARDS				
		1	**2**	**3**	**4**	**PLUS**
A	Ecological Flow Regimes	X				
B	Water Quality		X			
C	Upstream Fish Passage	X				
D	Downstream Fish Passage		X			
E	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species Protection	X				
G	Cultural and Historic Resources Protection	X				
H	Recreational Resources			X		

Zone of Effect #2: Bypass, Tailrace, Downstream Zone

CRITERION		ALTERNATIVE STANDARDS				
		1	**2**	**3**	**4**	**Plus**
A	Ecological Flow Regimes		X			
B	Water Quality		X			
C	Upstream Fish Passage	X				
D	Downstream Fish Passage	X				
E	Watershed and Shoreline Protection	X				
F	Threatened and Endangered Species Protection	X				
G	Cultural and Historic Resources Protection	X				
H	Recreational Resources			X		

3.0 SUPPORTING INFORMATION

A. Ecological Flow Regimes

The impoundment Zone #1 qualifies for Standard A-1 and the bypass, tailrace, downstream Zone #2 qualifies for Standard A-2.

Criterion	***Standard***	***Instructions***
A	1	Not Applicable / De Minimis Effect: • Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the facility. • For run-of-river facilities, provide details on operations and describe how flows, water levels, and operations are monitored to ensure such an operational mode is maintained. In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody. • For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habitat within the zone is evaluated and managed. ***NOTE:*** this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion.
A	2	Agency Recommendation: • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement. • Explain how the recommendation relates to formal agency management goals and objectives for fish and wildlife. • Explain how the recommendation provides fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations). • Explain how flows are monitored for compliance.

The Project is operated in an instantaneous run-of-river mode as required under the Water Quality Certification (WQC) and FERC license. The pond elevation sensors send data to the PC and recognize a minimum elevation must be achieved in order for the unit to be "ready". If the pond elevation is lower than the minimum set point, the unit cannot start.

Docket(s): P-13237-007
Lead Applicant: Whitman River Dam, Inc.
Filing Type: Project Safety Compliance Report
Description: Filing of Run of the River operating plan per Ma Certification section 17 under Article 401 of the License of Whitman River Dam, Inc. under P-13237.

Fish and wildlife habitat is protected by the run of river operation and is also subject to the Town of

Westminster's bylaws for shoreline protection and the Massachusetts Wetlands Protection Act.

The WQC requires an impoundment refill procedure with 90% of inflows passed downstream and 10% of inflow used to refill the impoundment after maintenance or emergency drawdowns. The WQC also requires a minimum flow in the de minimus bypass reach that is "sufficient to maintain water quality standards at all times". There is no flow requirement for aquatic habitat in the bypass reach since there is little to no aquatic habitat present given the bedrock and boulder substrate (per the FERC Environmental Assessment). Because the turbine's minimum hydraulic capacity is about 13 cfs, all flow less than that amount is spilled, and approximates the 14 cfs mean annual August flow at the project. When the turbine operates up to its maximum hydraulic capacity of about 60 cfs, leakage through the dam flashboards and a 4" diverter pipe provides flow in the bypass reach. All flows above 60 cfs would be spilled.

Research has found the water agreements date back to the late 1800's to establish and maintain control of the water flow to certain mills in Fitchburg, Massachusetts. The control was designed to guarantee water to "all" the operating mills and steam plants. Today, only one paper mill remains. Since assuming control of the dams in 1998 "no water" has been released for the manufacturing of paper. The only mill operating has a consumption rate of 200/gpm which is far less than normal run-of-river. Flash board leakage and the installation of a 4" pipe with gate valve will wet the dam and maintain a minimum flow to the pools at the tail of the dam. The turbine discharge channel was built to discharge tail water into the historic water pocket below the dam so that feature remains.

B. Water Quality

Both Zones qualify for Standard B-2.

Criterion	***Standard***	***Instructions***
B	2	<u>Agency Recommendation:</u> • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

The Whitman River is a Class B warm water fishery with designated uses including habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. The river is listed on the Massachusetts 2016 Integrated List of Waters[1] as attaining its designated uses; however, Whitmanville Reservoir and Crocker Pond have not been assessed.

The WQC was issued by Massachusetts Department of Environmental Protection (MDEP) on February 4, 2011, less than 10 years ago, certifying that there is "reasonable assurance" that the project will operate in compliance with water quality standards. The WQC notes that the river would be reclassified as a cold water fishery based on a 2010 survey that found reproducing brook trout downstream of the dam. The

[1] https://www.mass.gov/doc/final-massachusetts-year-2016-integrated-list-of-waters/download

classification has not been changed in the current water quality standards or in the pending proposed standards amendment.

State water quality standards require dissolved oxygen (DO) to be ≥ 5.0 mg/l and ≥ 60% saturation in warm water fisheries, and ≥ 6.0 mg/l unless background conditions are lower. Temperature must be ≤ 28.3ºC (83ºF) in warm water fisheries and ≤ 20ºC (68ºF) in cold water fisheries. pH must be between 6.0 and 8.3 standard units (S.U.). Both the WQC and FERC license require post-operational monitoring for DO and temperature. The WQC specified that DO must be at least 6.0 mg/l at all times based on the cold water fishery designation. If monitoring results indicate that the project is causing depletion of DO, mitigation measures such as releasing additional flow over the dam may be required.

The Dissolved Oxygen and operational plan for the facility was recently submitted to FERC after agency consultation and comment. All comments were addressed in the filed plan. A copy of the plan is attached.

C. Upstream Fish Passage

The impoundment Zone #1 qualifies for Standard C-1 since once above a dam there is no further facility-related barrier to upstream fish movement. The downstream Zone #2 also qualifies for Standard C-1.

Criterion	***Standard***	***Instructions***
C	1	<u>Not Applicable / De Minimis Effect:</u> • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement. • Document available fish distribution data and the lack of migratory fish species in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is not or was not the cause of the extirpation.

There are no migratory fish species present in the river. Dams on the main stem Nashua River including the Pepperell Dam create barriers to passage of anadromous fish that travel from the Atlantic Ocean into the Merrimack and Nashua rivers. American eels are present in the Nashua River and the Ice House project, the closest downstream hydroelectric project has upstream eel passage. There is no record of eels in the Whitman River.

The Project is not currently required by any state or federal agency to maintain upstream fish passage facilities. The FERC license includes Standard Article 11 which reserves authority to require fish passage if agencies request it in the future. The WQC also requires installation of upstream passage for both anadromous fish and for American eel, if requested by Massachusetts Department of Fish and Wildlife (MDFW) in the future.

The FERC license for the Crocker Pond Dam Hydroelectric project requires the construction of a “fish ladder” when “all” dams between Crocker Pond dam and the Atlantic Ocean have fish ladders.

D. Downstream Fish Passage and Protection

The downstream Zone #2 qualifies for Standard D-1 since once below a dam there is no further facility-related barrier to downstream fish movement. The impoundment Zone #1 qualifies for Standard D-2.

Criterion	***Standard***	***Instructions***
D	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tail water/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the species populations or to their access to habitat necessary for successful completion of their life cycles. • Document available fish distribution data and the lack of fish species requiring passage in the vicinity. • If migratory fish species have been extirpated from the area, explain why the facility is not or was not the cause of the extirpation.
D	2	Agency Recommendation: • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is part of a Settlement Agreement or not. • Describe any provisions for fish passage monitoring or effectiveness determinations that are part of the agency recommendation, and how these are being implemented. • Provide evidence that required passage facilities are being operated and maintained as mandated (e.g. meets season, coordination with agencies).

Resident fish in the Whitman River include: Naturally producing Brook trout, Bluegill, Blacknose Dace, Banded Sunfish, Chain Pickerel, Common Shiner, Fallfish (lots0, Golden Shiner, Largemouth Bass, Longnose dace, Pumpkinseed, Smallmouth Bass, White Sucker, Yellow Bullhead and Yellow Perch.

The Project is not currently required by any state or federal agency to maintain downstream fish passage facilities. The FERC license includes Standard Article 11 which reserves authority to require fish passage if agencies request it in the future. The WQC also requires installation of downstream passage for both anadromous fish and for American eel, if requested by Massachusetts Department of Fish and Wildlife (MDFW) in the future.

The WQC required installation of full-depth trash racks with 1-inch clear spacing and an approach velocity limited to 2.0 feet/second or less. The calculated approach velocity is 0.46 fps. Even under high water conditions and maximum intake we wouldn't reach the 2.0 fps threshold.

E. Shoreland and Watershed Protection

Both Zones qualify for Standard E-1.

Criterion	*Standard*	*Instructions*
E	1	Not Applicable / De Minimis Effect: • If there are no lands with significant ecological value associated with the facility, document and justify this (e.g., describe the land use and land cover within the FERC project or facility boundary, and absence of critical habitat for protected species). • Document that there have been no Shoreline Management Plans or similar protection requirements for the facility.

The shoreline around the impoundment is mostly undeveloped with a few homes & lots (9 total) along the impoundment which is bordered by South Ashburnham Road on the northeast side, and by an MBTA commuter rail track on the southwest side. The shorelines surrounding the impoundment consist of heavy vegetation including woodlands, brush and weedy thicket sub-growth. Islands in Crocker Pond and the downstream reach are both forested. The area near the dam is landscaped and kept mowed. The Town of Westminster's Crocker Pond Recreation Area is adjacent to the dam and tailrace on the southwest side and is a developed recreational area including a parking area and beach. The project boundary contains 107.5 acres of land and water.

There is no requirement in the FERC license for a shoreline management plan or similar plans. According to the Massachusetts BioMap2 report for the town of Westminster[2], there are no core habitats or critical natural landscapes, and there are no lands of ecological significance within the project boundary. The Massachusetts Oliver online mapping tool[3] shows an area of priority habitat for one or more unidentified rare species that extends upstream from the river's inlet to Crocker Pond and encompasses a large wetlands complex identified in the yellow area on Figure 6. Project operations would not impact this habitat given run of river operations and a stable impoundment elevation.

The project was constructed under the original and renewed Westminster Conservation Commission's Order of Conditions, under the Massachusetts Wetlands Protection Act which was also referenced as a condition in the WQC and incorporated into the FERC license. Westminster also has a local wetlands bylaw which protects the quality and quantity of surface and ground water, prevents flooding and storm damage and protects wetlands-dependent wildlife and their habitat. Since the completion of construction in January 2020 there have been no activities that impacted the shoreline or watershed.

