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**Technical Specifications
for
Remediation Area 1, Phase II
Sewage Treatment Plant Excavation Package**

**FDF Project No. 20712
Document No. 20712-TS-0001
Contract No. FSC622**

**October 1998
Revision 0**

**Environmental Remedial Action Project
Fernald Environmental Management Project
Fernald, Ohio
FDF Subcontract No. 98PC001322
Task Order P-012**



**INFORMATION
ONLY**

**4055 Executive Park Drive
Cincinnati, Ohio 45241**

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U.S. DEPARTMENT OF ENERGY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REMEDIATION AREA 1, PHASE II
SEWAGE TREATMENT PLANT EXCAVATION PACKAGE
TECHNICAL SPECIFICATIONS

PARSONS

Approved by: Carlton Schroeder 10/7/98
Carlton Schroeder, Project Manager Date

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U.S. DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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TECHNICAL SPECIFICATIONS

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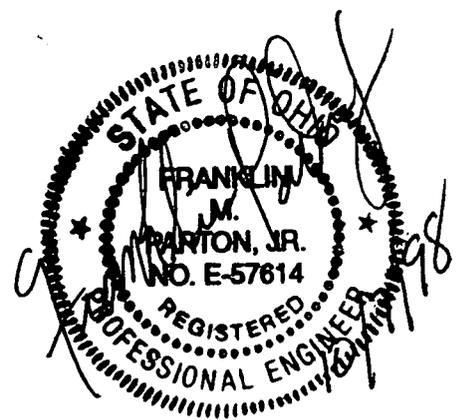
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SEWAGE TREATMENT PLANT EXCAVATION PACKAGE
TECHNICAL SPECIFICATIONS

Division 2

PARSONS

Prepared by: Franklin M. Parton, Jr. 10/7/98

Checked by: [Signature] 10/7/98



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SECTION 02050
SURVEYING

PART 1 GENERAL

1.1 SCOPE

Section includes, but is not limited to:

- A. Establishing temporary survey Control Points.
- B. Setting limits and boundaries of construction and excavation activities.
- C. Performing surveys for:
 - 1. Verification of the existing conditions.
 - 2. Support surveys during the construction and construction activities.
 - 3. Measurement and payment.
- D. Preparing and furnishing red-line and as-built survey documentation including: sketches, drawings, and field notes (electronic and hard copy).

1.2 RELATED SECTIONS AND PLANS

- A. Section 02100 - Site Preparation.
- B. Section 02270 - Erosion and Sediment Control.
- C. Part 6 - Statement of Work.
- D. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

National Geodetic Survey Standards.

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1.4 QUALIFICATIONS

- A. Oversight for survey work shall be provided and certified by a Land Surveyor licensed in the State of Ohio.
- B. Survey work shall be performed under the direct supervision of a person who has at least 5 years of experience in construction surveying.
- C. Work performed in referencing of Fernald Environmental Management Project (FEMP) or United States survey monuments shall be stamped/certified by an Ohio licensed Land Surveyor.

1.5 SUBMITTALS

- A. Provide submittals as required in Part 6 of the Contract Documents. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.
- B. Submit qualifications for land surveyor licensed in the State of Ohio and the survey supervisor in accordance with Part 6 of the Contract Documents. Provide resume demonstrating required years of experience as specified in Article 1.4.
- C. Submit daily survey sketches showing the locations and elevations of existing underground utilities and structures encountered during construction which are not shown on the Construction Drawings or differ from those shown on the Construction Drawings, and newly installed utilities.
- D. Submit electronic and hard copy of survey activities, survey notes, field notes, sketches and drawings for the following surveys within seven (7) calendar days of the completion of each survey:
 - 1. Preliminary surveys.
 - 2. Intermediate surveys.
 - 3. As-built, (Final) surveys.

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- E. Submit as-built survey work documentation by the end of each week for the work of the preceding week, or as requested by the Construction Manager.
- F. Submit 2 copies of field notes prepared by the licensed Land Surveyor on a bi-weekly basis (as a minimum) or upon request by the Construction Manager. Dated and signed field notes shall be legibly recorded in standardized field notebooks with format as defined in this section. Notation shall be consistently applied to surveying work; the stake marking format and the field book notation shall be compatible. Identify survey Control Points on the field notes, sketches, and drawings.

1.6 PROJECT RECORD DOCUMENTS

- A. Maintain on site, a complete and accurate log documenting survey work as it progresses.
- B. Maintain on site, drawings clearly showing existing Control Points and temporary survey control points, including coordinates and elevations, used to perform work. These drawings shall be updated the same day as new control points are set.
- C. Maintain on site, an accurate and current set of redline drawings with as-built locations. Data shall be incorporated within seven (7) calendar days of the respective construction activity.

