

SECTION 02140 - DEWATERING

City of San Diego, CWP Guidelines

PART 1 -- GENERAL

1.1 WORK OF THIS SECTION

- A. The WORK of this Section includes site dewatering necessary to lower and control groundwater levels and hydrostatic pressures to permit excavation and construction to be performed properly under dry conditions.
- B. Dewatering operations shall be adequate to assure the integrity of the finished project. The responsibility for conducting the dewatering operation in a manner which will protect adjacent structures and facilities rests solely with the CONTRACTOR. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the CONTRACTOR.
- C. The CONTRACTOR shall bear the sole responsibility for the design, installation, and operation of the dewatering system to comply with the requirements of this section. The CONTRACTOR shall be required to install additional dewatering equipment as may be required throughout the duration of the project to maintain specified groundwater levels.

1.2 RELATED SECTIONS

- A. The WORK of the following Section applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.
 - 1. Section 02200 Earthwork

1.3 STANDARD SPECIFICATIONS

- A. Except as otherwise indicated in this Section of the Specifications, the CONTRACTOR shall comply with the Standard Specifications for Public Works Construction (SSPWC), as specified in Section 01090 - REFERENCE STANDARDS.

1.4 SCHEDULE AND PLAN

- A. The following shall be submitted in compliance with Section 01300:
 - 1. The CONTRACTOR shall make an independent investigation of the soil and groundwater conditions at each site. The results of the CONTRACTOR's independent investigation shall include the results of any and all exploratory borings, laboratory tests, and analyses. The CONTRACTOR's independent investigation shall be in report form.
 - 2. Prior to commencement of excavation, a detailed plan and schedule, with description, for dewatering of excavations, piezometers, estimated dewatering rates, volume and equipment requirements shall be submitted with the dewatering plan. The plan shall be signed and sealed by a California registered Civil Engineer, Geotechnical Engineer, Engineering Geologist or Hydrogeologist with experience of at least one dewatering operation of similar magnitude and complexity in a recently completed construction project. The qualification of the dewatering system designer shall be submitted to CONSTRUCTION MANAGER for approval. The

CONTRACTOR shall make an independent investigation of the soil conditions to be dewatered. The dewatering plan shall be prepared specifically to accommodate soil materials and groundwater conditions of the site.

3. Demonstration of proposed system and verification that adequate personnel, materials and equipment are readily available, including standby equipment.
4. A copy of the executed industrial waste permit approved by MWWD.

1.5 CONTROL AND OBSERVATION

- A. Adequate control shall be maintained to ensure that the stability of excavated and constructed slopes are not adversely affected by water, that erosion is controlled and that flooding of excavation or damage to structures does not occur.
- B. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points shall be established and observed daily to detect any settlement which may develop.
- C. A daily report shall be maintained recording the following:
 1. Groundwater elevations of ground water and piezometric water levels in observation wells (if any).
 2. Change in elevation of reference points as stated in subsection 1.5 to detect settlement in adjacent structures. CONSTRUCTION MANAGER may suspend work if any settlement exceeds 0.05 feet.
- D. After dewatering is discontinued, a weekly report shall be maintained for two months recording:
 1. Change in elevation of reference points as stated in subsection 1.5 to detect settlement in adjacent structures.

1.6 INSPECTION

- A. During or after trench excavation, when CONTRACTOR observes sufficient groundwater to be present that may prevent proper installation of pipe bedding, pipelines, backfill and compaction, then CONTRACTOR shall call for inspection of conditions by the CONSTRUCTION MANAGER. The CONSTRUCTION MANAGER shall inspect the conditions and determine if unacceptable conditions are present for pipe installation.
- B. If unacceptable trench conditions are found by the CONSTRUCTION MANAGER, then the CONTRACTOR will be authorized to mobilize and start dewatering operations of the pipeline trench.
- C. Damp soils or low volumes of groundwater in the bottom of trenches are not sufficient cause for trench dewatering.

1.7 MEASUREMENT AND PAYMENT

- A. Separate payments shall be made as specified in the contract for providing all dewatering equipment and apparatus, for mobilization/demobilization of dewatering equipment, and for all dewatering operations.

- B. The CONTRACTOR shall also be responsible for all costs associated with the discharge of dewatering effluent into the sanitary sewer system of the City.
- C. Storm water run-off flowing into the excavation site shall be minimized to the maximum extent possible. All water entering the excavation site shall be subject to all dewatering requirements specified in this documents.
- D. Protection of adjacent structures from adverse effects of dewatering shall be the responsibility of the CONTRACTOR.

