MASSACHUSETTS WATER RESOURCES AUTHORITY
Charlestown Navy Yard
100 First Avenue, Building 39
Boston, MA 02129

Frederick A. Laskey
Executive Director

Telephone: (617) 242-6000
Fax: (617) 788-4899
TTY: (617) 788-4971

April 19, 2018

Suzanne Warner
US Environmental Protection Agency
NCCW GP Processing
OEP 06-4
5 Post Office Square, Suite 100
Boston, MA 02109

Jennifer Wood
Massachusetts Department of
Environmental Protection
Division of Watershed Management
627 Main Street, 2nd floor
Worcester, MA 01608

Re.: NPDES Permit Application Transmittal
Application for Permit to Discharge
Wachusett Aqueduct Pumping Station Geothermal System
84 D'Angelo Drive, Marlborough, MA 01752
Non-Contact Cooling Water General Permit

Dear Ms. Warner and Ms. Wood:

Attached please find a copy of the Notice of Intent (NOI) and supporting documents for the Non-Contact Cooling Water General Permit. The specifics of the facility and the discharges are summarized on the attached forms. This NOI includes information relating to a Pumping Station with a Geothermal System (under construction) located on the grounds of the John J. Carroll Water Treatment Plant. Additional explanatory facility details are summarized below.

Facility Description

The Wachusett Aqueduct Pumping Station (WAPS) is under construction with a completion date of February 2019 and testing to start this summer. This facility will provide a redundant raw water supply from the Wachusett Reservoir to the Carroll Water Treatment Plant via the Wachusett Aqueduct. This facility will be used either during emergency or planned shutdown of the Cosgrove Tunnel.

The project includes the construction of a 240 MGD pumping station. A number of green energy attributes including photovoltaic panels and an open-loop geothermal system will be installed to reduce the reliance on fossil fuels and electricity for heating and cooling of the station. The geothermal system will take advantage of the constant supply of water in the Forebay.

MWRA previously included WAPS geothermal system in our reapplication package for the John J. Carroll Water Treatment Plant (NPDES permit number MA0040398). Upon consultation with

NPDES Permit Application Transmittal
Wachusett Aqueduct Pumping Station Geothermal System
Non-Contact Cooling Water General Permit
April 18, 2018

EPA, MWRA has decided to remove WAPS from the MA0040398 individual permit and apply for coverage under the Non-Contact Cooling Water General Permit.

Discharges

Discharges from Outfalls 101 and 102 relate to the operation of the geothermal heating and cooling system for the Wachusett Aqueduct Pumping Station. The geothermal discharge mixes with other flows including leakage and occasional water transfers from the Wachusett Aqueduct, and natural flows due to precipitation, within the Forebay, a man-made constructed water conveyance channel, which is part of the MWRA's emergency water supply works. The Forebay was constructed for water supply purposes and extends from MWRA's Wachusett Aqueduct Terminal Chamber to the Hultman Weir, a distance of approximately 2,000 feet. MWRA does not believe that activities associated with traditional water supply purposes conducted within the Forebay are jurisdictional for NPDES permitting purposes.

Contrasted with the Forebay, the Sudbury Reservoir and the Wachusett Aqueduct Open Channel (Canal) are classified by the Massachusetts Department of Environmental Protection as Class A waters, Public Water Supply. To this end, in past NPDES permitting activities (*e.g.,* for startup of the MetroWest Tunnel and the temporary use of Wachusett Aqueduct), MWRA and EPA differentiated between the Forebay and the Canal, and MWRA continues to make this differentiation in the enclosed application forms. Accordingly, MWRA has identified Outfall 101 as the point where water associated with the geothermal heating and cooling system leaves the Forebay at the Hultman Weir and enters the Canal, for purposes of NPDES permitting. Outfall 102 (Hultman Intake Bypass) is located adjacent to the Weir, and consists of a bypass line to accommodate lowering of the Forebay, and can pass the large volumes of flow that occur during startup and shutdown of the WAPS.

Should you have any questions, or if you would like to arrange a meeting to discuss the geothermal system discharge, please feel free to contact Wendy Leo at 617-788-4948.

Sincerely,

Frederick A. Laskey
Executive Director

Attachments:
Notice of Intent Form

NPDES Permit Application Transmittal
Wachusett Aqueduct Pumping Station Geothermal System
Non-Contact Cooling Water General Permit
April 18, 2018

Attachment A: Individual Permit Application Cover Letter
Attachment B: Topographic Map
Attachment C: Facility Flow Schematic
Attachment D: Surface Water Temperature Rise Engineering Calculations
Attachment E: Source Water Information
Attachment F: Determination of Endangered Species Act Eligibility
Attachment G: Documentation of National Historic Preservation Act Requirements
Attachment H: Supplemental Information

cc:
David Coppes, MWRA
Carolyn Fiore, MWRA
Betsy Reilley, MWRA
Chris John, MWRA

APPENDIX 5
Suggested Notice of Intent Format

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY - REGION 1
FIVE POST OFFICE SQUARE SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

Request for General Permit Authorization to Discharge Noncontact Cooling Water
Notice of Intent (NOI) to be covered by the General Permit

Noncontact Cooling Water General Permit (NCCWGP)
NPDES General Permits No. MAG250000 and NHG250000

