SP-230017
(New)

SPECIAL PROVISIONS
FOR
LEVEE CONSTRUCTION

Fremont County
STP-333-1(030)--2C-36

Effective Date
October 17, 2023

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

230017.01 DESCRIPTION.

The special provision covers construction of Ditch 6 Levee, as shown in the contract documents.

230017.02 MATERIALS.

A. General.

1. The levee embankments shall be constructed of Cohesive Fill Material which shall be obtained from approved borrow areas.

2. The seepage berm embankment shall be constructed of Sand Fill Material which shall be obtained from approved borrow areas.

3. Earth used in construction of embankments shall be free of unsuitable materials.

B. Cohesive Fill Material.

Cohesive Fill Material shall consist of cohesive materials having at least 50% passing the U.S. Standard 200 mesh sieve size. Cohesive materials consist of materials classifying as lean (CL), having a Plasticity Index of 10 or greater, and falling between the “U” line and the “A” line on Figure 3 in ASTM D 2487 – Standard Tests for Classifications of Soils for Engineering Purposes and a Liquid Limit less than 50.

C. Sand Fill Material.

Sand Fill material shall consist of pervious material having less than 5% passing the U.S. Standard 200 mesh sieve size. Pervious materials consist of materials classifying as poorly graded sand (SP) and well graded sand (SW) per ASTM D 2487 – Standard Tests for Classifications of Soils for Engineering Purposes.

D. Unsuitable Materials.
Unsuitable materials are materials containing debris, brush, roots, sod, organic matter or stones with dimensions greater than one-half the loose layer thickness and shall not be used in the levees. Frozen earth, snow, or ice be shall not be used in the levees.

E. Suitable Materials.
Suitable materials for construction of the levee embankment and seepage berm embankment will include materials described in this Article. A material will not be classified as unsuitable based on its moisture content. See Article 230017.02, D.

F. Pre-Construction Testing of Proposed Borrow Materials.

1. Submit to the Engineer for approval the results of grain size testing (ASTM D 6913 and D 7928) and plasticity testing (ASTM D 4318) on all Cohesive Fill Materials proposed for use in the levee embankment.

2. Submit to the Engineer for approval the results of grain size testing (ASTM D 6913 and D 7928) on all Sand Fill Materials proposed for use in the seepage berm embankment.

3. The source of materials proposed for use in the levee and seepage berm embankments shall also be submitted. These submittals must be approved by the Engineer prior to the placement of materials within the levee section.

230017.03 CONSTRUCTION.

A. Notifications.
The following shall be notified at least 1 week prior to stripping.

Design Engineer.
Bryan P. Kumm, P.E.
HDR, Inc.
1917 S 67th St.
Omaha, Nebraska 68106
Phone: 402-399-1147
Email: Bryan.Kumm@hdrinc.com

B. Levee Embankment and Seepage Berm Subgrade Preparation.

1. **General.**
After stripping, removal of unsuitable foundation material, and coreout of the roadway embankment, cavities or other depressions shall be broken down to flatten out the slopes. Immediately prior to the placement of fill material the entire earth surface on or against which fill is to be placed, shall be thoroughly broken to a depth of 6 inches and the area to be occupied by the embankments shall be compacted in accordance with the provisions specified in Article 230017.03, C. If for any cause, this foundation surface or other fill surface that is to receive fill becomes compacted in such a manner that, in the opinion of the Engineer, a plane of seepage or weakness might be induced, it shall be scarified to a depth of 6 inches before the depositing of material thereon.

2. **Requirements.**
The depth of stripping on the existing slopes of levees, seepage berms, and roadway embankments shall not exceed 6 inches. All slopes upon which fill is to be placed shall be notched and broken up so that the fill material will bond with the existing material. Water shall be added as needed to achieve compaction requirements. All notching, scarifying, and breaking of ground surface shall be done parallel to the centerline of the embankment being

constructed. All foundation preparation shall be approved by the Engineer prior to placement of embankment. No fill shall be placed upon frozen ground.

3. Existing Embankments.
At locations where the levee or other embankments tie to existing earth embankments to complete the levee construction, such embankment surface slopes shall be flattened to 3 Horizontal to 1 Vertical or flatter. 1-foot tall benches shall be cut into the existing slope.

C. Embankment Construction and Testing.

1. General.
- **a.** Apply Section 2107 of the Standard Specifications, except when amended by requirements of this specification. Verify embankment placed with moisture and density control meets the requirements of Article 2107.03, I of the Standard Specifications.
- **b.** Place Cohesive Fill Material in successive horizontal layers not more than 8 inches in depth prior to compaction. Each layer shall be spread uniformly on the previously compacted surface; plowed, disked, or otherwise broke up; moistened or aerated as necessary; thoroughly mixed and compacted to produce embankments having the following moisture and density requirements. If in the opinion of the Engineer, the surface of any compacted layer is too smooth to bond properly with the succeeding layer, it shall be scarified to the satisfaction of the Engineer before the succeeding layer is placed thereon. The Contractor shall use equipment which achieves the compaction specified below and which will not create seams between embankment lifts.
- **c.** Place Sand Fill Material in successive horizontal layers not more than 8 inches in depth prior to compaction. Each layer shall be spread uniformly on the previously compacted surface; plowed, disked, or otherwise broke up; moistened or aerated as necessary; thoroughly mixed and compacted. The gradation and distribution of materials shall be such that the embankment will be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material of the same material type.