[2] http://maps.massgis.state.ma.us/dfg/biomap/pdf/town_core/Westminster.pdf
[3] http://maps.massgis.state.ma.us/map_ol/oliver.php

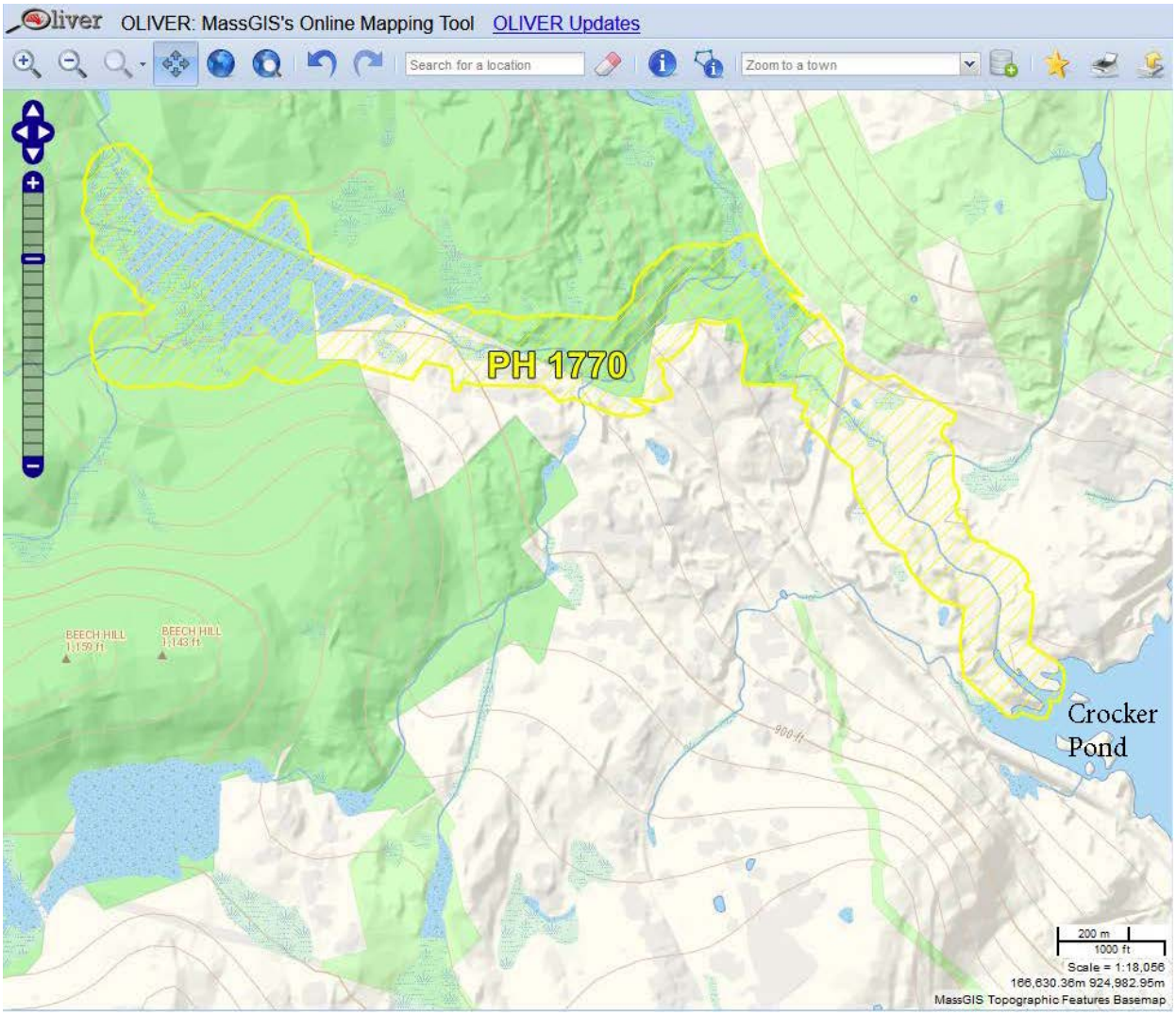


Figure 6. Massachusetts Priority Habitat

F. Threatened and Endangered Species Protection

Both Zones qualify for Standard F-1.

Criterion	*Standard*	*Instructions*
F	1	<u>Not Applicable / De Minimis Effect:</u> • Document that there are no listed species in the facility area or affected riverine zones downstream of the facility. • If listed species are known to have existed in the facility area in the past but are not currently present, explain why the facility was not the cause of the extirpation of such species. • If the facility is making significant efforts to reintroduce an extirpated species, describe the actions that are being taken.

Based on an online US Fish and Wildlife Service IPaC[4] report (see Appendix A), only the Northern long-eared bat (threatened) may be present in the project vicinity. There are no critical habitats for the species. The Massachusetts Natural Heritage Bureau online map[5] shows no hibernacula or roosting trees in the project vicinity. Given the project's small footprint and lack of a need to conduct tree cutting, there is no impact from the project on that species. In any event that a tree does need to be cut, the USFWS 4(d) rule for the species would be observed. No trees were cut for the completion of the Crocker Pond Dam Hydroelectric Project.

The IPaC report lists several migratory birds protected under the Migratory Birds Treaty Act and the Bald and Golden Eagle Protection Act, including the following species. Project operations do not affect these species unless possibly if tree cutting were to occur.

- Bald eagle (also a state species of special concern)
- Black-billed cuckoo
- Bobolink
- Canada warbler
- Cape May warbler
- Prairie warbler
- Rusty blackbird
- Wood thrush

An online data check at the Massachusetts Oliver mapping tool is shown in Figure 6 above, with priority habitat for rare or listed species shown. The Wood Turtle habitat area extends only to the inlet of the Whitman River into Crocker Pond and unaffected by the project's run of river operations and stable impoundment level.

G. Cultural and Historic Resources Protection

Both Zones qualify for Standard G-1.

Criterion	***Standard***	***Instructions***
G	1	Not Applicable / De Minimis Effect: • Document that there are no cultural or historic resources located on facility lands that can be affected by construction or operations of the facility; or • Document that the facility construction and operation have not in the past, nor currently adversely affect any cultural or historic resources that are present on facility lands.

The dam was originally constructed in 1933 and all other project structures are new. The dam is not listed on the National Register of Historic Places although it could be eligible for listing. At the time of licensing the Massachusetts State Historic Preservation Officer (SHPO) wrote in a letter to FERC that the project is unlikely to affect any significant historic properties and determined that there would be no effect. No archaeological resources were identified during project construction.

FERC license articles 403 and 404 require that the SHPO be consulted if previously unknown cultural or historic resources are found during construction, operations, maintenance, project modifications, land

[4] https://ecos.fws.gov/ipac/
[5] https://mass-eoeea.maps.arcgis.com/apps/Viewer/index.html?appid=de59364ebbb348a9b0de55f6febdfd52

clearing or ground-disturbing activities. If needed, cultural resource studies may be required, and a Historic Properties Management Plan must be developed to protect or mitigate for impacts. No Cultural or Historic resources were discovered during construction of the hydroelectric building.

H. Recreational Resources

Both Zones qualify for Standard H-3.

Criterion	***Standard***	***Instructions***
H	3	<u>Assured Accessibility:</u> • In lieu of existing agency recommendations and plans for recreational uses, document the facility's current and future commitment to accommodate reasonable requests from recreation interests for adequate public access for recreational use of lands and waters of the facility, including appropriate recreational water flows and levels, without fees or charges.

Article 13 of the FERC license requires the licensee, "so far as it is consistent with the proper operation of the project, allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and for outdoor recreational purposes, including fishing and hunting." Access is allowed except in locations around project facilities that would be unsafe which will be defined by fencing and signage.

A letter from MDFW commenting on the license application stated: "The applicant should investigate the need for a canoe take out above the dam as well as a portage route and put in below the dam." There has been some discussion regarding a "put in" area below the dam but as the river depth is extremely shallow and rocky, it would not allow for canoeing during most of the season. Should there be a need in the future Whitman River Dam, Inc. or its predecessor would certainly re-investigate the feasibility of a put-in area.

The Town of Westminster 's Crocker Pond Recreation Area[6] has a beach, picnic tables and grills, a gazebo, playground area, restrooms, a boat launch (no gas motors and up to 5 hp electric motors only), a swimming area and trails.

[6] https://www.westminster-ma.gov/sites/g/files/vyhlif1431/f/uploads/2019_crocker_pond_rules_regs.pdf

4.0 FACILITY AND STAKEHOLDER CONTACTS FORMS

Project Owner: Whitman River Dam, Inc.	
Name and Title	Robert Francis/Owner
Company	Whitman River Dam, Inc.
Phone	978-423-1037
Email Address	bfrancis@verizon.net
Mailing Address	97 Oakmont Ave Westminster, MA 01473
Project Operator (if different from Owner):	
Name and Title	Same
Company	
Phone	
Email Address	
Mailing Address	
Consulting Firm / Agent for LIHI Program (if applicable):	
Name and Title	
Company	
Phone	
Email Address	
Mailing Address	
Compliance Contact (responsible for LIHI Program requirements):	
Name and Title	Same
Company	
Phone	
Email Address	
Mailing Address	
Party responsible for accounts payable:	
Name and Title	Same
Company	
Phone	
Email Address	
Mailing Address	

Agency Contact		***Area of Responsibility***
Agency Name	USFWS/ New England Field Office	☐ Flows ☐ Water Quality x Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Melissa Grader, USFWS New England Field Office	
Phone	413-548-9138	
Email address	melissa_grader@fws.gov	
Mailing Address	103East Plumtree Rd. Sunderland, MA 01375	

Agency Contact		***Area of Responsibility***
Agency Name	MASS DEP, Division of Watershed Management	☐ Flows ☐ Water Quality ☐ Fish/Wildlife x Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Robert Kubit, P.E	
Phone	508-767-2854	
Email address	robert.kubit@state.ma.us	
Mailing Address	627 Main St. Worcester, MA 01608	

Agency Contact		***Area of Responsibility***
Agency Name	Massachusetts Division of Fisheries and Wildlife	☐ Flows ☐ Water Quality ☐ Fish/Wildlife ☐ Watershed ☐ T&E Species ☐ Cultural/Historic ☐ Recreation
Name and Title	Caleb Slater, Ph D., Anadromous Fish Project Leader	
Phone	508-389-6331	
Email address	Caleb.Slater@state.ma.us	
Mailing Address	One Rabbit Hill Rd. Westborough, MA 01581	

Sworn Statement and Waiver Form

All applications for LIHI Certification must include the following sworn statement before they can be reviewed by LIHI:

SWORN STATEMENT

As an Authorized Representative of Whitman River Dam, Inc., the Undersigned attests that the material presented in the application is true and complete.

The Undersigned acknowledges that the primary goal of the Low Impact Hydropower Institute's certification program is public benefit, and that the LIHI Governing Board and its agents are not responsible for financial or other private consequences of its certification decisions.

The Undersigned further acknowledges that if LIHI Certification of the applying facility is granted, the LIHI Certification Mark License Agreement must be executed prior to marketing the electricity product as LIHI Certified®.

The Undersigned further agrees to hold the Low Impact Hydropower Institute, the Governing Board and its agents harmless for any decision rendered on this or other applications, from any consequences of disclosing or publishing any submitted certification application materials to the public, or on any other action pursuant to the Low Impact Hydropower Institute's certification program.

FOR PRE-OPERATIONAL CERTIFICATIONS:

The Undersigned acknowledges that LIHI may suspend or revoke the LIHI Certification should the impacts of the facility, once operational, fail to comply with the LIHI program requirements.

