



## **SECTION 312319**

### **DEWATERING**

#### **PART 1 - GENERAL**

##### **1.01 GENERAL PROVISIONS**

- A. Attention is directed to the **CONTRACT AND GENERAL CONDITIONS** and all Sections within **DIVISION 1 – GENERAL REQUIREMENTS** which are hereby made a part of this Section of Specifications.
- B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of the **CONTRACT AND GENERAL CONDITIONS**.

##### **1.02 DESCRIPTION OF WORK**

- A. The Contractor shall design, furnish, install, and operate a system to maintain a dewatering effluent within applicable [NPDES], [BWSC], and/or [MWRA] Permit discharge limits. If additional treatment to reduce chemical concentrations in the dewatering effluent is necessary to meet the permit discharge criteria, such additional treatment shall be provided as specified herein.
- B. On-site recharge of groundwater at locations approved by the Owner's Engineer in accordance with the requirements of the EPA, MassDEP, City of [Cambridge] [Boston] and other permits, and in accordance with all federal, state, and local codes, ordinances, and regulations, including the MCP. On-site recharge shall commence only after receiving approval from the Owner's Engineer.
- C. The Contractor shall remove temporary dewatering and drainage systems when no longer needed, and restore all disturbed areas.

##### **1.03 RELATED SECTIONS**

- A. Section 013529 – **HAZARDOUS MATERIALS HEALTH AND SAFETY**
- B. Section 013543 – **ENVIRONMENTAL PROTECTION**
- C. Section 024100 – **BUILDING AND ANCILLARY STRUCTURES DEMOLITION**



- D. Section 026100 – EXCAVATED SOIL AND MATERIAL MANAGEMENT PLAN
- E. Section 312000 – EARTHWORK
- F. Section 026500 – REMOVAL AND DISPOSAL OF STORAGE TANKS

#### 1.04 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only. The list provided below is not intended to be all inclusive of each regulation prevailing over the work. The latest version of the document listed shall govern the work performed.

- A. Federal Register
- B. Massachusetts Department of Environmental Protection:
  - 1. Massachusetts Contingency Plan, 310 CMR 40.000.
  - 2. Surface Water Discharge Requirements, 314 CMR 3.00.
  - 3. Surface Water Quality Standards, 314 CMR 4.00.
    - a. BRP WM 10 - Request for General Permit Coverage: Dewatering General Permit
    - b. BRP WM 12 - Request for General Permit Coverage: Remediation & Miscellaneous Contaminated Sites
  - 4. The Water Management Regulations, 310 CMR 36.00.
  - 5. Board of Registrations of Operators of Wastewater Treatment Facilities, 257 CMR

#### 1.05 DEFINITIONS

- A. In-the-dry: The in-situ soil moisture content of no more than two percentage points above the optimum moisture content for that soil.
- B. BWSC: Boston Water and Sewer Commission.
- C. Contractor: Refers to the General Contractor and/or Subcontractor responsible for the Work under contract with the Owner.



- D. **Engineer:** Authorized representative of the Harvard Project Manager. Engineer shall be the Architect or Designer of Record for the project.
- E. **Harvard Project Manager:** A representative of the Property Owner, President and Fellows of Harvard College.
- F. **MWRA:** Massachusetts Water Resource Authority
- G. **NPDES:** National Pollutant Discharge Elimination System.
- H. **ASTM:** American Society for Testing and Materials.
- I. **USEPA:** United States Environmental Protection Agency.
- J. **Mass DEP:** Massachusetts Department of Environmental Protection.
- K. **OSHA:** Occupational Health and Safety Administration.
- L. **MCP:** Massachusetts Contingency Plan.

#### 1.06 PROJECT CONDITIONS

- A. Refer to Project Documents for results from the Pre-Characterization Program.
- B. The Owner has obtained a National Pollutant Discharge Elimination System (NPDES) Remediation General Permit from the USEPA [and a Boston Water and Sewer Commission Permit to Dewater] or [a Massachusetts Water Resource Authority Permit] to discharge effluent from temporary construction dewatering systems into the local storm drain. A copy of each permit is appended to this Section and a copy of the Notice of Intent to the USEPA will be made available upon request. The Contractor is required to route effluent from the dewatering system to an acceptable discharge location, as identified in the permit(s).]