A. Facility Information

1. Indicated applicable General Permit for discharge: MAG250000 ☒
   NHG250000 ☐

2. Facility Information/Location:
   Facility Name Wachusett Aqueduct Pumping Station
   Street/PO Box _____ City Marlborough
   State MA Zip Code 01752
   Latitude 42°18'56.8" N Longitude 71°35'20.9" W
   Type of Business public water supply facility
   SIC Codes(s) 4941

3. Facility Mailing address (if different from Location Address):
   Facility Name Massachusetts Water Resources Authority
   Street/PO Box 100 First Ave, CNY City Charlestown
   State MA Zip Code 02129

4. Facility Owner:
   Name Massachusetts Water Resources Authority
   E-mail Wendy.Leo@mwra.com
   Street/PO Box 100 First Ave, CNY City Charlestown
   State MA Zip Code 02129
   Contact Person Wendy Leo Tel 617-788-4948
   Owner is (check one): Federal _____ State X Tribal _____ Private _____
   Other (describe) _____

5. Facility Operator (if different from above):
   Legal Name Massachusetts Water Resources Authority
   E-mail Guy.Foss@mwra.com
   Street/PO Box 260 Boston Road City Southboro
   State MA Zip Code 01772
   Contact Person Guy Foss Tel 508-424-3661

6. Current permit coverage: yes☐ no☒
   a) Has a prior NPDES permit (individual or general permit coverage) been granted for the discharge that is listed on the NOI? yes☐ no☒ If Yes, permit number _____
   b) Is the facility covered by an individual NPDES permit for other discharges? yes☐ no☒
      If yes, Permit Number: _____

c) Is there a pending NPDES application on file with EPA for this discharge? yes☒ no☐
If yes, date of submittal: 10/01/2017 **(Attachment A)** and permit number, if available MA0040398

7. Attach a topographic map indicating the location of the facility and the outfall(s) to the receiving water.
Map attached? ☒ (Attachment B)

B. Discharge Information (attach additional sheets as needed):

1. Name of receiving water into which discharge will occur: Forebay to Wachusett Aqueduct Open Canal to Sudbury Reservoir
Freshwater ☒ Marine Water ☐
State Water Quality Classification Class n/a
Type of Receiving Water Body (e.g., stream, river, lake, reservoir, estuary, etc.) constructed water conveyance channel

2. Attach a line drawing or flow schematic showing water flow through the facility including sources of intake water, operations contributing to flow, treatment units, outfalls, and receiving water(s). **Line drawing or flow diagram attached? ☒ (Attachment C)**

3. Describe the discharge activities for which the owner/applicant is seeking coverage (e.g., building cooling, process line cooling, etc.) building heating and cooling

4. Number of Outfalls 2 Latitude and Longitude to the nearest second for each Outfall. See EPA's siting tool at http:/www.epa.gov/tri/reporting/siting_tool. Attach additional pages if necessary.

Outfall #101	Latitude	42°18'47.1" N	Longitude	71°34'57.1" W
Outfall #102	Latitude	42°18'45.1" N	Longitude	71°34'52.8" W
Outfall #	Latitude		Longitude	

5. For each Outfall provide the following discharge information:

Outfall # 101
a) Maximum Daily Flow 0.6 MGD Average Monthly Flow 0.6 MGD
NOTE: EPA will use the flow reported here as the facility's permitted effluent flow limit.
b) Maximum Daily Temperature 72.5 °F Average Monthly Temperature 49.5 °F
c) Maximum Monthly pH 8.3 s.u. Minimum Monthly pH 6.5 s.u.
d) Outfall's discharge is: continuous ☐ intermittent ☒ seasonal ☐

Outfall # 102
a) Maximum Daily Flow 0.6 MGD Average Monthly Flow 0.6 MGD
NOTE: EPA will use the flow reported here as the facility's permitted effluent flow limit.
b) Maximum Daily Temperature 72.5 °F Average Monthly Temperature 49.5 °F
c) Maximum Monthly pH 8.3 s.u. Minimum Monthly pH 6.5 s.u.
d) Outfall's discharge is: continuous ☐ intermittent ☒ seasonal ☐

Outfall # _____
a) Maximum Daily Flow _____ MGD Average Monthly Flow _____ MGD
NOTE: EPA will use the flow reported here as the facility's permitted effluent flow limit.
b) Maximum Daily Temperature _____ °F Average Monthly Temperature _____ °F
c) Maximum Monthly pH _____ s.u. Minimum Monthly pH _____ s.u.
d) Outfall's discharge is: continuous ☒ intermittent ☐ seasonal ☐

6. Is the source of the NCCW potable water? yes☐ no☒
If yes, EPA will calculate a Total Residual Chlorine effluent limit for your facility.

7. Provide the reported or calculated seven day-ten year low flow (7Q10) of the receiving water NA* MGD
Attach any calculation sheets used to support stream flow and/or dilution calculations. **(*The dilution factor of the receiving water was determined to be 10:1 by MassDEP.)**

8. **For facilities that discharge to Massachusetts surface waters:**
a) Submit the completed engineering calculation of the surface water temperature rise as shown in Attachment B of the General Permit. Calculation attached? ☒ **(Attachment D)**
b) Does the discharge occur in an Area of Critical Environmental Concern (ACEC)? yes☐ no☒
If yes, provide the name of ACEC _____
Note: See Part 3.4 and Appendix 1 of the General Permit for more information on ACEC.