Company Name: **Whitman River Dam, Inc.**

Authorized Representative:

Name: **Robert T Francis**

Title: **President/Owner**

Authorized Signature:

Date: **August 18,2020**

APPENDIX A – USFWS IPaC Report

IPaC Information for Planning and Consultation

U.S. Fish & Wildlife Service

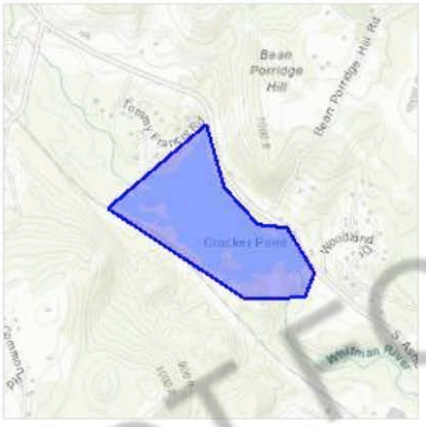
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Worcester County, Massachusetts



Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- **Birds of Conservation Concern** http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- **Measures for avoiding and minimizing impacts to birds** http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES

NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle Haliaeetus leucocephalus — **Breeds Dec 1 to Aug 31**

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Black-billed Cuckoo Coccyzus erythropthalmus — **Breeds May 15 to Oct 10**

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9399

Bobolink Dolichonyx oryzivorus — Breeds May 20 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Canada Warbler Cardellina canadensis — Breeds May 20 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cape May Warbler Setophaga tigrina — Breeds Jun 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prairie Warbler Dendroica discolor — Breeds May 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rusty Blackbird Euphagus carolinus — **Breeds May 10 to Jul 20**

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wood Thrush Hylocichla mustelina — **Breeds May 10 to Aug 31**

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

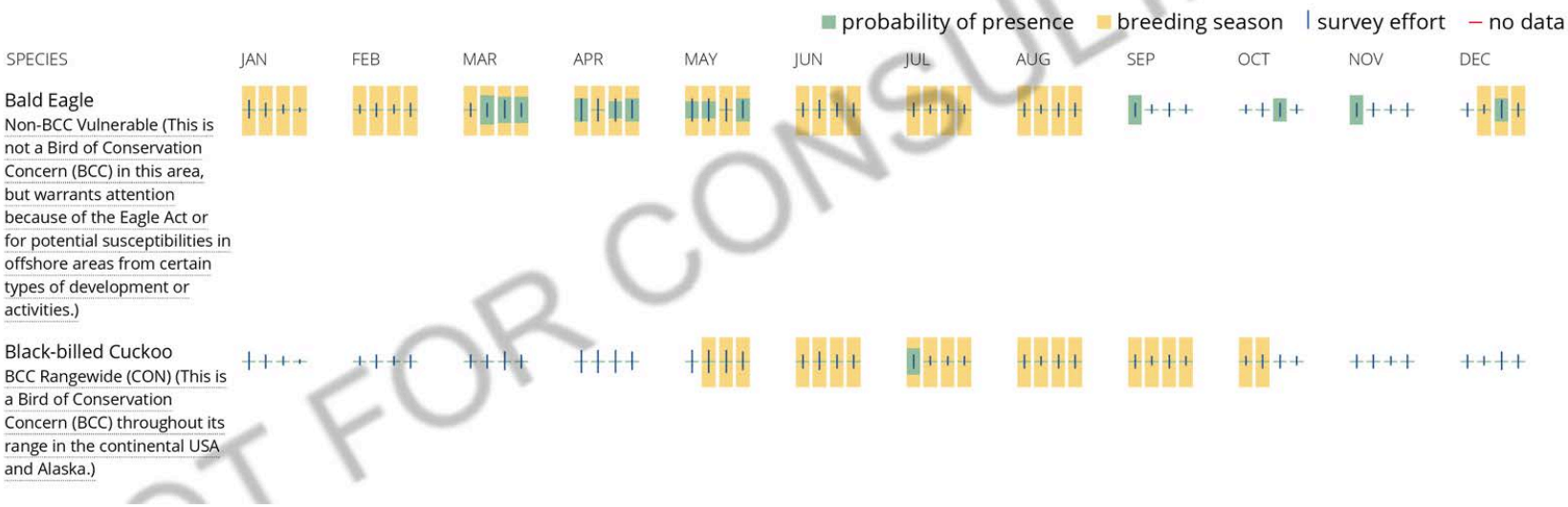
Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

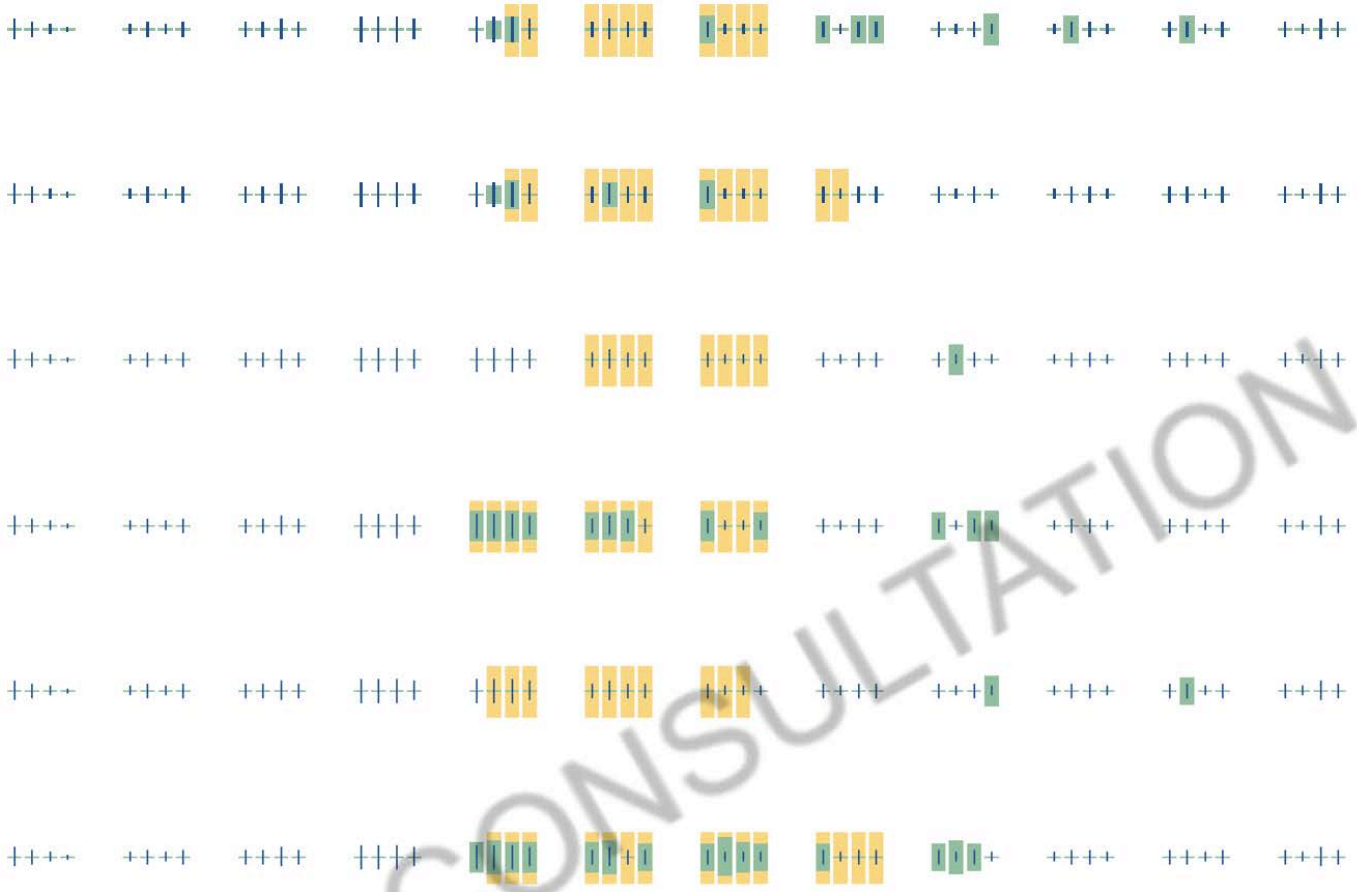
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Bobolink
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Canada Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Cape May Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Prairie Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Rusty Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the

locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know

what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER FORESTED/SHRUB WETLAND

PFO1C

LAKE

L1UBHh

RIVERINE

R5UBH

R2UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX B – Dissolved Oxygen and Water Temperature Monitoring Plan

Water Quality Certificate Conditions Issued by the Massachusetts Department of Environmental Protection (DEP) February 4, 2011 for the Crocker Dam Hydroelectric Project, Westminster, MA

Federal Energy Regulatory Commission (FERC) P-13237

Certification Condition 18

Dissolved Oxygen and Water Temperature Monitoring Plan (Plan)

Prepared for:

Whitman River Dam, Inc.
PO Box 145
Westminster, MA 01473
Cell 978-423-1037 Office 978-874-1010
Mr. Robert Francis

Prepared by:

W.E. Kuriger Associates
90 Atlantic Avenue
Fitchburg, MA 01420
978-343-0921, 800-292-0921
wek123@verizon.net

January 28, 2020

Introduction

The "Dissolved Oxygen and Water Temperature Monitoring Plan" (Plan) included here was prepared in response to the requirements set out in the Federal Energy Regulatory Commission (FERC) license process and the requirements of the Massachusetts DEP "Water Quality Certification" (Certification) filing for the hydroelectric power generation system at the Crocker Pond, Westminster, MA, P-13237 (the site) operated by Whitman River Dam, Inc. (operator). The requirements are outlined below.

Article 401. Commission Approval, Notification, and Filing of Amendments.

(a) Requirement to File Plans for Commission Approval.

Various conditions of this license found in the Massachusetts Department of Environmental Protection (Massachusetts DEP) water quality certification (certification) issued pursuant to section 401 of the Clean Water Act (Appendix A) require the licensee to prepare plans in consultation with state and federal agencies but without submittal to or approval by the Commission. Each such plan also shall be submitted to the Commission for approval.

This plan specifically meets the requirements of Section 18 of the Certification which are:

"Dissolved oxygen and water temperature monitoring plan"; to be produced within six months of license issuance or within three months of completion of turbine installation at the dam, whichever occurs first.

The conditions of the certification that pertain to this Plan are found in Appendix A in the Certification and are appended to this Plan. The specifics for this Plan at Section 18 are:

18. Within three months of completion of turbine installation at the dam, the project owner shall submit a plan of operations to insure dissolved oxygen levels in the Whitman River remain above 6 mg/l at all times. Operations shall include at a minimum, monitoring dissolved oxygen and temperature at stations South 1 and South 2 (identified during summer 2010 sampling) upon turbine discharge and during any adjustments necessary to maintain the 6 mg/l standard. Adjustments could include providing continuous spill during the summer months (July-September) or improving aeration at the outlet, if needed. The project owner shall consult with the state and federal resource agencies in developing this plan, shall respond to all agency comments, and shall include agency comment letters when submitting the plans to Massachusetts DEP for approval. The project owner shall provide state and federal resource agencies with at least thirty days to respond to a draft plan before it is

submitted to Massachusetts DEP for approval. The project owner shall implement the plan as approved by Massachusetts DEP.

The Plan to meet these requirements is included below.

Dissolved Oxygen and Water Temperature Monitoring Plan
January 26, 2020

Background

The new powerhouse at the Crocker Pond dam (the site) is of precast construction on the east side of the Whitman River and the upstream side of the access bridge that is downstream of the dam. Water will be supplied to the new powerhouse by extension of the existing 42-inch diameter carbon steel penstock. The penstock will be connected to a Kaplan turbine model number KS560K4 with an integral synchronous generator. The turbine has been sized at 145 kW as licensed, with an estimated annual energy output of 887.45 MWh.

Photo 1. Crocker Pond Dam, September 10, 2010.

The operator shall run the system in a run-of-river mode such that inflow to the turbine equals outflow on an instantaneous basis and fluctuations of the head pond water level are minimized. This operating regime may be temporarily modified by approved

maintenance activities, agreement between the operator and appropriate state and/or federal resource agencies, or by extreme hydrologic conditions or emergency electrical system conditions, as these terms are defined in the permit.

Control systems will be provided so that operation of the machine will be accurately controlled by head pond level and will follow the elevation of head pond so that it will perform as a run of river installation. Reservoir operating range will be determined based on compliance with downstream cold water fishery dissolved oxygen requirements.

The goal of this Plan is to coordinate head pond elevation and flow through the generator with known dissolved oxygen levels in order to use water elevation and flow as guidelines in the generator operation at all times.

