

## SECTION 02240 - DEWATERING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes construction dewatering.
- B. Related Sections:
  - 1. Division 1 Section "Construction Progress Documentation and Photographic Documentation" for recording preexisting conditions and dewatering system progress.
  - 2. Division 2 Section "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.
  - 3. Division 2 Section "Earthwork" for excavating, backfilling, site grading, and for site utilities.
  - 4. Division 2 Section "Subdrainage" for permanent foundation wall, underfloor, and footing drainage.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
  - 1. Delegated Design: Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
  - 2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
  - 3. Prevent surface water from entering excavations by grading, dikes, or other means.
  - 4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation and on nearby properties.
  - 5. Collaborate with Owner's Representative to minimize the amount of groundwater lowering at any given time while maintaining piezometric levels at elevations necessary to prevent bottom heave and sand boils. The purpose of such

collaboration is to minimize settlements that may be caused by increasing effective stresses on compressible soils in the vicinity of the Project.

6. Remove dewatering system when no longer required for construction.

#### 1.4 ACTION SUBMITTALS

- A. Shop Drawings: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.
  1. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
  2. Include a written plan for dewatering operations including control procedures to be adopted if dewatering problems arise.
  3. Include analysis that demonstrates the suitability of proposed filter stability criteria against aquifer sands.
- B. Delegated-Design Submittal: For dewatering system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and professional engineer.
- B. Field quality-control reports.
- C. Other Informational Submittals:
  1. Photographs: Show existing conditions of adjoining and nearby construction and site improvements that might be misconstrued as damage caused by dewatering operations.
  2. Test sand content of discharge from wells.
  3. Well permits from the state of Louisiana.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer that has specialized in design of dewatering systems and dewatering work.
- B. Dewatering System Engineer Qualifications: Submit evidence that engineer has designed at least five similar dewatering systems.
- C. Regulatory Requirements: Comply with governing local, state, EPA and other federal notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.

- D. Preinstallation Conference: Conduct conference at Project site .
1. Review methods and procedures related to dewatering including, but not limited to, the following:
    - a. Inspection and discussion of condition of site to be dewatered including coordination with temporary erosion control measures and temporary controls and protections.
    - b. Geotechnical report.
    - c. Proposed site clearing and excavations.
    - d. Existing utilities and subsurface conditions.
    - e. Coordination for interruption, shutoff, capping, and continuation of utility services.
    - f. Construction schedule. Verify availability of Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    - g. Testing and monitoring of dewatering system, including flow measurements, piezometer readings and sand content testing.

#### 1.7 PROJECT CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
1. Notify Project Coordinator no fewer than two days in advance of proposed interruption of utility.
  2. Do not proceed with interruption of utility without Project Coordinator's written permission.
- B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Neither the Owner nor the geotechnical engineer will not be responsible for interpretations or conclusions drawn from this data.
1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
  2. The geotechnical report is referenced elsewhere in the Project Manual.
- C. Survey Work: Engage a qualified land surveyor or professional engineer to survey nearby existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags, or other damage is evident in nearby construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.
  - 1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
  - 2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install at least 2 piezometers in sand stratum underlying the site to monitor the performance of the dewatering system.
- C. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- D. Provide temporary grading to facilitate dewatering and control of surface water.
- E. Monitor dewatering systems continuously. Measure and report flow from system and piezometric elevations at least one time per day.
- F. Promptly repair damages to nearby facilities caused by dewatering.
- G. Protect and maintain temporary erosion and sedimentation controls, which are specified in Division 1 Section "Temporary Facilities and Controls" during dewatering operations.

3.2 INSTALLATION

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
  - 1. Space well points or wells at intervals required to provide sufficient dewatering.
  - 2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.
  - 3. Demonstrate suitability of filters by performing filter stability calculations.

4. Measure sand content in the discharge using a Roscoe Moss Rossum Sand Tester (RST) or equal. The maximum acceptable sand content is 1 part per million (ppm) by volume.
- B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
- C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
  1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
  1. Maintain piezometric water level a minimum of 24 inches below bottom of excavation; in compliance with Geotechnical Report recommendations.
  2. The system shall have adequate capacity to lower groundwater to 24 inches below the deepest excavation.
- E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.
- F. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.
  1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.
  2. Comply with Louisiana regulations for abandonment of wells.
- G. Damages: Promptly repair damages to nearby facilities caused by dewatering operations.

### 3.3 FIELD QUALITY CONTROL

- A. Observation Wells: Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated; additional observation wells may be required by authorities having jurisdiction.
1. Observe and record daily elevation of ground water and piezometric water levels in observation wells.
  2. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. In areas where observation wells are not functioning properly, suspend construction activities until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
  3. Observe and record daily flow.
  4. Perform sand content testing after each well is developed. The maximum allowable sand content in the discharge is 1 ppm by volume.
  5. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.
- B. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

END OF SECTION 02240