C. Chemical Additives

1. Are any non-toxic neutralization and/or dechlorination chemicals used in the discharge(s)? yes☐ no☒

2. If yes, attach a listing of each chemical used. Include the chemical name and manufacturer; maximum and average daily quantity used on a monthly basis, as well as the maximum and average daily expected concentrations (mg/l) in the discharge, and the vendor's reported aquatic toxicity (NOAEL and/or LC_{50} in percent for typically acceptable aquatic organism).

3. Was the listing submitted with the facility's 2008 NCCWGP NOI? yes☐ no☐

D. NCCW Source Water Information

1.State the source of the NCCW (e.g., municipal water supply, private well, surface water withdrawal, etc.).
Source constructed water conveyance channel Name of Source Water Wachusett Reservoir to Forebay

2. Is the source water registered/permitted under MA Water Management Act or NHDES User Registration Rule (ENV WQ 2202)? yes☐ no☒ If yes, registration number _____

3. If the source water is groundwater (non-municipal well water), see Appendix 9 of the General Permit and submit effluent (and receiving water hardness) test results, as required in Part 5.4 of the General Permit.
Test results attached? ☐

4. Does the facility use both a primary and backup source of NCCW? yes☐ no☒ If yes, **attach information** that identifies and explains the primary and backup sources of NCCW and how often the backup supply was used in the past three years.

E. Best Technology Available for Cooling Water Intake Structures (CWISs)

If the facility's discharge is covered by this General Permit and the facility **withdraws non-contact cooling water from a surface water**, you are subject to the BTA requirements at Part 4.2 of the General Permit.

1. Are you subject to the BTA requirements of the General Permit? yes☐ no☒
a) If no, explain source water is a constructed water conveyance channel, see **Attachment E** and skip to F.

b) If yes, was the facility-specific BTA description submitted with the facility's 2008 NCCW GP NOI? yes☐ no☐

c) If yes, does that description accurately describe the facility current operations and practices? yes☐ no☐

2. If the facility is subject to the General Permit's BTA requirements and is requesting coverage under the NCCWGP for the first time, or if you answered "No" to question E.1.c. above, attach the facility-specific BTA description as required in Part 4.2 of the General Permit. For additional information and guidance, see Section IV of the Fact Sheet.

Include in your description:

a) Measures to meet the General Permit Part 4.3.a general BTA requirements, including documentation that describes the facility's monitoring program for impinged fish and/or invertebrate; or the required alternative monitoring plan frequency and/or protocol.
b) A characterization of the source water body's aquatic life habitat in the vicinity of each CWIS during the seasons when the CWIS may be in use.
c) The attributes of the current CWIS.
d) The design measures of the CWIS.
e) The operation measures of the CWIS.
f) The historical occurrence of impinged fish for the past five years.
g) If applicable, a demonstration that the facility's intake rate is commensurate with a closed-cycle recirculation system.
h) Other components to reduce impingement and/or entrainment of aquatic life.

3. Provide the following information for each CWIS to support your attached facility-specific BTA description:

a) The design capacity of the of the CWIS _____MGD
b) Maximum monthly average intake of the CWIS during the previous five years _____MGD
c) The month in which this flow reported in 3.b. occurred _____
d) The maximum through-screen design intake velocity _____feet/second (fps)

4. For facilities where the CWIS is located on a freshwater river or stream, provide the following information:

a) The source water's annual mean flow in MGD as available from USGS or other appropriate source _____ MGD
b) The design intake flow as a % of the source water's annual mean flow _____ % Attach calculations if equal to or less than 5% of annual mean flow.
c) The source water's 7Q10 _____ MGD
d) The design intake flow as a percent of the source water's 7Q10 _____%

5. Provide a map showing the location of each cooling water intake structure; NCCW Outfall(s) and CWIS features referred to in the BTA description. **Map attached?** ☐

F. Endangered Species Act Eligibility Information

Using the instructions in Appendix 2 of the NCCW GP, which of the following criteria apply to your facility? USFWS Criteria: A ☒ B ☐ C ☐

1. If you selected USFWS criteria B, has consultation with the U.S. Fish and Wildlife Service been completed? yes☐ no☐

2. If consultation with US Fish & Wildlife Service and/or NOAA Fisheries Service was completed, was a written concurrence finding that the discharge is "not likely to adversely affect" listed species or critical habitat received? yes☐ no☐

3. Attach documentation of ESA eligibility for USFWS as required at Part 3.4 and Appendix 2 of the General Permit.
Documentation attached? Attachment F

4. Please indicate if your facility **directly intakes water for non-contact cooling** from any of the following waterbodies:
☐ Merrimack River
☐ Connecticut River
☐ Piscataqua River
☐ Taunton River

EPA will consult with the National Marine Fisheries Service on cooling water intakes covered under this permit in areas (in the above waterbodies) of the endangered Shortnose Sturgeon and Atlantic Sturgeon.

G. National Historic Properties Act Eligibility

1. Are any historic properties listed or eligible for listing on the National Register of Historic Places located on the facility site or in proximity to the discharge? yes☐ no☒

2. Have any State or Tribal Historic Preservation Officers been consulted in this determination? yes☒ no☐
If yes, attach the results of the consultation(s).