1.7 EXAMINATION OF EXISTING CONDITIONS

- A. Prior to the start of work, verify the accuracy of the existing conditions shown on the Construction Drawings. Immediately notify the Construction Manager in writing of deviations from the existing conditions indicated on the Construction Drawings.
- B. Stake the locations of earthwork and stripping, as shown on the Construction Drawings and review proposed

work with the Construction Manager in the field prior to start of excavation.

1.8 SURVEY Control Points

- A. Locate and verify Control Points as shown on the Construction Drawings and identify any other survey monuments in the work area in accordance with this Section. The Construction Manager will provide coordinate and elevation data for FEMP control points if not shown on the Construction Drawings. Use only FEMP approved control points.
- B. Protect and preserve Control Points.
- C. Survey Control Points damaged or disturbed during construction activities will be replaced/reset by the Construction Manager. The Contractor shall be responsible for the costs of replacing/resetting survey Control Points.

1.9 HEALTH AND SAFETY REQUIREMENTS

- A. Environmental Health and Safety, and Training requirements shall be as specified in Part 8 of Contract Documents.

PART 2 PRODUCTS AND INSTRUMENTS

- A. Provide materials as required to perform the surveys, including, but not limited to: instruments, tapes, rods, mounts, tripods, stakes, hubs, nails, ribbon, and other reference markers.
- B. The survey instruments shall be precise and accurate to meet the needs of the project. Survey instruments shall be capable of reading to a precision of 0.01 feet with a setting accuracy of 8 seconds.

PART 3 EXECUTION**3.1 GENERAL**

- A. The accuracy of horizontal and vertical control shall meet or exceed Third-Order, Class I and Third-Order, Class I, respectively, as defined by National Geodetic Survey Standards. Elevation shall be referenced to National Geodetic Vertical Datum (NGVD) of 1929 and horizontal coordinates to North American Datum (NAD) 1983.
- B. Establish elevations, lines, and levels that are tied into the FEMP Survey Control System. Topographic contours shall be shown to the nearest foot. The Construction Manager shall provide data on these control points if not shown on the Construction Drawings. Field run data shall be taken to adjacent existing undisturbed area (100 ft. minimum overlap or to FEMP property line) to create a smooth contour transition.
- C. Maintain accurate and complete notes of surveys:
1. Handwritten survey notes and information shall be documented in survey field books. A copy of the numbered, dated and signed field book pages shall be given to the Construction Manager weekly, or upon request, for use in reviewing the work.
 2. Electronically collected field survey information shall be collected and backup equipment shall be available in the event of equipment malfunction.
 - a. Electronic format for printed output of data collector's field survey notes shall be compatible with the field book notation format.
 - b. Electronic format for survey data shall be Intergraph Microstation 5.0 or other compatible system as approved by the Construction Manager.
- D. Measurement and payment surveys for elevation and for horizontal distance shall be to the nearest 0.1 foot +/- 0.05 foot.

- E. Perform construction and excavation layout surveys in advance of scheduled excavation activities. The Contractor is responsible for rework and/or construction delays caused by survey or staking errors.
- F. Set grade stakes and slope stakes for excavation activities as work progresses in accordance with accepted surveying practices.
- G. Establish and maintain temporary survey control points (horizontal and vertical control), as necessary, to support construction excavation activities.
- H. Temporary Control Points, Accuracy and Documentation:
 - 1. Record the following information in survey notebooks for each benchmark established:
 - a. Designation of survey benchmark. Coordinate through the Construction Manager for the designation protocol so as not to duplicate existing points.
 - b. State Plane Coordinates in North American Datum (NAD), 1983;
 - c. Elevation based on National Geodetic Vertical Datum (NGVD) of 1929;
 - d. Date of establishment;
 - e. Description and sketch of each survey benchmark location including reference to a minimum of three permanent features that can be seen from the survey benchmark with the corresponding measurement from the feature to the survey benchmark shown on the above referenced sketch.
 - 2. Document survey work in the field notebooks using the format and procedures described below:
 - a. Title and consecutive notebook number on the front cover;
 - b. Consecutively numbered pages;
 - c. Table of contents, indicated by survey task, on the first numbered page;
 - d. Legend indicating symbols and abbreviations used in survey notes;

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- e. Names of survey team for each task;
- f. Notes on weather, equipment, etc.;
- g. Date and time on each page to indicate when work was recorded;
- h. Notes in a uniform character such that they can be interpreted and used by anyone with survey knowledge;
- i. Description and/or sketches of the existing survey control used.