Table 1. The Specifications of the Kaplan Turbine Model Number KS560K4 Rated at the Flowing:

Number of Units	1
Maximum Net Head	11.7 m
Maximum Water Flow	1.7 m3/s
Average Turbine Power Output@ design	145 kW as licensed
Runner Diameter	560 mm
Turbine Speed	900 rpm
Suction head	-0.49 m

1. The Plan assumes that based on previous results from oxygen monitoring in 2010 during normal weather conditions the water in the Whitman River downstream from the Crocker Pond hydroelectric turbine contains diurnal dissolved oxygen levels of 6 mg/liter or higher. Instructions in 2010 from Robert Kubit, DEP, Division of Watershed Management, Worcester, MA included that the first round of sampling would occur in 2010 and a second round of sampling will occur in the first low-flow season after the project goes on line. A copy of the DEP instructions is appended to this Plan.

2. Upon the start of continuous turbine discharge dissolved oxygen and temperature readings will be taken during the first low flow season at two locations shown on Figure 1, namely South 1 and South 2. The low flow season is typically during the summer months of July to September. Operations shall include monitoring dissolved oxygen at stations South 1 and South 2 upon turbine discharge during the first low flow season and during any adjustments necessary to maintain the 6 mg/l standard. Adjustments could include providing continuous spill during the summer months (July – September) or improving aeration at the outlet, if needed.

2. Dissolved Oxygen measurements could be conducted with a point of use instrument or with data logging sondes. Three calibrated YSI 600 DO meters (now obsolete) and data logging sondes were used at three stations at the site at three time periods in 2010. The data from those measurements can be used as a guide for future point of use measurements. A copy of the "Dissolved Oxygen & Water Quality Report", dated October 16, 2010 is appended to this plan.

The three time periods in 2010 were July 6-9, August 9-12, and September 9-12, 2010. The two stations that are required in 2020, South 1 and South 2 are shown on Figure 1. At each 2010 sampling event, sampling began after at least three days with no precipitation or slight precipitation of less than 0.5 inches total. There were no major storm events while sampling during each of the three periods. For reference, the current design of the system is shown on Figure 2, "Powerhouse Location Plan".

The "South 1" location was about 30 feet south of the bridge that is located south of the Crocker Pond dam; and "South 2" was located about 100 feet to the south of the bridge. Both the South 1 and South 2 stations contained water that was about 0.5 to 1.0 feet deep. The data logging sonde was placed on the bottom of the river bed at those stations. During the sampling periods in 2010, from July to September, some water always flowed through the South 1 and South 2 stations.

At the end of each of the three sampling periods, data from the sondes was downloaded to the EcoWatch program from YSI for analysis, and then to an Excel spreadsheet.

3. Based on oxygen and temperature measurements taken during 2010 and new data taken during the first low flow season in 2020 a correlation will be made with head pond elevation, flow and dissolved oxygen levels to establish the reservoir operating range so that water elevation and/or flow rate can be used to determine when if needed the operator would provide continuous spill during the summer months (July – September) or improve aeration at the outlet.

For example, if data indicate that during low flow conditions downstream river water contains dissolved oxygen levels of 6 mg/liter or more, the dam water elevation and flow measurements could be used alone to accomplish run of river operation. If during at the low flow season downstream dissolve oxygen levels fall below 6 mg/liter, the dam water elevation and flow characteristics will be used as indicators that require improved spill or water aeration. Subsequent measurements would be used to determine which elevation and flow characteristics are necessary to maintain 6 mg/liter dissolved oxygen levels in the river.

4. Data regarding elevation and flow should be collected at the turbine and provided to the DEP and/or FERC upon request. The system will be equipped for such measurements.

5. The operator will follow the additional Certifications found in Appendix A dated February 4, 2011 or later.

Please give us a call regarding any questions you have regarding this Plan or the site.

Sincerely,
W. E. Kuriger Associates

William E. Kuriger, Ph.D., P.W.S., L.S.P.
Environmental Scientist, Plant Pathologist, Wetland Scientist
New Hampshire Certified Wetland Scientist 069
Massachusetts Licensed Site Professional 8104

APPENDIX A

Water Quality Certificate Conditions for the Crocker Dam Hydroelectric Project issued by the Massachusetts Department of Environmental Protection on

February 4, 2011.

1 Massachusetts Department of Environmental Protection (Massachusetts DEP) approves the application of Whitman River Dam, Inc. and certifies that there is reasonable assurance that the Crocker Hydroelectric Project, as described above and subject to the conditions below, can be constructed and operated in compliance with the applicable provisions of §303 of the Federal Act, 33 U.S.C. §1313.

2 This Water Quality Certification shall become a condition of the FERC license issued to the project owner.

3 This certification shall become effective on the date that the license issued for the project by FERC becomes effective.

4 The state and federal resource agencies referred to in this certification include the Massachusetts DEP, the Massachusetts Department of Fisheries and Wildlife (Massachusetts DFW), the U.S. Department of the Interior, Fish and Wildlife Service.

5 The project shall be operated by the project owner in accordance with the conditions contained in this certification and information included in the FERC license application. Any modification made to the FERC application during the licensing process that would have a significant effect on the conclusions or conditions contained in this certification, as determined by Massachusetts DEP, must be submitted to Massachusetts DEP for prior review and approval.

6 The project shall be operated to maintain the existing and designated uses of the Whitman River as outlined in the Standards at 314 CMR 4.00, and to maintain and integrated and diverse biological community within the Whitman River.

7 The project owner shall obtain and comply with all applicable federal, state and local licenses, permits, authorizations, conditions, agreements and orders required for the construction and operation of the project in accordance with the terms of this certification.

8 All activities shall be conducted in compliance with the Massachusetts Wetlands Protection Act, including the Rivers Restoration Act, G.L. Chapter 131,

Section 40, and the implementing regulations at 310 CMR 10.00. A water quality certification shall be obtained from Massachusetts DEP prior to initiating any activity that will cause a discharge subject to §404 of the federal Act 33 U.S.C., §1344. The project owner shall comply with all applicable provisions of the Public Waterfront Act GL c. 91, and the implementing regulation at 310 CMR 9.00.

9 Prior to beginning any construction on the project, the project owner shall submit a plan to monitor and control erosion during construction activities to keep impacted waters free from turbidity in concentrations that are aesthetically objectionable or would impair any designated use(s) of such waters. The project owner shall implement the plan as approved by Massachusetts DEP.

10. All construction, maintenance, and repair activities, including disposal of debris and removal of sediments in impounded areas, shall be conducted in a manner so as not to impair water quality, and pursuant to and in compliance with any required approvals.

11. Massachusetts DEP may request, at any time during which this certification is in effect, that FERC reopen the license to make modifications Massachusetts DEP deems necessary to maintain compliance with the Standards at 314 CMR 4.00, or other appropriate requirements of state law.

12. Massachusetts DEP reserves the right to add and alter the terms and conditions of this certification when authorized by law, and as it deems appropriate to carry out its responsibilities during the life of the project with respect to water quality and the protection of the existing designated uses of the waters of the Commonwealth.

13. The project owner shall operate the project in a run-of-river mode such that inflow to the project equals outflow from the project on an instantaneous basis and fluctuation of the head pond water level are minimized. This operating regime may be temporarily modified by approved maintenance activities, agreement between project owner and appropriate state and/or federal resource agencies, or by extreme hydrologic conditions or emergency electrical system conditions, as these terms are defined below.

14. “Extreme hydrologic conditions” signifies the occurrence of events beyond the project owner’s control including without limitation, abnormal precipitation, extreme runoff, flood conditions, ice conditions or other hydrologic conditions which render the operational restrictions and requirements contained within this certification impossible to achieve, or are inconsistent with the safe operation of the project.

15. “Emergency electrical system conditions” signifies operating emergencies beyond the project owner’s control which require changes in flow regimes to eliminate such emergencies including without limitation, equipment failure or other abnormal temporary operating condition, generating unit operation or third-party mandated

interruptions under power supply emergencies, and orders from local, state or federal law enforcement or public safety authorities.

16. During refilling of the project reservoir after dam maintenance or emergency drawdown, the project owner shall operate the project such that 90% of the inflow to the project is released below the project and the impoundment is refilled on the remaining 10% of inflow.

17. Within three months of completion of turbine installation at the dam, or upon such other schedule established by FERC, the project owner shall, submit a plan for monitoring run-of-river operation including pond level and flow release from the project to Massachusetts DEP for approval. The plan shall include: a description and design of the mechanisms and structures that will be used; a description of periodic maintenance and/or calibration that will be conducted to ensure these mechanisms and structures work properly; a description of the method used to record project operation data for verification of proper operations and minimum flow releases; and a description of the manner in which data will be maintained for inspection by Massachusetts DEP and the state and federal resource agencies. The project owner shall consult with the state and federal resource agencies in developing these plans, shall respond to all agency comments, and shall include agency comment letters when submitting the plans to Massachusetts DEP for approval. The project owner shall provide state and federal resource agencies with at least thirty days to respond to a draft plan before it is submitted to Massachusetts DEP for approval. The project owner shall implement the plan as approved by Massachusetts DEP.

18. Within three months of completion of turbine installation at the dam, the project owner shall submit a plan of operations to insure dissolved oxygen levels in the Whitman River remain above 6 mg/l at all times. Operations shall include at a minimum, monitoring dissolved oxygen and temperature at stations South 1 and South 2 (identified during summer 2010 sampling) upon turbine discharge and during any adjustments necessary to maintain the 6 mg/l standard. Adjustments could include providing continuous spill during the summer months (July-September) or improving aeration at the outlet, if needed. The project owner shall consult with the state and federal resource agencies in developing this plan, shall respond to all agency comments, and shall include agency comment letters when submitting the plans to Massachusetts DEP for approval. The project owner shall provide state and federal resource agencies with at least thirty days to respond to a draft plan before it is submitted to Massachusetts DEP for approval. The project owner shall implement the plan as approved by Massachusetts DEP.

19. Within one year of the effective date of this certification, or upon such other schedule established by FERC, the project owner shall install full-depth, one inch clear trash racks with velocities less than or equal to two feet per second (≤2 fps) at the intakes to reduce impingement and entrainment of fish at the project.

20. Massachusetts DEP reserves the right to prescribe upstream and downstream eel passage facilities and operations when determined necessary by the Massachusetts DFW.

21. Massachusetts DEP reserves the right to prescribe upstream and downstream anadromous fish passage facilities and operations when determined necessary by the Massachusetts DFW.

22. The project owner shall maintain a minimum flow in the bypassed reach sufficient to maintain water quality standards at all times.

23. The project owner shall allow any employee, agent, consultant, contractor or authorized representative of Massachusetts DEP or Massachusetts DFW to enter the facilities in order to assess compliance with the terms and conditions of this certification including, but not limited to, entry for the purposes of: (i) investigating, sampling, inspecting, or photocopying documents or other writings, conditions, equipment, practices or property; (ii) interviewing facility personnel and contractors; (iii) making records of field activities; and (iv) observing any activities undertaken at the facilities under any of the provisions of this certification.

24. If any event occurs which delays or will delay the project owner's performance of work beyond a deadline established by or pursuant to this certification, which event was beyond the reasonable control and without the fault of the project owner or any person or entity subject to the project owner's control, and which event could not have been prevented or avoided by the exercise of due care, foresight, or due diligence on the part of the project owner (a "force majeure event"), then the time for performance shall be extended for an appropriate period of time, as determined by Massachusetts DEP in its sole discretion. The project owner shall bear the burden of demonstrating that a force majeure event has occurred or will occur, and that the delay was beyond the reasonable control and without the fault of the project owner. Such an extension of time must be in writing to have effect.