3. Which of the three National Historic Preservation Act scenarios listed in Appendix 3, Section C have you met?
☐ 1 ☒ 2 **(Attachment G)** ☐ 3

H. Supplemental Information

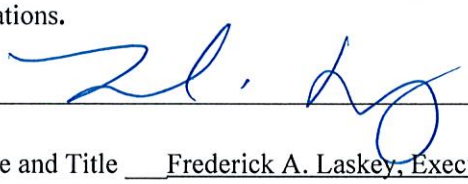
Please provide any supplemental information, including antidegradation review information applicable to new or increased discharges. Attach any analytical data used to support the application. Attach any certification(s) required by the General Permit.

See **Attachment H**

I. Signature Requirements

The NOI must be signed by the operator in accordance with the signatory requirements of 40 CFR § 122.22 (see below) including the following certification:

> I certify under penalty of law that (1) no biocides or other chemical additives except for those used for pH adjustment and/or dechlorination are used in the noncontact cooling water (NCCW) system; (2) the discharge consists solely of NCCW (to reduce temperature) and authorized pH adjustment and/or dechlorination chemicals; (3) the discharge does not come in contact with any raw materials, intermediate product, water product (other than heat) or finished product; (4) if the discharge of noncontact cooling water subsequently mixes with other wastewater (i.e. stormwater) prior to discharging to the receiving water, any monitoring provided under this permit will be only for noncontact cooling water; (5) where applicable, the facility has complied with the requirements of this permit specific to the Endangered Species Act and National Historic Preservation Act; and (6) this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted.
>
> Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I certify that I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature  Date 4/19/2018

Printed Name and Title Frederick A. Laskey, Executive Director

Federal regulations require this application to be signed as follows:

1. For a corporation, by a principal executive officer of at least the level of vice president;
2. For a partnership or sole proprietorship, by a general partner or the proprietor, respectively, or,
3. For a municipality, State, Federal or other public facility, by either a principal executive officer or ranking elected official.

Attachment A

MASSACHUSETTS WATER RESOURCES AUTHORITY

Charlestown Navy Yard
100 First Avenue, Building 39
Boston, MA 02129

Frederick A. Laskey
Executive Director

Telephone: (617) 242-6000
Fax: (617) 788-4899
TTY: (617) 788-4971

October 1, 2017

Ms. Shelley Puleo
U.S. EPA - New England, Region 1
5 Post Office Square, Suite 100 (OEP06-1)
Boston, MA 02109-3912

Ms. Xiaodan Ruan
Massachusetts DEP
Surface Water Discharge Program
8 New Bond Street
Worcester, MA 01606

Re.: NPDES Permit Application Transmittal
Application for Permit to Discharge
John J. Carroll Water Treatment Plant
86 D'Angelo Drive, Marlborough, MA 01752
NPDES Permit No. MA0040398

Dear Ms. Puleo and Ms. Ruan:

Attached please find a copy of the required application forms including Application Form 1 and Form 2C. The specifics of the facility and the discharges are summarized on the attached forms. This reapplication form includes new information relating to a Pumping Station (under construction) located on the grounds of the John J. Carroll Water Treatment Plant. Additional explanatory facility details are summarized below.

Facility Description

The John J. Carroll Water Treatment Plant (CWTP) is on D'Angelo Drive in Marlborough at the intersection of the Marlborough, Northborough, and Westborough town boundaries. The facility serves as the water treatment plant for the MWRA metropolitan Boston area water distribution system. The plant is supplied with raw water from the Wachusett Reservoir via the Cosgrove Tunnel, undergoes chemical treatment and disinfection, and is transmitted to the Boston area via the MetroWest Tunnel and the Hultman Aqueduct. The plant consists of two parallel treatment trains and has an operating range of approximately 180 to 405 million gallons per day (MGD).

The new Wachusett Aqueduct Pumping Station is under construction with a completion date of October 2018 and will provide a redundant raw water supply from the Wachusett Reservoir to the Carroll Water Treatment Plant via the Wachusett Aqueduct. This facility will be used either during emergency or planned shutdown of the Cosgrove Tunnel.

The project includes the construction of a 240 MGD pumping station. A number of green energy attributes including photovoltaic panels and an open-loop geothermal system will be installed to reduce the reliance on fossil fuels and electricity for heating and cooling of the station. The geothermal system will take advantage of the constant supply of water in the Forebay. Additional information is provided in Appendix A.

Discharges

Outfall 001: Discharges from Outfall 001 occur as a result of maintenance activities at the CWTP, including winter maintenance, although related activities could occur at other times of the year as well. This discharge enters the Wachusett Aqueduct Open Channel (also called the Open Canal), which flows to the Sudbury Reservoir. The discharges from Outfall 001 are unchanged from those permitted by the existing permit MA0040398.

Over the past five years, monitoring results demonstrate there is no reasonable potential to cause or contribute to a hardness based chronic water quality exceedance for lead or copper, therefore MWRA requests discontinuing monitoring for lead, copper, and hardness.