#### 1.07 DESIGN AND PERFORMANCE CRITERIA

- A. Comply with federal, state, and local codes, ordinances, regulations, and permits for disposal of discharge effluent and collected sediment.
- B. Provide means and measures to maintain total suspended solids and pH within permit requirements. The Contractor shall use sedimentation tanks, bag filters or combination thereof to control suspended solids. Control of suspended solids and pH is considered a baseline requirement paid as part of the Contractor's Base Contract Price and is not considered pre-treatment.



- C. The [Owner] [Contractor] will conduct [NPDES], [MWRA] and/or [BWSC] Permit compliance testing, and submit the test data to the [EPA], [MWRA], and/or [BWSC]. A copy of the test results will be provided to the [Contractor] [Owner].
- D. Prevent surface water runoff from entering or accumulating in excavation and the demolished building basement.
- E. Drainage of all water resulting from pumping by the Contractor shall be managed so as not to cause damage to adjacent properties or facilities. Repair damage caused by dewatering and drainage system operations to adjacent structures, buildings and/or utilities as directed by the Harvard Project Manager.

#### 1.08 SUBMITTALS

- A. The Contractor shall forward submittals to the Owner's Engineer a minimum of two weeks prior to any planned Work related to the contractor's submittals.
- B. The time period(s) for submittals are the minimum required by the Owner's Engineer to review, comment, and respond to the Contractor. The Owner's Engineer may require resubmission(s) for various reasons. The Contractor is responsible for scheduling specified submittals and re-submittals so as to prevent delays in the Work.
- C. The Contractor shall submit, as part of the Work Plan, the temporary dewatering and drainage system design. The Contractor shall remain responsible for adequacy and safety of construction means, methods and techniques as well as regulatory approvals that may be required for discharge.
- D. The Contractor's submittals shall be prepared and stamped by a Professional Engineer currently registered in the Commonwealth of Massachusetts and retained by the Contractor. Alternatively, and if approved by the Owner's Engineer, the Contractor may retain the services of a temporary construction dewatering treatment system designer provided the designer meets the criteria specified herein. The Contractor's Professional Engineer or approved dewatering treatment system designer shall have a minimum of five years' experience in planning and executing dewatering systems for the type specified herein.
- E. The resume of the Contractor's dewatering treatment system designer (if not a Professional Engineer and if requested by the Owner's Engineer) including the name, date, location, and description of five similar successfully completed dewatering projects. The resume shall also



demonstrate that the system designer has a minimum of five years experience in the design and implementation of dewatering systems of the type specified herein.

- F. The Contractor's submittals shall be reviewed and accepted by the Owner's Engineer prior to conducting any Work.
- G. Acceptance of the Contractor's submittals by the Owner's Engineer does not relieve the Contractor of the responsibility for the adequacy, safety and performance of the Work.
- H. Shop Drawings and Engineering Calculations:
  - 1. Drawings and supporting engineering calculations for the proposed dewatering and recharge (as applicable) systems including sediment control tanks, bag filters, pH neutralization systems, and additional treatment systems, including the following:
    - a. Arrangements, sizes, capacities, locations and depths of all elements of the proposed systems.
    - b. Descriptions of equipment and materials to be used and the procedure to be followed during installation, operation, maintenance and removal relative to the proposed sequence of excavation, foundation construction and backfilling.
    - c. Provisions for standby equipment and standby power supply.
    - d. Discharge locations as established by the applicable permits.
    - e. Manufacturer technical literature for the flow meter and totalizer proposed to measure flow rate and total volume of effluent discharged into the storm drain.
    - f. Details regarding schedule and procedure for cleaning sedimentation tanks and bag filters and details regarding the testing and legal off-site disposal of the materials.
    - g. Anticipated peak and average discharge rates.
  - 2. Schematic details, descriptions, design calculations, and supporting technical information for the proposed base bid treatment system to treat dewatering effluent. Minimum treatment includes control of total suspended solids and pH, and tanks to temporarily store effluent prior to discharge.