2. Quality Control Program.
- **a.** Provide and maintain a Quality Control Program (Embankment Construction). This is defined as process control sampling, testing, and inspection as described in Materials I.M. 540 for construction of embankments with moisture and density control.
- **b.** Provide a Quality Control Technician who is responsible for all process control sampling, testing, and inspection. The Quality Control Technician shall obtain Soils Technician certification through the Iowa DOT Technical Training and Certification Program (TTCP).
- **c.** Provide a laboratory facility and necessary calibrated equipment to perform required tests.
- **d.** Notify the Engineer when a moisture content falls outside specified control limits or density falls below required minimum. If a moisture content falls outside control limits, fill material in this area will be considered unacceptable for compaction. Perform corrective action(s) to bring uncompacted fill material within control limits. If material has been compacted, disk it, bring to within control limits, and re-compact. When project has a density requirement, if an in-place density does not meet the requirements, compacted fill material in this area will be considered unacceptable. Perform corrective action(s) to material to meet density requirements. Compensation will not be allowed for delays resulting from moistening, disking, or re-compacting.

3. Test Procedures.
- **a.** Use test procedures complying with Materials I.M. 204, Appendix A.
- **b.** Atterberg Limits (ASTM D 4318) and grain size analysis (ASTM D 6913 and D 7928) shall also be determined for each of the representative materials. Copies of all test results made for and used as a basis for moisture and density control shall be furnished

to the Engineer in advance of the time that materials are to be placed in the embankments.

4. **Moisture and Density Control (Cohesive Fill Material).**
Cohesive Fill Materials placed in embankments shall be compacted to a density of at least 95% of the maximum dry density and be within -2% to +2% of the optimum moisture content at the time the compactive effort is applied which may require the addition of water or aeration of materials.

5. **Moisture and Density Control (Sand Fill Material).**
Sand Fill Materials placed in embankments shall be compacted to a minimum relative density of 80% and be saturated at the time the compactive effort is applied which may require the addition of water.

D. As-Built Survey.

1. Upon completion of placement of Levee and Seepage Berm Material and prior to placement of topsoil or surfacing, complete an as-built survey of the levee limits. The as-built survey shall be completed by a surveyor licensed in the State of Iowa. The results of the as-built survey shall be provided to the Engineer. At all points a tolerance of 2 inches above and 0 inches below the prescribed grade will be permitted. Areas determined to be deficient by the Engineer shall be immediately restored and confirmed by survey. Survey information shall be reported in a table format with levee stations and elevations presented along the levee centerline at 25 foot intervals and in graphical format in plan and profile view and cross-sections at 25 foot intervals. The plan view shall show the levee centerline, levee station, and 1 foot elevation contours. The profile view shall show the elevation at the levee centerline.

2. Record survey data in reference to horizontal datum Iowa State Plane Coordinate System, NAD83 South Zone and vertical datum North American Vertical Datum NAVD88.

3. Provide the raw survey data to the Engineer in form of ASCII text or spreadsheet files, as well as provide plots in .pdf format.

230017.04 METHOD OF MEASUREMENT.

A. The quantity of Embankment-In-Place, Contractor Furnished, Cohesive for Contractor-furnished Cohesive Fill Material will be measured in cubic yards placed. The Engineer will determine the quantity of materials placed using cross section and end area methods. The quantity for which payment is made will not exceed that necessary to construct the embankment to the neat cross section shown in the contract documents, adjusted for settlement. Shrinkage will not be included in the quantity.

B. The quantity of Embankment-In-Place Select, Contractor Furnished, Select Sand for Contractor-furnished Sand Fill Material will be measured in cubic yards placed. The Engineer will determine the quantity of materials placed using cross section and end area methods. The quantity for which payment is made will not exceed that necessary to construct the embankment to the neat cross section shown in the contract documents, adjusted for settlement. Shrinkage will not be included in the quantity.

230017.05 BASIS OF PAYMENT.

A. The quantities accepted for payment will be paid for at the contract unit price. The contract unit prices will be full and complete payment for providing all design, materials, labor, equipment, and incidentals to complete the work.

Except for water added, payment for Embankment-In-Place, Contractor Furnished, Cohesive and Embankment-In-Place, Contractor Furnished, Select Sand is full compensation for all work involved in furnishing, excavating, hauling, and incorporating this material into the levee.

B. Payment for Compaction with Moisture and Density Control will be the contract unit price in cubic yards for the quantity of embankment placed with moisture and density control. Payment is full compensation for furnishing a Quality Control Technician, sampling and testing, process control inspection, working of drying material, furnishing and applying water, controlling moisture content of the materials, and compacting the materials to the required density, as specified.