Outfall 002: Discharges from the new Outfall 002 relate to the operation of the geothermal heating and cooling system for the Wachusett Aqueduct Pumping Station. The geothermal discharge mixes with other flows including leakage and occasional water transfers from the Wachusett Aqueduct, and natural flows due to precipitation, within the Forebay, a man-made constructed water conveyance channel, which is part of the MWRA's emergency water supply works. The Forebay was constructed for water supply purposes and extends from MWRA's Wachusett Aqueduct Terminal Chamber to the Hultman Weir, a distance of approximately 2,000 feet. MWRA does not believe that activities associated with traditional water supply purposes conducted within the Forebay are jurisdictional for NPDES permitting purposes.

Contrasted with the Forebay, the Sudbury Reservoir and the Wachusett Aqueduct Open Channel (Canal) are classified by the Massachusetts Department of Environmental Protection as Class A waters, Public Water Supply. To this end, in past NPDES permitting activities (*e.g.*, for startup of the MetroWest Tunnel and the temporary use of Wachusett Aqueduct), MWRA and EPA differentiated between the Forebay and the Canal, and MWRA continues to make this differentiation in the enclosed application forms. Accordingly, MWRA has identified Outfall 002 as the point where water associated with the geothermal heating and cooling system leaves the Forebay (at a weir) and enters the Canal, for purposes of NPDES permitting. See Appendix A for additional details.

Should you have any questions, or if you would like to arrange a meeting to discuss the geothermal system discharge, please feel free to contact Wendy Leo at 617-788-4948.

Sincerely,

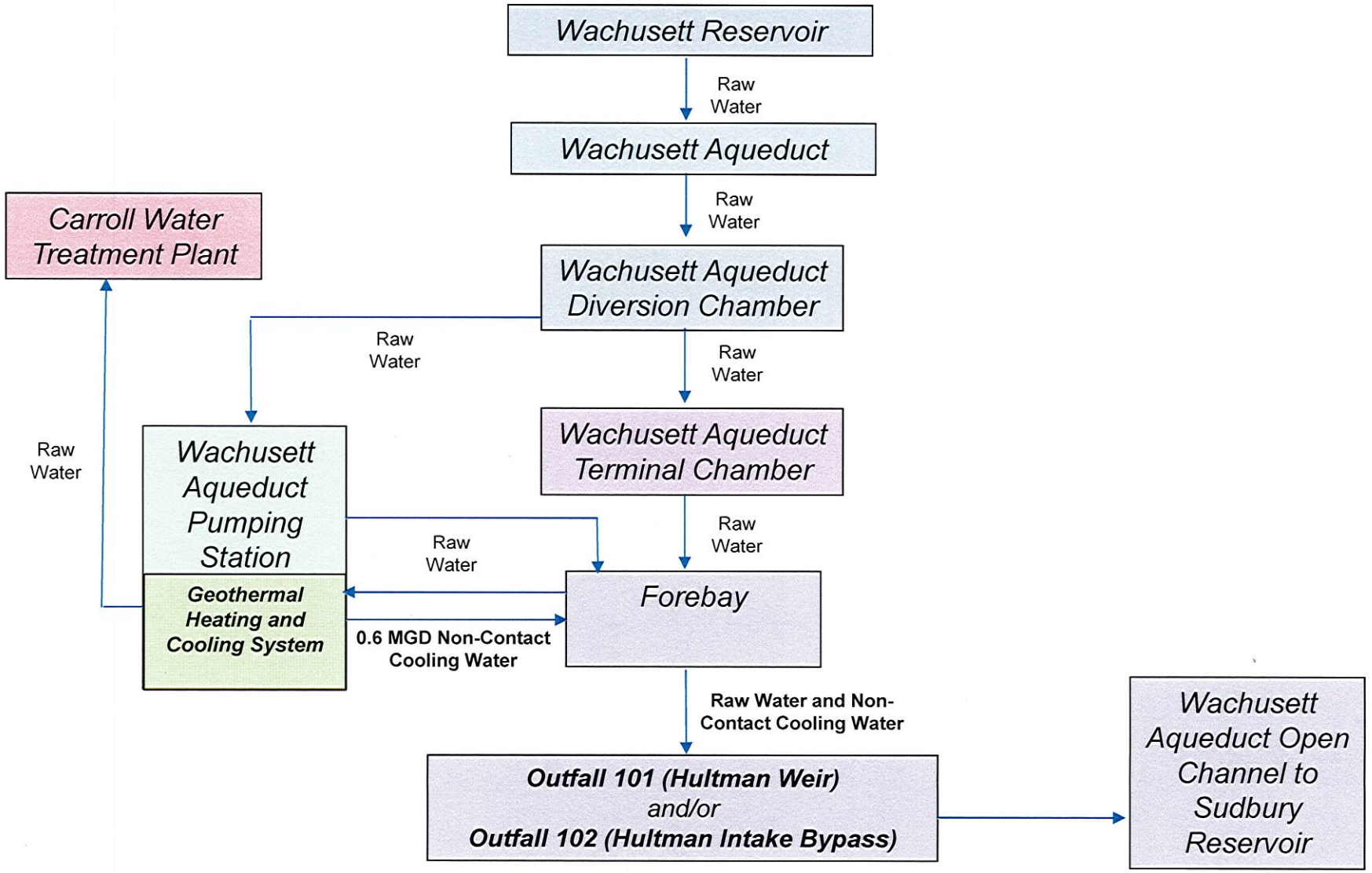
Michael J. Hornbrook
Chief Operating Officer