- I. [IF PROJECT IS SUBJECT TO USEPA NPDES REQUIREMENTS and is a MCP site for groundwater] Qualifications and valid license for treatment system operator. System operation and inspection shall meet the requirements specified in the MCP at 310 CMR 40.0041(9). If the Contractor proposes to utilize an operator that is not licensed, submit qualifications for the operator and qualifications and valid license for individual designated to inspect treatment system. Licensed operator shall have a minimum Grade 2I license as defined in 257 CMR 2.12 or higher if required by 257 CMR 2.13.
  
- J. [IF PROJECT IS SUBJECT TO USEPA NPDES REQUIREMENTS] NPDES Permit Compliance:
  1. Monitor total flow (gallons) and instantaneous flow rate (gpm) with a continuous total flow meter. Record data daily and make available to Owner's Engineer in the field. Submit monthly logs to Owner's Engineer.
  2. Monitor pH with continuous pH meter. Record data daily and make available to Owner's Engineer in the field. Submit monthly logs to Owner's Engineer.
  3. Analyze discharged water to meet all other requirements as outlined in the applicable permits including at a minimum TSS. (See also Section 1.07 Design and Performance Criteria).



## **PART 2 - PART 2 - PRODUCTS**

### **2.01 BASE BID DEWATERING SYSTEM**

- A. Maintain dry and stable working surfaces; to pump, store, manage, treat and discharge dewatering effluent; and maintain groundwater levels outside the excavation at pre-construction levels.
- B. Materials and equipment shall be of appropriate type and maintained in good working order at all times during the course of the Work. Any leaks or spills shall be immediately fixed and/or cleaned.
- C. Sedimentation tanks and bag filters shall be of sufficient size and capacity to handle the dewatering flows, and to reduce suspended materials in the dewatering effluent in accordance with all permits obtained for the Project. Tanks shall contain baffles to reduce velocities and allow sediment to settle inside them.
- D. Tanks to temporarily store effluent prior to discharge (in addition to sedimentation tanks) shall be of sufficient size and capacity to handle the dewatering flows.
- E. Maintain and employ adequate back-up equipment and generators in the case of equipment breakdown or loss of power.
- F. Provide a calibrated flow meter and totalizer to measure the flow rate and total volume of water discharged into the storm drain.
- G. Provide spigots in the discharge line before and after sediment control tanks/ bag filters and treatment systems for sampling water for chemical testing in accordance with the applicable permits. Maintain access to sampling spigots at all times.
- H. pH neutralization systems shall be of sufficient size and capacity to handle the dewatering flows, and to maintain pH of the dewatering effluent in accordance with the [NPDES], [MWRA] and/or [BWSC] Permit. pH fluctuation of the effluent shall be maintained within the permit limit range. As a minimum, the pH neutralization system shall consist of mixing tanks, mixers, chemical metering pumps and proportional pulse output pump controllers unless Construction Manager can demonstrate that a scaled-down system will effectively meet the permit limits based on anticipated flows and expected influent water quality.
- I. Secondary containment shall be provided for chemical containers that are either stored or in active use.



2.02 *[IF PROJECT IS SUBJECT TO USEPA REMEDIATION GENERAL NPDES PERMIT REQUIREMENTS] - [IF DATA IS AVAILABLE WHICH INDICATES ADDITIONAL TREATMENT MEASURES ARE REQUIRED, THEN THIS SECTION SHOULD SPECIFICALLY STATE WHAT THE ADDITIONAL TREATMENT MEASURES ARE IN ORDER TO MEET PERMIT REQUIREMENTS.]* ADDITIONAL TREATMENT SYSTEMS