25. Submissions under this certification shall be sent to:

Massachusetts DEP:
Massachusetts Department of Environmental Protection
Division of Watershed Management
Central Regional Office
627 Main Street
Worcester, MA 01608
(508) 767-2854; FAX (508) 791-4131

Appendix B

The following is taken from the FERC License:

Article 401. *Commission Approval, Notification, and Filing of Amendments.*

(a) Requirement to File Plans for Commission Approval.

Various conditions of this license found in the Massachusetts Department of Environmental Protection (Massachusetts DEP) water quality certification (certification) issued pursuant to section 401 of the Clean Water Act (Appendix A) require the licensee to prepare plans in consultation with state and federal agencies but without submittal to or approval by the Commission. Each such plan also shall be submitted to the Commission for approval. These plans are listed below.

Massachusetts DEP certification condition	Plan name	Due date
9	Erosion monitoring and control plan	Within six months of license issuance or 60 days prior to commencing construction of the project, whichever occurs first
17	Run-of-river operation monitoring plan	Within six months of license issuance or within three months of completion of turbine installation at the dam, whichever occurs first
18	Dissolved oxygen and water temperature monitoring plan	Within six months of license issuance or within three months of completion of turbine installation at the dam, whichever occurs first

The licensee shall include with each plan filed with the Commission documentation that the licensee developed the plan in consultation with the Massachusetts DEP, Massachusetts Department of Fish and Wildlife (Massachusetts DFW), and the U.S. Department of the Interior's Fish and Wildlife Service (FWS) and has received approval from Massachusetts DEP. The Commission reserves the right to make changes to any plan submitted. Upon Commission approval, the plan becomes a requirement of this license, and the licensee shall implement the plan or changes in project operation or facilities, including any changes required by the Commission.

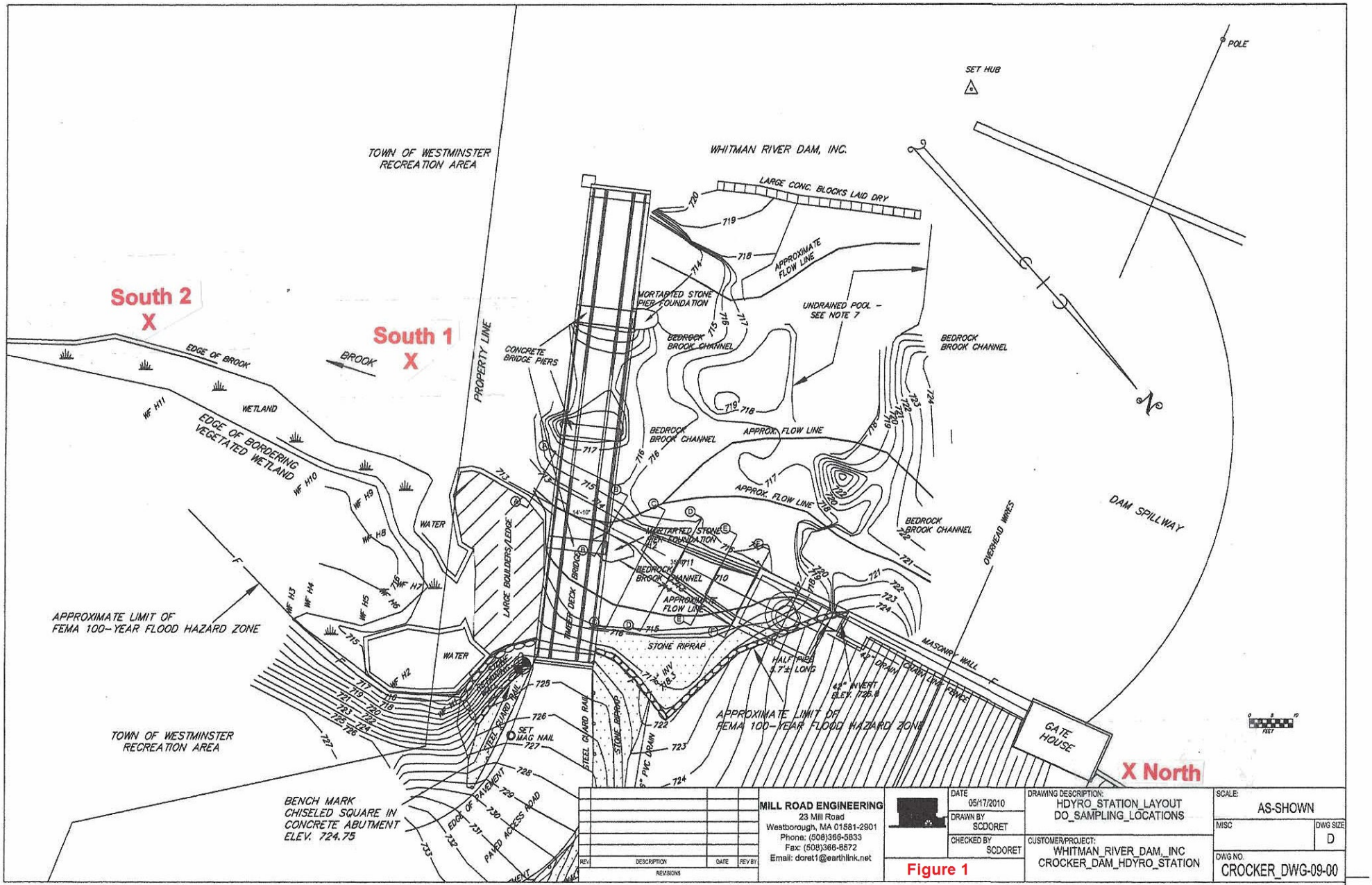
(b) Requirement to Notify Commission of Emergencies and Other Activities.

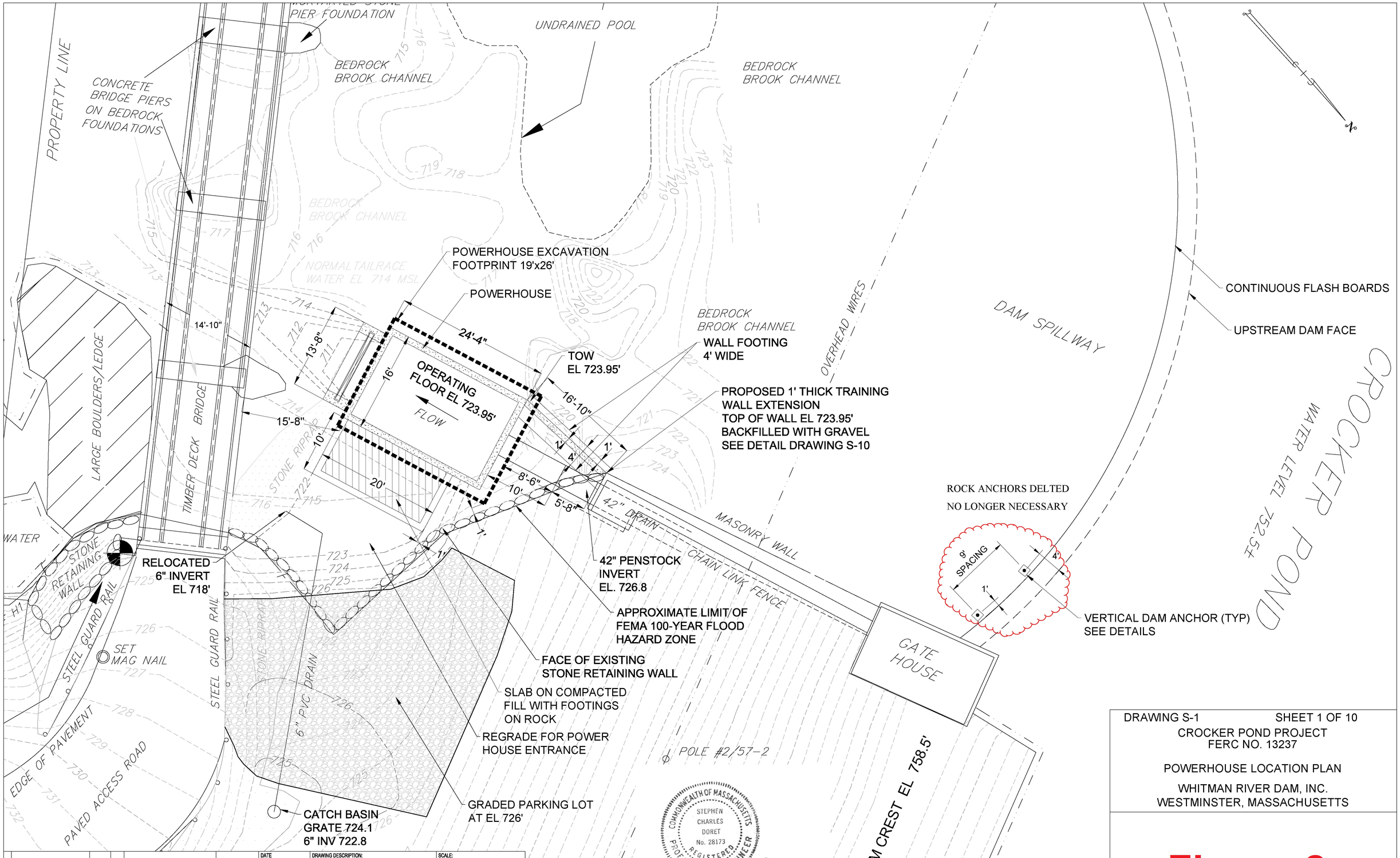
If licensee temporarily modifies run-of-river project operation due to an emergency situation, extreme hydrological conditions, or other reason as provided in certification condition 13, the license must notify the Commission, Massachusetts DEP, Massachusetts DFW, and FWS prior to implementing such modifications, if possible, or in the event of an emergency, as soon as possible, but no later than 10 days after each such incident.

(c) Requirement to File Amendment Applications.

Certain certification conditions in Appendix A contemplate unspecified long-term changes to project operations or facilities for the purpose of mitigating environmental impacts, but do not appear to require prior Commission approval for such changes. These changes may not be implemented without prior Commission authorization, granted after the filing of an application to amend the license.

Article 402. *Notification of Commencement of Project Operation*. The run-of-river operation monitoring plan required by certification condition 17 shall include a requirement to notify the Massachusetts Department of Fisheries and Wildlife, U.S. Fish and Wildlife Service, Massachusetts Department of Environmental Protection, and the Commission within 30 days of the commencement of project operation.