Attachments:
Appendix A: Wachusett Aqueduct Pumping Station
EPA Form 1
EPA Form 2C
Facility Location Maps
Facility Flow Schematic

cc:
Carolyn Fiore
Betsy Reilley
Chris John
David Coppes

Attachment B
Site Location Map
MWRA Wachusett Aqueduct Pumping Station Marlborough MA

Attachment C
Schematic of Water Flow
Wachusett Aqueduct Pumping Station
Marlborough, Massachusetts



Attachment D
Wachusett Aqueduct Pumping Station
Geothermal System Operation
Impacts on Forebay Temperature
Calculations in accordance with Attachment B of the Non Contact Cooling Water General Permit
Date: April 18, 2018

With station operating at full capacity, and
With cooling system operating at maximum capacity:

Forebay flow rate (station overflow) — 10,000,000 gal/day

$\Delta T_r = (m_p/m_r) \times \Delta T_p$

Where: ΔT_r = change in river temperature, °F

Based on 110 ton capacity (equivalent to 340 gpm at 9.5°F ΔT)

m_p = mass of effluent, lbs (gal/day if volume)	=	340 gpm	=	489,600 gal/day
m_r = mass of river, lbs (gal/day if volume)			=	10,000,000 gal/day
ΔT_p = change in effluent temperature, °F			=	9.5 °F

$\Delta T_r = (489{,}600/10{,}000{,}000) \times 9.5$ = **0.465 °F**

With station operating at reduced or zero capacity (ready mode), and
With cooling system operating to meet typical dails loads:

Forebay volume at elevation 278.5 ft ("Hultman Weir") = 11,738,281 gallons

Calculation assumes all heat rejected by the pumping station is absorbed by the Forebay so that:

$\Delta T_r = Q_r/(C_p \times m_r)$

Where: ΔT_r = change in river temperature, °F

Q_r = heat rejection of water, Btu = rated capacity of cooling unit	=	24.0 tons	=	8,640,000.0	BTU/day
C_p = heat capacity (specific heat) of water, BTU/lb°F			=	1	BTU/lb°F
m_r = mass of river, lbs	=	11,738,281 gallons	=	97,957,128.77	lbs

$\Delta T_r = 8{,}640{,}000/(1 \times 97{,}957{,}128)$ = **0.088 °F per day**

Attachment E
Source Water Information

The MWRA's Hultman Aqueduct Forebay Channel was constructed for water supply purposes and MWRA does not believe it is federally jurisdictional as a Water of the United States.

The Forebay extends from MWRA's Wachusett Aqueduct Terminal Chamber to the Hultman Weir, a distance of approximately 2,000 feet. The only inlet to the Forebay is the Wachusett Aqueduct and the water level between the Terminal Chamber and the Hultman Weir is determined by MWRA operations.

The Wachusett Aqueduct and dam were constructed in 1898 to create the Wachusett Reservoir and provide a means of transferring the water from the Wachusett Reservoir to the Sudbury Reservoir. The Wachusett Aqueduct system was in continuous use until 1964, when the Cosgrove Tunnel was constructed. Water was discharged from the Wachusett Aqueduct into the "Forebay" channel. The Forebay extends from the Wachusett Aqueduct Terminal Chamber to the Hultman Weir. The water in the Forebay is comprised of discharges from Wachusett Aqueduct, including groundwater that seeps into the Aqueduct. The Hultman Weir at the end of the Forebay keeps a constant water level in this constructed water conveyance channel. The Wachusett Aqueduct Forebay channel was an integral component of MWRA's active water transmission system prior to construction of Cosgrove Tunnel in the 1960s.

The Forebay is distinguished from the MWRA's Open Channel which begins at the Hultman Weir below/at the terminus of the Wachusett Forebay Channel and ends at Deerfoot Road, (Deerfoot Road is the beginning of Sudbury Reservoir). The Open Channel is variable in width. The Wachusett Aqueduct, including the Forebay, the Hultman Weir and the open channel to the Sudbury Reservoir was, and continues to be maintained as an emergency source of water supply.

When the Wachusett Aqueduct was originally constructed, water from the Wachusett Reservoir entered the aqueduct at a hydraulic grade line (HGL) elevation of 287 feet and at the end of the aqueduct, flows passed through a terminal chamber and into an Open Channel. In 1940, the Hultman Aqueduct was constructed to bypass and replace the Open Channel and Sudbury Reservoir system. The Hultman Aqueduct was supplied from the Wachusett system, and received water supply at a HGL elevation of 278.5 feet, which was established by constructing a circular weir (the Hultman Weir) about 2,000 feet downstream of the Wachusett Aqueduct Terminal Chamber. The circular weir keeps a constant water level in the Forebay. Flows entered the Hultman Aqueduct through a gate house that was constructed just upstream of the circular weir.

The Forebay channel is rip-rapped along its sides near the Wachusett Aqueduct Terminal Chamber and the bottom is devoid of natural habit. Drainage from the adjacent Crane Swamp drains to constructed channels paralleling the Forebay (the Northern and Southern Diversion Channels) in order to prevent natural surrounding drainage from entering the Forebay Channel and then the Hultman Aqueduct. The diversion channels divert flow to the Open Channel downstream of the Hultman Weir. By design, the catchment area that drains into the Forebay is extremely limited.