- A. Additional treatment systems shall be of sufficient size and capacity to process the anticipated dewatering effluent quantities, and to reduce contaminant concentrations to levels acceptable to the applicable permits. Additional treatment systems shall be implemented only if required to meet [NPDES] [MWRA] [BWSC] Permit discharge requirements.
- B. Additional treatment systems may consist of oil/water separators (with appropriate secondary containment), granular activated carbon units (with provisions for monitoring breakthrough), and other types of materials and equipment required for treating the dewatering effluent to meet applicable permit criteria. Sedimentation control (whether sediment tanks, bag filters, or other systems) to remove suspended solids from effluent, tanks to temporarily store effluent prior to discharge, and pH neutralization systems are not considered additional treatment systems and shall be part of the Contractor's base system.
- C. Storage units used to handle quantities of water in excess of the treatment unit capacity shall be of sufficient size, and capacity to allow the Work to proceed without interruption. The Contractor shall incorporate any non-productive time due to interruptions in dewatering into the schedule and costs for the Work.
- D. Treatment systems shall be equipped, or be adaptable, to process dewatering effluent containing non-aqueous phase liquids, if encountered, at no additional cost to the Owner.

**Part 3 - EXECUTION**

3.01 GENERAL

- A. The Contractor shall control surface water and groundwater such that excavation is performed in-the-dry.
- B. The Contractor shall submit, as part of the Work Plan, a temporary dewatering and drainage system design. Submittal will be for information only; Harvard will not be responsible for the design and implementation of the system including any loss of productivity or increased cost should the system be ineffective and require re-design and installation. The design





shall include the type of dewatering system, spacing of dewatering units and other details of the Work, including the installation of shoring, sheeting, or bracing. The Contractor shall remain responsible for adequacy and safety of construction means, methods and techniques as well as regulatory approvals that may be required for discharge, and shall engage a Massachusetts Registered Professional Engineer or geotechnical engineer to design the dewatering and drainage systems on the anticipated soil/water conditions at the site.

- C. The temporary dewatering and drainage system shall be installed and operated by the Contractor so as to allow all work to be completed in accordance with these specifications. The lowered groundwater level shall be maintained until the backfill has been placed to the elevations specified such that backfill will not be floated or otherwise damaged.
- D. The Contractor shall provide protection against floatation of all Work.
- E. [IF PROJECT IS SUBJECT TO USEPA NPDES REQUIREMENTS] Provide means and measures to maintain total suspended solids and pH within permit requirements. The Contractor shall use sedimentation tanks, bag filters or combination thereof to control suspended solids. Control of suspended solids and pH is considered a baseline requirement paid as part of the Contractor's Base Contract Price and is not considered pretreatment.
- F. [IF PROJECT IS SUBJECT TO USEPA NPDES REQUIREMENTS] [The [Owner's Engineer] [Contractor] will conduct [NPDES] [MWRA] and/or [BWSC] Permit compliance testing, and submit the test data to EPA. The [Contractor] [Owner's Engineer] will provide a copy of the test data to the [Owner's Engineer] [Contractor].]

### 3.02 SURFACE WATER CONTROL

- A. The Contractor shall control surface water runoff to prevent flow into excavations and demolished building basement. Provide temporary measures such as dikes, ditches and sumps, as needed.

### 3.03 EXCAVATION DEWATERING

- A. The Contractor shall provide and maintain adequate equipment and facilities to remove promptly, store, treat and properly discharge all water entering excavation(s).
- B. Surface runoff shall be diverted around the perimeter of the excavation and pumped from the excavation to maintain in-the-dry conditions.



- C. Utilities that are to be maintained, repaired or replaced shall not be installed in water or allowed to be submerged prior to placing backfill around the utility.
- D. Dewatering and drainage operations shall be conducted in a manner which does not cause loss of ground or disturbance to the pipe bedding or soil that supports overlying utilities or adjacent structures and buildings.

### 3.04 TREATMENT SYSTEM OPERATION

- A. Install and operate treatment system per manufacturer's instructions.
- B. The treatment system shall be operated and inspected only by those individuals identified in the Contractor's submittal and properly and currently licensed as required.
- C. Notify the Project Manager a minimum of seven days prior to any discharge, whether to designated off-site storm drain or on-site (recharge) locations.
- D. Perform equipment inspection and calibration weekly. Provide inspection reports and calibration logs weekly.
- E. Perform maintenance and cleaning per manufacturer instructions and to meet [NPDES], [MWRA], and/or [BWSC] permit limits. Provide maintenance log monthly.