South 2
X
South 1
X
X North
TOWN OF WESTMINSTER RECREATION AREA
WHITMAN RIVER DAM, INC.
POLE
SET HUB
LARGE CONC. BLOCKS LAID DRY
APPROXIMATE FLOW LINE
MORTARTED STONE PIER FOUNDATION
UNDRAINED POOL - SEE NOTE 7
BEDROCK BROOK CHANNEL
CONCRETE BRIDGE PIERS
PROPERTY LINE
EDGE OF BROOK
BROOK
WETLAND
EDGE OF BORDERING VEGETATED WETLAND
WATER
APPROX. FLOW LINE
DAM SPILLWAY
OVERHEAD WIRES
LARGE BOULDERS/LEDGE
STEEL DECK BRIDGE
APPROXIMATE LIMIT OF FEMA 100-YEAR FLOOD HAZARD ZONE
STONE RIPRAP
HALF PIPE 3.7'± LONG
42" INVERT ELEV. 726.8
MASONRY WALL
CHAIN LINK FENCE
GATE HOUSE
STEEL GUARD RAIL
CONCRETE SILLS
PVC DRAIN
SET MAG NAIL
BENCH MARK CHISELED SQUARE IN CONCRETE ABUTMENT ELEV. 724.75
EDGE OF PAVEMENT
PAVED ACESS ROAD
MILL ROAD ENGINEERING
23 Mill Road
Westborough, MA 01581-2901
Phone: (508)366-5833
Fax: (508)366-8572
Email: doret1@earthlink.net
REVISIONS
REV
DESCRIPTION
DATE
REV BY
DATE 05/17/2010
DRAWN BY SCDORET
CHECKED BY SCDORET
DRAWING DESCRIPTION: HDYRO_STATION_LAYOUT DO_SAMPLING_LOCATIONS
CUSTOMER/PROJECT: WHITMAN_RIVER_DAM,_INC CROCKER_DAM_HDYRO_STATION
SCALE: AS-SHOWN
MISC
DWG SIZE D
DWG NO. CROCKER_DWG-09-00
Figure 1



4	PER FERC COMMENTS	09/05/18	JEM
3	UPDATED POWERHOUSE LOCATION	07/16/18	JEM
2	UPDATED DETAILS AND DWG SHEETS	11/14/16	JEM
1	UPDATED POWERHOUSE FOOTPRINT	08/05/16	JEM
	REVISIONS		

MILL ROAD ENGINEERING
23 Mill Road
Westborough, MA 01581-2901
Phone: (508)366-5833
Fax: (508)366-8572
Email: doret1@earthlink.net

DATE: 02/3/2016
DRAWN BY: JEM
CHECKED BY: SCD
DRAWING DESCRIPTION: POWERHOUSE LOCATION PLAN
CUSTOMER/PROJECT: WHITMAN RIVER DAM CROCKER POND WESTMINSTER, MASSACHUSETTS
SCALE: AS SHOWN
DWG SIZE: ANSI D
DWG NO. S 1

DRAWING S-1 SHEET 1 OF 10

CROCKER POND PROJECT
FERC NO. 13237

POWERHOUSE LOCATION PLAN

WHITMAN RIVER DAM, INC.
WESTMINSTER, MASSACHUSETTS

Figure 2

W.E. Kuriger Associates

ECONOMICS
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90 ATLANTIC AVE.
FITCHBURG, MA 01420
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1-800-292-0921
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October 16, 2010

Robert D. Kubit, P.E.
Environmental Engineer
The Commonwealth of Massachusetts
Department of Environmental Protection (DEP)
Division of Watershed Management
627 Main Street
Worcester, MA 01608

Re: Dissolved oxygen and temperature results, Crocker Pond, Westminster, MA; and plan for turbine operations after installation, FERC Docket P-13227-001

Dear Mr. Kubit:

At your request, we have collected dissolved oxygen (DO) and temperature readings from Crocker Pond during July, August and September 2010. This report provides the details of the results of the readings obtained, and provides a description of operations that will be taken after turbine installation to insure dissolved oxygen levels in the Whitman River at stations South 1 and South 2 remain at 6 mg/l at all times.

Materials and Methods

Three calibrated YSI 600 DO meters and data logging sondes were used at three stations at Crocker Pond, Westminster, MA (the site). One calibrated YSI 55 manual DO meter was used for comparison readings at the start and end of the three day monitoring periods at each location.

The three time periods were July 6-9, August 9-12, and September 9-12, 2010. The three stations are shown on Figure 1. At each sampling event, sampling began after at least three days with no precipitation or slight precipitation of less than 0.5 inches total. There were no major storm events while sampling during each of the three periods.

The three stations readings were collected from included "North", which was next to the northeast side of the dam at Crocker Pond, at a depth of 18 feet, which is where a portion of the water that would enter the penstock gate is located; "South 1" located about 30 feet south of the bridge that is located south of the Crocker

Pond dam; and "South 2", located about 100 feet to the south of the bridge. Both the South 1 and South 2 stations contained water that was about 0.5 to 1.0 feet deep. The sonde was placed on the bottom of the river bed at those stations. During the sampling period, July – September, water always flowed through the South 1 and South 2 stations.

At the end of each of the three sampling periods, data from the sondes was downloaded to the EcoWatch program from YSI for analysis, and then to an Excel spreadsheet. Data was plotted to graphs for each location and each sampling event. All data was previously submitted to you.

Results

July 6-9, 2010

The first set of data was obtained in July, with no rainfall before sampling began and no rainfall during the sampling period. Some sondes recorded data as % DO, so a conversion/correction was made to mg/l or parts per million (ppm). These results were compared to the manual readings taken in mg/l.

The results for the north readings included a steady decline in oxygen levels till the readings were 0.38 mg/l during and at the end of day three.

The results for the South 1 location were quite uniform over the three day period, with a range from about 6.5 mg/l to 7.2 mg/l.

The results for the South 2 location were more variable, from 2 mg/l to 8 mg/l. The variability may have been due to lack of micro flow at various times at the sonde location, and/or debris interference.

Photos 1 and 2 show the flows at the dam, the existing penstock, and location South 1 during the July sampling period.

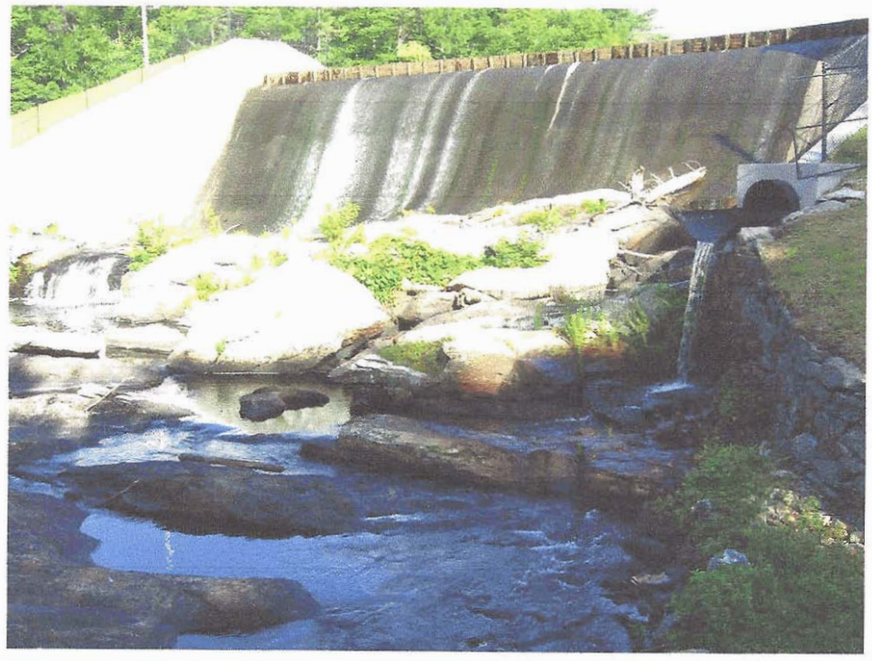


Photo 1. Crocker Pond Dam, July 6, 2010.

Photo 2. Crocker Pond, South 1 Location, (foreground) July 6, 2010

The temperature readings during the July sampling period were lowest at the 18 foot depth at the North location, and higher and similar at the South 1 and South 2 stations.

August 9-12, 2010

During the three days before the sampling period in August 2010, there was a small thunderstorm at the Fitchburg Airport as recorded for the National Oceanic and Atmospheric Administrations (NOAA) data collection that resulted in 0.09 inches of rainfall on August 8, 2010. There was also a slight shower on August 9, 2010, that resulted in 0.11 inches of rainfall.

The North location, at 18 feet deep, recorded readings that were below 1 mg/l DO, similar to the July data, with occasional spikes to up to 4.69 mg/l. The last reading was 0.45 mg/l DO.

The South 1 and South 2 readings were in the range of 8 mg/l to 9 mg/l DO over the three day period. The readings obtained with the manual YSI 45 DO meter were lower.

Photos of the Crocker Dam, penstock and bedrock below the penstock during the August sampling period are shown in Photos 3 and 4.

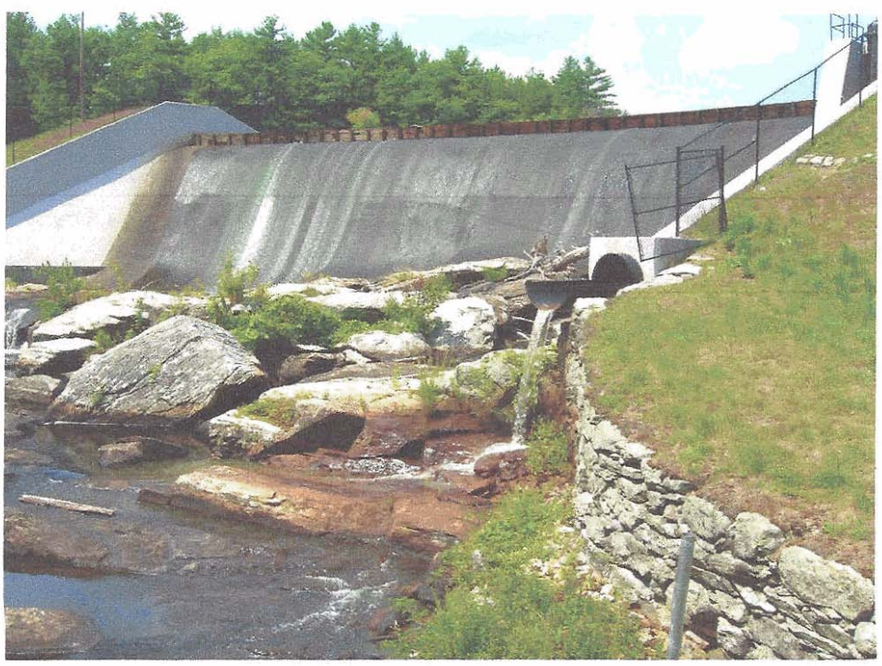


Photo 3. Crocker Pond Dam, August 9, 2010.

Photo 4. Bedrock below Crocker Pond Dam August 9, 2010.

The temperature readings were higher at the North location in August compared to July, and similar or slightly lower at the South 1 and South 2 stations.

September 9-12, 2010

The readings obtained in September were taken after Hurricane Earl, which probably had some effect on mixing the water in Crocker Pond. During the three day period before installation of the three DO monitors about 0.07 inches of rainfall was recorded at the Fitchburg Airport for NOAA recording.

The results for the North sample were higher than during the July and August readings, and similar initially to the South 1 and South 2 readings, but declined over the three day period, from about 9 mg/l to 6.32 mg/l at the end. These results were significantly higher than the North readings for July and August.

The South 1 and South 2 readings were from 8 mg/l to 9 mg/l over the three day period. During portions of the three day period, the South 1 sonde collected data in 30 minute intervals, not 15 minute intervals, resulting in less data, but still met the requirements for sampling.

The temperature readings were higher at the North location, and slightly lower at the South 1 and South 2 stations. This was the first time from the three time periods that the North location temperatures, at 18 feet deep, were higher than the South 1 and South 2 stations.

After the August DO results were reviewed, the DEP requested that one water sample be collected and analyzed for phosphorus, ammonia, biochemical oxygen demand (BOD), and nitrate. The sample was collected at the18 foot deep with a Kemmerer bottle at the North location. The results of the water quality tests are listed below.

Table 1. Water Quality Test Results, North Location, September 9, 2010.

Test	Result	RDL
Phosphorus	0.0720 mg/l	0.01 mg/l
Ammonia	BRL	0.20 mg/l
Biochemical Oxygen Demand	BRL	3.00 mg/l
Nitrate	BRL	0.10 mg/l

There was no significant biological oxygen demand (BOD) in the water at the North location.