The Forebay channel is part of the water supply distribution system, and work in those areas is exempt under 310 CMR 10.02(2)(a)(2) and thus not regulated under the Commonwealth's Wetlands Protection Act. In addition, MWRA does not believe the Forebay Channel is a water of the United States, an Outstanding Resource Water, or Land Under Water. Further, the Forebay is neither a river, stream, lake, pond spring, impoundment, estuary, wetland, etc., but instead is part of the MWRA's water transmission system.

In prior NPDES permitting (July 2003) for startup of the MetroWest Tunnel and the temporary use of the Wachusett Aqueduct, which required disinfection of the water transmissions system necessitating MWRA to discharge chlorinated water into the Forebay, MWRA, and EPA differentiated between the Forebay and Open Channel. In the 2003 NPDES permit (MA0103357), EPA regulated discharges from the Forebay Channel at Outfall 001 below the weir, but not upstream.

Current Project and context and reason for questions regarding status of Forebay and Permit Requirements

The Wachusett Aqueduct Pumping Station will provide a redundant raw water supply from the Wachusett Reservoir to MWRA's Carroll Water Treatment Plant (CWTP) and would be used either during an emergency or a planned shutdown of the Cosgrove Tunnel. The project includes a 240 million gallons per day (MGD) pumping station and bypass conduit, both of which are currently under construction. A geothermal system, using water from the adjacent Forebay will be installed to provide heating and cooling; thereby reducing the requirements for fossil fuels.

Attachment F

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To: March 27, 2018
Consultation Code: 05E1NE00-2018-SLI-1401
Event Code: 05E1NE00-2018-E-03189
Project Name: Wachusett Aqueduct Pump Station

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2018-SLI-1401

Event Code: 05E1NE00-2018-E-03189

Project Name: Wachusett Aqueduct Pump Station

Project Type: WATER SUPPLY / DELIVERY

Project Description: MWRA is constructing a Pumping Station to provide a redundant supply of water for the Cosgrove Tunnel / Carroll Water Treatment Plant. Since the Wachusett Aqueduct operates at a lower hydraulic grade line than the Cosgrove Tunnel, water cannot flow from it into the CWTP's ozone contactors without pumping.

The Wachusett Aqueduct with the proposed emergency pumping station can deliver approximately 240 million gallons per day (MGD) of raw water to the Carroll Plant for full treatment. The 240-MGD capacity allows for unrestricted supply for at least eight months in the lower-demand fall/winter/spring period during a planned or emergency shutdown of the Cosgrove Tunnel.

Once completed, this new pumping station will allow the Wachusett Aqueduct to provide redundancy for the Cosgrove Tunnel. Completion of the Hultman Aqueduct rehabilitation and interconnections project provide redundancy for the MetroWest Water Supply Tunnel. Together, these projects will provide water transmission redundancy from the Wachusett Reservoir to metropolitan Boston.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/42.314872402664236N71.58684886333684W

Counties: Middlesex, MA

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. 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.

Mammals

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

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Attachment G

November 4, 2013

The Commonwealth of Massachusetts

William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

Marianne Connolly
Senior Program Manager
Environment Review and Compliance
Massachusetts Water Resources Authority
100 First Avenue, Building 39
Boston, MA 02129

RE: Proposed Wachusett Aqueduct Pumping Station Project, Marlborough, MA. MHC #RC.55010.

Dear Ms. Connolly:

Thank you for providing the Massachusetts Historical Commission (MHC), the office of the State Historic Preservation Officer, with information regarding the proposed project referenced above.

The project is proposed for federal funding through the Drinking Water State Revolving Fund, as well as state agency permitting and funding.

The project proposes the demolition of the Westborough State Hospital Pumping Station, included in the MHC's Inventory of Historic Assets of the Commonwealth (MRB.1306). It is the opinion of the MHC that the 1975 structure does not meet the Criteria of Eligibility (36 CFR Part 60) for listing in the National Register of Historic Places.

Please notify the MHC of the date of demolition of the Westborough State Hospital Pumping Station so that the MHC can update its inventory files.

The area of potential effect for the project also includes the Wachusett Aqueduct Linear District (MRB.AR) part of the Water Supply System of Metropolitan Boston (MRB.AS), listed in the State and National Registers of Historic Places.

After review of the MHC's files and the information that provided, the MHC believes that the project as proposed will have no adverse effect (36 CFR 800.5(b), 950 CMR 71.07(2)(b)(2)) on the Wachusett Aqueduct Linear District (MRB.AR) part of the Water Supply System of Metropolitan Boston.

These comments are offered to assist in compliance with Section 106 of the National Historic Preservation Act of 1966 as amended (36 CFR 800) and MGL c. 9, ss. 26-27C (950 CMR 71). Please contact Edward L. Bell, Deputy State Historic Preservation Officer, if you have any questions.

Sincerely,

Brona Simon

Brona Simon
State Historic Preservation Officer
Executive Director
Massachusetts Historical Commission

xc:
Secretary Richard K. Sullivan, Jr. EEA-MEPA Office
John Felix, DEP-SRF Program
Donald St. Marie, DEP
Eric Friedman, Mass. Dept. of Energy Resources-Leading By Example Program
Marlborough Historical Commission

220 Morrissey Boulevard, Boston, Massachusetts 02125
(617) 727-8470 • Fax: (617) 727-5128
www.state.ma.us/sec/mhc

Attachment H
Wachusett Aqueduct Pumping Station Supplemental Information

Purpose of adding emergency pumping station to the Carroll Water Treatment Plant facility

MWRA is constructing a Pumping Station to provide a redundant supply of water for the Cosgrove Tunnel / Carroll Water Treatment Plant (CWTP). Since the Wachusett Aqueduct operates at a lower hydraulic grade line than the Cosgrove Tunnel, water cannot flow from it into the CWTP's ozone contactors without pumping.