### 3.05 DISCHARGE TO STORM DRAIN

- A. Discharge to the designated location(s) in accordance with the [NPDES], [BWSC] and/or [MWRA] Permit. Discharge to the storm drain shall commence only after receiving approval from the Owner's Engineer, and [EPA], [BWSC] and/or [MWRA].
- B. Provide a sedimentation tank, bag filter, or other system to remove sediment and suspended particles from the dewatering effluent prior to discharge. Manage effluent to meet the terms and conditions of the [NPDES], [MWRA], and/or [BWSC] Permit. Additional permit requirements will be provided to the Contractor as they become available. The Contractor shall comply with the most stringent criteria and requirements set forth by regulatory agencies.
- C. Clean and legally dispose of all sediment or other materials discharged from the dewatering system that accumulates in the storm drains or other



improvements to the satisfaction of the Project Manager and the owner of the utility at no additional cost to the Harvard.

- D. If required, treat dewatering effluent by processing the water through a designed treatment unit. The treatment unit shall contain all equipment and materials necessary to reduce the chemical concentration in the dewatering effluent below permit discharge criteria. Provide additional filtering or sedimentation control, as required to meet permit discharge criteria and to prevent fine grained material from clogging or blocking the treatment media.
- E. Provide sampling ports in the dewatering system(s) that are accessible at all times to obtain samples of the dewatering effluent at points prior to and after treatment as appropriate. Ports shall meet all requirements of the [NPDES], [BWSC], and/or [MWRA] Permit.
- F. The Contractor shall provide notification of the unexpected or non-complying discharge to the EPA, Project Manager and Harvard. The Contractor shall then adapt and modify the dewatering and/or pretreatment systems as required to meet the requirements of all permits. The Contractor shall immediately cease discharging effluent to the site storm drains, route effluent to on-site storage units and notify the Project Manager if one of the conditions outlined below occurs.
  - 1. Discharge of oil or hazardous materials sufficient to cause a sheen (as defined in 40 CFR 110) is observed.
  - 2. Upon discovery, through monitoring, that the effluent is not in compliance with permit requirements.
- G. The Contractor shall pay all fines, penalties and other costs associated with non-compliance of the permits at no additional cost to Harvard. [The Contractor shall also pay all storm drain fees.]
- H. The Contractor shall measure and maintain flow and sediment logs in accordance with [NPDES], [MWRA], and/or [BWSC] Permit requirements. [The Owner will arrange for and conduct permit compliance chemical testing as outlined in the [NPDES], [BWSC] and/or [MWRA] Permit. Copies of all test data will be provided to the Contractor.] [The Contractor will arrange for and conduct permit compliance chemical testing as outlined in the [NPDES], [BWSC], and/or [MWRA] Permit. Copies of all test data will be provided to the Owner and [EPA], [MWRA], and/or [BWSC].]



### 3.06 ON-SITE RECHARGE

- A. The Contractor may manage construction dewatering effluent on-site, provided that the on-site discharge of the effluent does not result in off-site surface runoff, damage to existing and new site improvements both on and off the project site, or damage to on-site construction, and the on-site discharge does not spread contamination and/or increase existing levels of contamination in other portions of the site or adjacent sites. On-site recharge shall commence only after receiving approval from the Owner's Engineer.
- B. The Contractor shall recharge construction dewatering effluent only on-site at locations approved by the Owner's Engineer.
- C. On-site recharge of groundwater at locations approved by the Owner's Engineer in accordance with the requirements of the MassDEP, City of [Cambridge] [Boston], and other permits, and in accordance with all federal, state, and local codes, ordinances, and regulations, including the MCP. On-site recharge shall commence only after receiving approval from the Owner's Engineer.
- D. The Project Manager may require the Contractor to use additional sedimentation and erosion controls, materials, and equipment to facilitate proper on-site recharge at no additional cost to the Owner.
- E. Do not conduct any dewatering on site until the proposed dewatering procedures and discharge locations have been accepted by the Project Manager.

END OF SECTION