Photos 5 and 6 show Crocker Pond Dam, penstock, and location South 1 during the September sampling period.

Photo 5. Crocker Pond Dam, September 10, 2010.

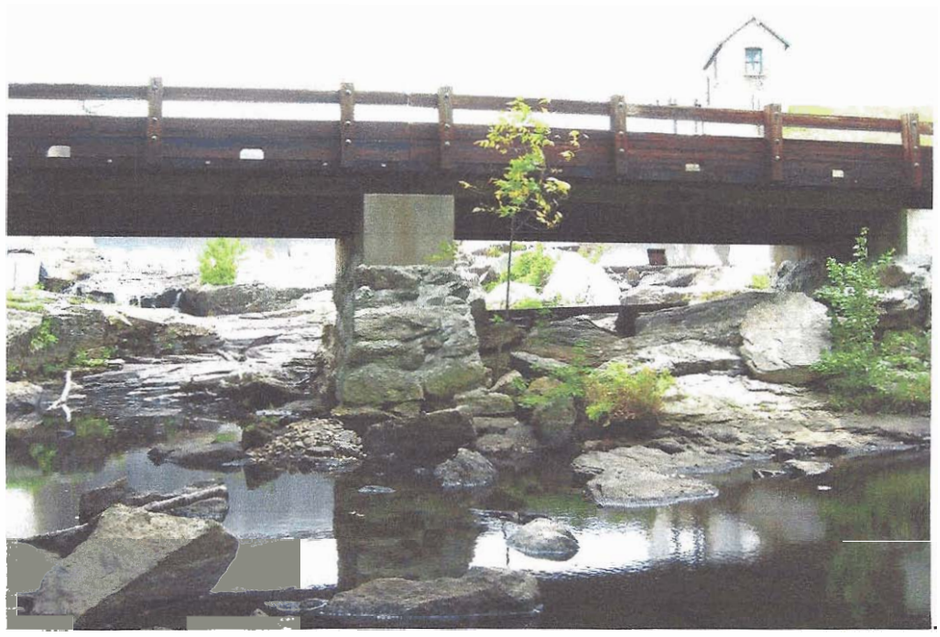


Photo 6. Location South 1, September 10, 2010.

Comments

Comments received from Robert Kubit, P.E., DEP, Division of Watershed Management, 627 Main Street, Worcester MA 01608 on October 8, 2010 are provided below.

"Data from the three stations at Crocker Dam taken July, August and September indicate very low dissolved oxygen at the inlet gate to the proposed turbine and acceptable dissolved oxygen levels downstream of the project. Comparing data from the two different types of dissolved oxygen meters shows wide variability for unknown reasons thus making the reliability of the data uncertain. I understand the flow from the dam during sampling consisted of leakage around the dam (including the inlet gate) and spillage over the dam. I agree with you the 2010 summer provided a representative low flow season.

Note the cold water fishery 6 mg/l oxygen standard will be used in our Water Quality Certification rather than the 5 mg/l warm water fishery standard. Per conversation with Caleb Slater (MADFW), native trout were confirmed present in the vicinity of Crocker Dam downstream this past summer, therefore the published Water Quality Standards will be changed in the near future to reflect this fact.

Caleb also mentioned you might investigate the possibility of the turbine manufacturer making alterations to the turbine to help increase the dissolved oxygen levels. This is being done at another hydroelectric facility.

In order to complete the water quality certification process, please do two things:

1. Provide a description of operations to be taken after turbine installation to insure dissolved oxygen levels in river remain above 6 mg/l at all times. Operations shall include at a minimum, monitoring dissolved oxygen at stations South 1 and South 2 upon turbine discharge and during any adjustments necessary to maintain the 6 mg/l standard. Adjustments could include providing continuous spill during the summer months (July – September) or improving aeration at the outlet, if needed.

2. According to 314 CMR 9.05(3), a public notice of an application for 401 Water Quality Certification shall be published by the applicant.....in a newspaper of general circulation within the area of the proposed activity.....The public notice shall contain:
(a) the name and address of the applicant and property owner;
(b) the location of the proposed activity;
(c) a brief description of the activity;

(d) the name and address of the person from whom additional information may be obtained;
(e) the 21 day time period within which the public may comment;
(f) the office and address within the Department to which comments should be addressed;
and
(g) a statement that any ten persons of the Commonwealth, any aggrieved person, or any governmental body or private organization with a mandate to protect the environment that has submitted written comments may also appeal the Department's Certification and that failure to submit comments before the end of the public comment period may result in the waiver of any right to an adjudicatory hearing.

Please fax a copy of the public notice to me when published. If you have any questions, please call."

Bob

Robert Kubit, P.E.
MassDEP
Division of Watershed Management
627 Main Street
Worcester MA 01608
Telephone: (508) 767-2854
Email: robert.kubit@state.ma.us
Fax: (508) 791-4131

Discussion and Description of Post Turbine Installation Operations to Maintain DO Levels Above 6 mg/l

The lower readings for the manual YSI meter were thought to be possibly due to an older electrode. The YSI 55 DO meter has been in service since July 1997. The YSI 600 series DO meters have been in service since June 2007. The gold and central triangular electrode both appear to be in excellent condition on the YSI 55 meter. YSI technical support personnel stated that the difference in readings appear to be due to a more accurate calculation for DO based on DO, conductivity/salinity and temperature with the YSI 600 units. The YSI 55 unit relies on an estimate of elevation and salinity for DO calculations. The YSI 55 will be updated with more accurate salinity estimates for future comparative readings.

Based on the results obtained from the three sample periods, it appears that DO levels vary at the North station depending on the ability of waters at the 18 foot deep level to mix with waters at higher elevations that contain higher

concentrations of DO, as a function of the water through put of the reservoir. During the July and August sampling periods, DO levels at the 18 foot depth were low for extended periods. During the September period, after Hurricane Earl, which produced significant rainfall over a short period of time, the DO level in the North sampling location, at 18 feet deep, was significantly higher, and declined during the course of the sampling period.

The data indicates that the DO value in the lower level of the pond is low when water mixing is not taking place, but also that with mixing, which currently is caused by reservoir through put, the DO level will increase substantially.

Hand measurements taken in July with the YSI 55 manual DO meter at the North location showed the variation of DO stratification with water depth.

Table 2. Dissolved Oxygen Readings at Various Depths at the North Location on July 7, 2010.

Water Depth of Reading (feet)	Average DO Reading (mg/l)
5	4.82
10	4.84
15	0.34

As a result of this data, project engineer Steve Doret, P.E. estimated the lower pond volume by use of the Historical 1893 USGS Contour map for this area. From the map bathymetry was determined. It appears that the lower pond volume is small compared to the balance of the pond. The calculated volume of the lower 20 feet of the pond at the dam is about 5 acre-feet. The proposed turbine, when running at capacity, will be able to discharge this water volume in about 2.5 days.

Because the data indicates that under today's existing conditions through put causes significant mixing in this lower zone of the reservoir, it appears that the installation of the hydro turbine and its operation will tend to cause the lower level of the reservoir to stay well mixed. The data shows how sensitive this region is to mixing so that when the turbine is running the entire water column will benefit. Also, based on the concept of a well mixed discharge from the proposed hydro electric turbine, DO levels downstream at stations South 1 and South 2 will be improved.

We conclude that the installation of the proposed hydro turbine will result in discharges from the station which will be well mixed and that the discharge will meet state standards for DO downstream at stations South 1 and South 2 based on the data analyzed. The DO downstream from the turbine will be unchanged or improved. The likely continuing condition in the reservoir will tend to mix the reservoir and reduce DO stratification as a result of the proposed turbine continuing to withdraw water at depth, which as a result will reduce DO stratification in the reservoir.

Operations that will take place and be researched to insure DO levels in the river remain above 6 mg/l downstream at stations South 1 and South 2 at all times will include the following.

1. Mixing of Crocker Pond waters at the dam with the penstock gate open from about 6 feet below the surface of the gate to about 20 feet below the surface when the gate is totally open and the draw to the turbine is allowed to be maximized. Based on recent measurements under the most stressful conditions of a drought year, the mixing of waters should insure that 6 mg/l of DO will be present downstream from the turbine at stations South 1 and South 2. The waters going through the penstock, with the gate open, will contain a higher concentration of DO than exists at the present time due to the amount of water going through the penstock with the resultant mixing of the water column.

2. If levels of 6 mg/l are not met downstream at stations South 1 and South 2 after turbine discharge, a plate will be added to the gate at the Crocker Pond Dam to so that only water from the surface to about 8 feet below the surface can enter the penstock. The water at these elevations contains higher levels of DO and will provide a higher DO level to waters entering the turbine.

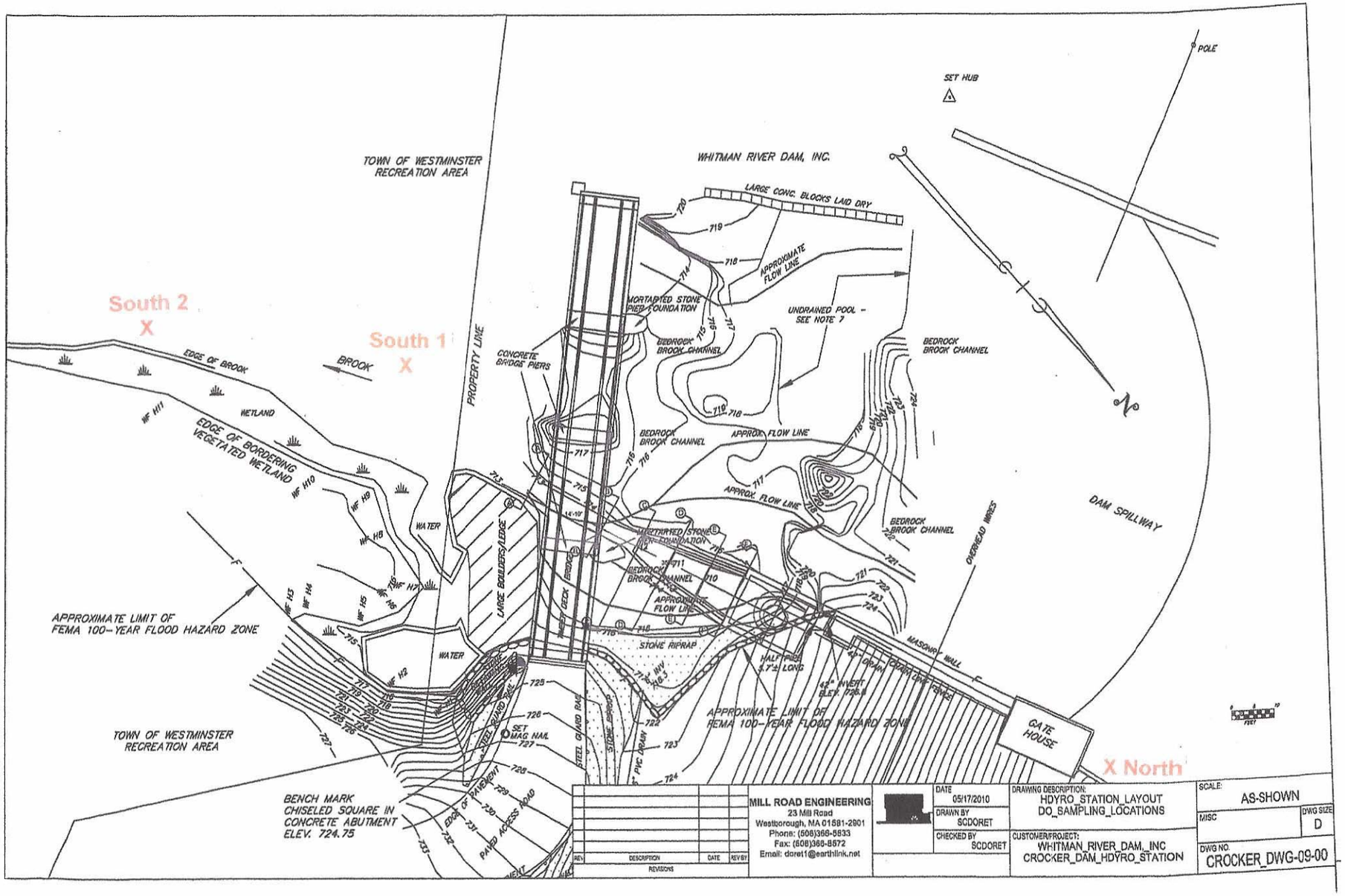
3. If levels of 6 mg/l are still not met downstream, at stations South 1 and South 2, adjustments such as providing continuous spill during the summer months (July-September) or alterations that are feasible to implement to the installed turbine system to help increase DO levels will be implemented and/or researched.