The Wachusett Aqueduct with the proposed emergency pumping station can deliver approximately 240 million gallons per day (MGD) of raw water to the Carroll Plant for full treatment. The 240-MGD capacity allows for unrestricted supply for at least eight months in the lower-demand fall/winter/spring period during a planned or emergency shutdown of the Cosgrove Tunnel.

Once completed, this new pumping station will allow the Wachusett Aqueduct to provide redundancy for the Cosgrove Tunnel. Completion of the Hultman Aqueduct rehabilitation and interconnections project provide redundancy for the MetroWest Water Supply Tunnel. Together, these projects will provide water transmission redundancy from the Wachusett Reservoir to metropolitan Boston.

Low carbon footprint design

In addition to the geothermal heating/cooling system described below, the pumping station will include other energy saving measures including a cold roof with photovoltaic panels, light and temperature monitoring and sensors, premium efficiency motors and high efficiency pumps.

The geothermal heating/cooling system is designed to lower the energy footprint of this emergency facility. The system is an open loop system using water from/to the Wachusett Aqueduct Forebay. The Forebay was an integral component of MWRA's active water transmission system prior to construction of Cosgrove Tunnel in the 1960s.

Discharges from the new Outfall 101 and Outfall 102 relate to the operation of the geothermal heating and cooling system for the Wachusett Aqueduct Pumping Station. The geothermal discharge mixes with other flows including leakage and occasional water transfers from the Wachusett Aqueduct, and natural flows due to precipitation, within the Forebay, a man-made constructed water conveyance channel, which is part of the MWRA's emergency water supply works. The Forebay was constructed for water supply purposes and extends from MWRA's Wachusett Aqueduct Terminal Chamber to the Hultman Weir, a distance of approximately 2,000 feet. MWRA does not believe that activities associated with traditional water supply purposes conducted within the Forebay are federally jurisdictional for NPDES permitting purposes.

Contrasted with the Forebay, the Sudbury Reservoir and the Wachusett Aqueduct Open Channel (Canal) are classified by the Massachusetts Department of Environmental Protection as Class A waters, Public Water Supply. To this end, in past NPDES permitting activities (*e.g.,* for startup of the MetroWest Tunnel and the temporary use of Wachusett Aqueduct), MWRA and EPA

differentiated between the Forebay and the Canal, and MWRA continues to make this differentiation in the enclosed Notice of Intent (NOI). Accordingly, for purposes of NPDES permitting, MWRA has identified Outfall 101 as the point where water associated with the geothermal heating and cooling system leaves the Forebay at the Hultman Weir and enters the Canal. Outfall 102 (Hultman Intake Bypass) is located at the base of the conduit built to lower the water level in the Forebay by bypassing the Hultman Weir.

Operating conditions and environmental impact

The geothermal system will take advantage of the constant supply of water in the Forebay. Water temperatures in the Forebay generally fluctuate between 36 °F and 63 °F. Water will be pumped from the Forebay through heat exchangers that will be used to heat or cool the building. After passing through the system, the water will be returned to the Forebay. The geothermal system continuously circulates 0.6 MGD under all operating and weather conditions, however Outfall 101 and Outfall 102 discharge only intermittently.

When the pumping station is not operating ("Ready Mode"), the geothermal system will moderate the building temperature to protect the pumping station electronics and other equipment; temperature to be maintained at 55 °F in the winter and 85 °F in the summer, respectively. While in "Ready Mode" there is little to no flow in the Forebay, but the peak cooling load is much less, and is estimated to increase the temperature in the Forebay minimally in summer; under these conditions, there is no discharge from Outfall 101 or Outfall 102 to the Wachusett Aqueduct Open Channel which flows to the Sudbury Reservoir.

During station operation, there will be a minimum of 10 MGD (15.5 cfs) flowing through the Forebay, so the increase in Forebay temperature is estimated to be less than 0.5 °F. While full operation of the station would only occur during an emergency or planned maintenance, the station pumping equipment and controls will be operated monthly to ensure their reliability and to maintain the equipment.

Up to 250 MGD of water, including the Wachusett Aqueduct Pumping Station non-contact cooling water, may flow through the Forebay and into the Wachusett Aqueduct Open Channel via the bypass conduit (Outfall 102) as the pumping station transitions from ready mode to full operation. Once the pumping station is pumping water to CWTP, flow through the Forebay will drop to a minimum of 10 MGD, which will exit the Forebay at Outfall 101.

The Forebay is part of the water system, is rip-rapped along its sides, and past investigations have shown it does not provide any significant habitat. Nonetheless, the geothermal system intake was designed using the Best Technology Available (BTA), including an intake velocity of 0.14 fps and a screen mesh size of 3.3 mm, to protect any aquatic life that might incidentally occur in the vicinity of the cooling water intake structure.