1.8 PERMITS

- A. The CONTRACTOR shall obtain an Industrial Waste Discharge Permit from MWWD for discharging effluent from dewatering operations into the City sanitary sewer system.
- B. The CONTRACTOR shall be responsible for all costs associated with obtaining all proper permits and for maintaining permit compliance, including all costs associated with permit violations.

PART 2 -- PRODUCTS

2.1 EQUIPMENT

- A. Dewatering, where indicated, includes deep wells, well points, piezometers, sump pumps, temporary pipelines for water disposal, and rock or gravel placement, and other means including standby pumping equipment maintained on the jobsite continuously.

2.2 FOUNDATION ROCK

- A. Foundation rock shall be included in the dewatering system to replace weakened soil within the excavation. Rock shall be 1-1/2 inch maximum crushed stone placed in minimum 12-inch layers and completely wrapped in filter fabric. Foundation rock shall be used in addition to bedding material shown on the plans and shall be used at the CONTRACTOR'S discretion, or as directed by the CONSTRUCTION MANAGER. Foundation rock shall be considered to be part of the dewatering system.

PART 3 -- EXECUTION

3.1 GENERAL REQUIREMENTS

- A. All water encountered in the trench shall be disposed by the CONTRACTOR in such a manner as will not damage public or private property or create a nuisance or health nuisance. The CONTRACTOR shall furnish, install, and operate pumps, pipes, appliances, and equipment of sufficient capability to keep trench excavation free from water until the trench is backfilled, unless otherwise authorized by the CONSTRUCTION MANAGER. No dewatering from inside the trench will be permitted while the pipeline is being installed, unless it is approved by the CONSTRUCTION MANAGER.
- B. Dewatering shall be performed in compliance with Subsection 306-3.3 of SSPWC and as specified herein.

- C. An independent assessment of the subsurface conditions shall be performed prior to submitting a dewatering plan. The assessment shall be signed and sealed by a California registered Geotechnical Engineer, Engineering Geologist or Hydrogeologist. The plan shall include, but not be limited to:
1. Additional exploratory borings.
 2. Laboratory testing.
 3. Pump testing.

All boreholes and wells advanced by the CONTRACTOR shall be logged and submitted for review.

- D. An adequate system shall be designed, installed and maintained to lower and control the ground water to permit excavation, construction of structures, and placement of fill materials to be performed under dry conditions. The system shall include two piezometers at each structure and one piezometer at the midpoint of each pipeline reach. The piezometers shall be properly installed to accurately reflect the groundwater depth adjacent to the excavation.
- E. Sufficient dewatering equipment shall be installed to pre-drain the water-bearing strata below the bottom of foundations, sewers and other excavations.
- F. The hydrostatic head in water-bearing strata below foundations, drains, sewers and other excavations shall be reduced to ensure that the water level and piezometric water levels are below the excavation surface at all times. The piezometric water level shall be maintained a minimum of 3 feet below the excavation surface. No excavation shall be made without proof of required lowered groundwater levels.
- G. The system shall be placed into operation prior to excavation below ground water level to lower the ground water level and shall be operated continuously 24 hours a day, 7 days a week until drains, sewers and structures have been constructed and fill materials have been placed and dewatering is no longer required. Groundwater will need to remain depressed until adequate loading from proposed structures and uplift resistance to buoyant forces can be provided. All dewatering wells, well points and piezometers shall be installed under the supervision of a California registered Geotechnical Engineer, Engineer Geologist, or Hydrogeologist. The registered professional shall submit a written certificate that the system has been installed according to the dewatering plan.
- H. The site shall be graded to facilitate drainage. Surface runoff shall be diverted from excavations. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and then be pumped or drained by gravity away from the excavation and disposed of in compliance with the CWP Guidelines, and local, State and Federal regulations.
- I. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
- J. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with foundation rock completely wrapped in filter fabric at no additional cost to the OWNER.
- K. Flotation of structures and facilities shall be prevented by maintaining a positive and continuous removal of water. The dewatering system shall be in continuous operation until all structure and pipelines are properly backfilled.

- L. If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sandpacked and/or other means used to prevent pumping of fine sands or silts from the subsurface. A continual check shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation.
- M. An Industrial Waste Discharge Permit shall be obtained from MWWD to discharge dewatering effluent into the sanitary sewer system.

If the laboratory results of the independent assessment of subsurface conditions show contamination levels above what is acceptable, a treatment system shall be provided under the bid allowances in the Bid Schedule.

- N. The release of groundwater to its original level shall be performed in such a manner as not to disturb natural foundation soils, prevent disturbance of compacted backfill and prevent flotation or movement of structures, pipelines, and sewers.

** END OF SECTION **