Measurement of DO at the South 1 and South 2 stations will take place after initial start up of the hydro turbine, and then during the first summer based on input from the DEP to show that the 6 mg/l standard is being met by the operation of the turbine. Upon establishing that the DO levels are above 6 mg/l, measurements will be discontinued.

Please give us a call with any questions regarding this report or the site.

Sincerely,
W. E. Kuriger Associates for
Whitman River Dam, Inc.

William E. Kuriger, Ph.D., P.W.S., L.S.P
Environmental Scientist
Licensed Site Professional 8104
SWS Professional Wetland Scientist 000383
NHANRS Certified Wetland Scientist 069


TOWN OF WESTMINSTER RECREATION AREA
WHITMAN RIVER DAM, INC.
SET HUB
POLE
LARGE CONC. BLOCKS LAID DRY
APPROXIMATE FLOW LINE
MORTARTED STONE PIER FOUNDATION
UNDRAINED POOL - SEE NOTE 7
BEDROCK BROOK CHANNEL
CONCRETE BRIDGE PIERS
PROPERTY LINE
South 2
South 1
EDGE OF BROOK
BROOK
WETLAND
EDGE OF BORDERING VEGETATED WETLAND
WATER
APPROX. FLOW LINE
LARGE BOULDERS/LEDGE
STONE RIPRAP
HALF PIER 3.7'± LONG
42" INVERT ELEV. 726.8
MASONRY WALL
OVERHEAD WIRES
DAM SPILLWAY
APPROXIMATE LIMIT OF FEMA 100-YEAR FLOOD HAZARD ZONE
GATE HOUSE
X North
SET MAG NAIL
STEEL GUARD RAIL
PAVED ACCESS ROAD
EDGE OF PAVEMENT
BENCH MARK CHISELED SQUARE IN CONCRETE ABUTMENT ELEV. 724.75
MILL ROAD ENGINEERING
23 Mill Road
Westborough, MA 01581-2901
Phone: (508)366-5833
Fax: (508)366-5572
Email: doret1@earthlink.net
DATE 05/17/2010
DRAWN BY SCDORET
CHECKED BY SCDORET
DRAWING DESCRIPTION: HDYRO_STATION_LAYOUT DO_SAMPLING_LOCATIONS
CUSTOMER/PROJECT: WHITMAN_RIVER_DAM,_INC CROCKER_DAM_HDYRO_STATION
SCALE: AS-SHOWN
MISC
DWG SIZE D
DWG NO. CROCKER_DWG-09-00
REVISIONS
REV DESCRIPTION DATE REV BY

Report Date:
21-Sep-10 15:40

☑ Final Report
☐ Re-Issued Report
☐ Revised Report

SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

Laboratory Report

W.E. Kuriger Associates
90 Atlantic Avenue
Fitchburg, MA 01420
Attn: William Kuriger

Project: Crocker Pond-Westminster, MA
Project #: [none]

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
SB17964-01	North-18'	Water@18'	09-Sep-10 16:40	10-Sep-10 16:00

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.

Massachusetts # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538
New Jersey # MA011/MA012
New York # 11393/11840
Pennsylvania # 68-04426/68-02924
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393

Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Technical Reviewer's Initial:

Spectrum Analytical holds certification in the State of Massachusetts for the analytes as indicated with an X in the "Cert." column within this report. Please note that the State of Massachusetts does not offer certification for all analytes.
Please note that this report contains 5 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Spectrum Analytical, Inc.

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method or analyte indicated. Please refer to our "Quality" web page at www.spectrum analytical.com for a full listing of our current certifications and fields of accreditation. States in which Spectrum Analytical, Inc. holds NELAC certification are New York, New Hampshire, New Jersey and Florida. All analytical work for Volatile Organic and Air analysis are transferred to and conducted at our 830 Silver Street location (NY-11840, FL-E87936 and NJ-MA012).

Please contact the Laboratory or Technical Director at 800-789-9115 with any questions regarding the data contained in this laboratory report.

CASE NARRATIVE:

The sample temperature upon receipt by Spectrum Analytical courier was recorded as 4.6 degrees Celsius. The condition of these samples was further noted as received on ice. The samples were transported on ice to the laboratory facility and the temperature was recorded at 0.3 degrees Celsius upon receipt at the laboratory. Please refer to the Chain of Custody for details specific to sample receipt times.

An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

If a Matrix Spike (MS), Matrix Spike Duplicate (MSD) or Duplicate (DUP) was not requested on the Chain of Custody, method criteria may have been fulfilled with a source sample not of this Sample Delivery Group.

There is no relevant protocol-specific QC and/or performance standards non-conformances to report.

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
North-18' SB17964-01	[none]	Water@18'	09-Sep-10 16:40	10-Sep-10

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Analyst	Batch	Cert.
General Chemistry Parameters												
7723-14-0	Phosphorus as P	0.0720		mg/l	0.0100	1	ASTM D515-88(A)	21-Sep-10	21-Sep-10	SJL	1019920	X
	Ammonia as N	BRL		mg/l	0.200	1	SM4500-NH3 C.	17-Sep-10	17-Sep-10	SJL	1019728	X
	Biochemical Oxygen Demand (5-day)	BRL		mg/l	3.00	1	SM5210B	10-Sep-10 16:00	16-Sep-10 15:02	TDD	1019332	X
14797-55-8	Nitrate as N	BRL		mg/l	0.100	1	EPA 300.0	10-Sep-10 18:00	11-Sep-10 03:50	Jol	1019399	X

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1019332 - General Preparation										
Blank (1019332-BLK1)						Prepared: 10-Sep-10		Analyzed: 16-Sep-10		
Biochemical Oxygen Demand (5-day)	BRL		mg/l	3.00						
Blank (1019332-BLK2)						Prepared: 10-Sep-10		Analyzed: 16-Sep-10		
Biochemical Oxygen Demand (5-day)	BRL		mg/l	3.00						
LCS (1019332-BS1)						Prepared: 10-Sep-10		Analyzed: 16-Sep-10		
Biochemical Oxygen Demand (5-day)	176		mg/l	50.0	198		89	85-115		
Reference (1019332-SRM1)						Prepared: 10-Sep-10		Analyzed: 16-Sep-10		
Biochemical Oxygen Demand (5-day)	78.0		mg/l	37.5	83.0		94	67-133		
Reference (1019332-SRM2)						Prepared: 10-Sep-10		Analyzed: 16-Sep-10		
Biochemical Oxygen Demand (5-day)	70.0		mg/l	37.5	83.0		84	67-133		
Batch 1019399 - General Preparation										
Blank (1019399-BLK1)						Prepared: 10-Sep-10		Analyzed: 11-Sep-10		
Nitrate as N	BRL		mg/l	0.100						
Duplicate (1019399-DUP1)			Source: SB17964-01			Prepared: 10-Sep-10		Analyzed: 11-Sep-10		
Nitrate as N	BRL		mg/l	0.100		BRL				20
Matrix Spike (1019399-MS1)			Source: SB17964-01			Prepared: 10-Sep-10		Analyzed: 11-Sep-10		
Nitrate as N	0.430		mg/l	0.100	0.400	BRL	108	90-110		
Matrix Spike Dup (1019399-MSD1)			Source: SB17964-01			Prepared: 10-Sep-10		Analyzed: 11-Sep-10		
Nitrate as N	0.420		mg/l	0.100	0.400	BRL	105	90-110	2	20
Reference (1019399-SRM1)						Prepared: 10-Sep-10		Analyzed: 11-Sep-10		
Nitrate as N	2.49		mg/l	0.100	2.50		100	90-110		
Reference (1019399-SRM2)						Prepared: 10-Sep-10		Analyzed: 11-Sep-10		
Nitrate as N	0.530		mg/l	0.100	0.500		106	90-110		
Batch 1019728 - SM4500-NH3 B										
Blank (1019728-BLK1)						Prepared & Analyzed: 17-Sep-10				
Ammonia as N	BRL		mg/l	0.200						
LCS (1019728-BS1)						Prepared & Analyzed: 17-Sep-10				
Ammonia as N	4.76		mg/l	0.200	5.00		95	90-110		
Duplicate (1019728-DUP1)			Source: SB17964-01			Prepared & Analyzed: 17-Sep-10				
Ammonia as N	BRL		mg/l	0.200		BRL				20
Reference (1019728-SRM1)						Prepared & Analyzed: 17-Sep-10				
Ammonia as N	2.94		mg/l	0.200	3.35		88	85-113		
Batch 1019920 - General Preparation										
Blank (1019920-BLK1)						Prepared & Analyzed: 21-Sep-10				
Phosphorus as P	BRL		mg/l	0.0100						
LCS (1019920-BS1)						Prepared & Analyzed: 21-Sep-10				
Phosphorus as P	0.205		mg/l	0.0100	0.200		102	90-110		
Reference (1019920-SRM1)						Prepared & Analyzed: 21-Sep-10				
Phosphorus as P	0.409		mg/l	0.0100	0.401		102	86-113		

Notes and Definitions

BRL	Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Continuing Calibration Verification: The calibration relationship established during the initial calibration must be verified at periodic

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Leja

SB17964

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Exceptional
HANDBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:
☑ Standard TAT - 7 to 10 business days
☐ Rush TAT - Date Needed: _____
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: W.E. Kuriger Associates, 90 Atlantic Ave., Fitchburg MA 01420
Project Mgr.: W.E. Kuriger
Telephone #: 9783430934

Invoice To: SAME
P.O. No.: _____ RQN: _____

Project No.: _____
Site Name: Crocker Pond
Location: Westminster, State: MA
Sampler(s): W.E. Kuriger

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH$_3$OH
8=$NaHSO_4$ 9=none 10= _____ 11= _____

List preservative code below: 9 3 3 9

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1=Water@18° X2= _____ X3= _____

G=Grab C=Composite

Lab Id.	Sample Id	Date	Time	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	BOD5	Total Phosphorus	Ammonia N	Nitrate N				
SB17964-01	North-18'	9/9/10	4:40	G	X1				4	✓	✓	✓	✓				

QA/QC Reporting Notes: (check as needed)
☑ Provide MA DEP MCP CAM Report
☐ Provide CT DPH RCP Report
QA/QC Reporting Level: ☑ Standard ☐ No QC ☐ Other _____
State specific reporting standards: _____

EDD Format _____
☑ E-mail to wekc@airspill.com

Condition upon receipt: ☑ Iced ☐ Ambient ☐ °C 4.6

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	9-10-10	11:05
[signature]	[signature]	9/10/10	16:00

0.3