3.2 SUPPORT SURVEYS

- A. Contractor shall temporarily mark in the field any new underground utilities and installations until the new as-built surveys are obtained and incorporated into the red-line markups.
- B. Preliminary Surveys:
 1. As part of the verification of existing conditions, perform topographic surveys of areas to be excavated prior to construction activities.
 2. Initial topographic survey shall be at a minimum of 50-foot intervals with additional shots as required to define the topography for the impacted surface soil stripping and stockpile areas to be excavated.
 3. Establish location for the installation of the erosion and sediment control measures specified in Section 02270.
 4. Establish limits of earthwork shown on the Construction Drawings. Similarly provide the location and extent of all stockpile areas. Maximum staking interval shall be 50 feet unless otherwise directed by the Construction Manager.
 5. Establish work limits required for installation of construction fencing and Radiological Control Boundary Fencing as specified in Section 02100 and as shown on the Construction Drawings unless otherwise directed by the Construction Manager.

C. Intermediate Surveys:

1. Perform surveys during progress of the construction activities to verify the accuracy of field work as directed by the Construction Manager.
2. Perform surveys for measurement and periodic progress payment as specified in this Section.
3. Perform surveys during progress of excavation to confirm limits of the excavation.
 - a. Perform surveys both before and after 6 inch excavation of Above WAC Tc-99 and Above WAC Uranium soil excavations to confirm removal of 6 inches of material.
 - b. Perform surveys both before and after excavation of all 6 inch stripping areas.

D. As-built (Final) Surveys:

1. Final topographic survey shall be at a minimum of 50-foot intervals or as required to define the topography of final excavated areas at the Sewage Treatment Plant (STP) and the impacted surface soil stripping areas and the STP Borrow Area. Additionally, the following points shall be surveyed and noted as applicable.
 - a. Grade breaks.
 - b. Points of horizontal curvature and tangency.
 - c. Roads, ditches, pipes, culverts, channels and fences.
 - d. Limits of final excavation in the STP excavation and surface stripping areas.
 - e. Limits of trench excavation prior to backfill, and final backfill elevations.
 - e. Spot elevations every 25 feet along the top and toe of slopes of the excavations.
 - f. Finish grades.
2. Horizontal and vertical locations of all utilities installed.
3. Location of Transfer Line pipe supports and Transfer Line at 50' intervals (minimum).
4. Perform survey for final measurement and payment.

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3.3 SURVEYS FOR MEASUREMENT AND PAYMENT

- A. Perform surveys for periodic progress payments and final payment to determine quantities of work.
- B. Calculate and certify quantities of work and submit survey notes and calculations to the Construction Manager for review, evaluation and payment.
- C. Measurement and payment surveys for elevation and for horizontal distance shall be to the nearest 0.1 foot +/- 0.05 foot, respectively.

END OF SECTION

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SECTION 02100
SITE PREPARATION

PART 1 GENERAL

1.1 SCOPE

This Section includes but is not limited to:

- A. Installation and relocation of construction fence.
- B. Installation of Radiological Control Fence.
- C. Fugitive dust control.
- D. Protection of existing groundwater monitoring wells and survey benchmarks.
- E. Clearing, wood chipping, and stockpiling.
- F. Removal of existing chain link fencing.

1.2 RELATED SECTIONS

- A. Section 02050 - Surveying.
- B. Section 02150 - Traffic Control.
- C. Section 02205 - Impacted Material Excavation and Handling.
- D. Section 02270 - Erosion and Sediment Control.
- E. Part 6 - Statement of Work.
- F. Part 8 - Environmental Health and Safety, and Training Requirements.

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1.3 SUBMITTALS

- A. Provide submittals as required by Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.
- B. Submit a Fugitive Dust Control Plan in accordance with Part 6.
- C. Submit, along with the Fugitive Dust Control Plan, manufacturer's Material Safety Data Sheets (MSDS), and recommendations for material handling and usage in accordance with Part 6.
- D. Submit Construction Fence and Radiological Control Fence material specifications, including steel T posts.

1.4 HEALTH AND SAFETY REQUIREMENTS

Environmental Health and Safety, and Training requirements shall be as specified in Part 8.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Dust Suppression Agent shall be as specified for Crusting Agent in Section 02270.
- B. Construction fence shall be orange, high density polyethylene fabric, 4 foot in height, opening size approximately 4 inches by ½ inch, minimum tensile strength of 2000 lbs/ft of width. Posts shall be steel T.
- C. Radiological control fence shall be the same as Construction Fence, except the color shall be yellow. Post shall be 6 foot steel T as used for Construction Fence.

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PART 3 EXECUTION**3.1 GENERAL**

- A. Verify existing conditions, including underground and aboveground utilities as specified in Section 02050.
- B. Notify Construction Manager prior to removal of all utilities and receive confirmation from Construction Manager that utilities to be removed or tapped have been properly isolated and de-energized prior to commencement of work. Construction Manager will properly isolate and de-energize utilities that are to be removed, abandoned, disconnected, or tied into.
- C. Notify Construction Manager prior to movement of material for stockpiling.
- D. Install erosion and sediment control measures, in accordance with Section 02270 and the Construction Drawings, within a drainage area prior to clearing or excavation activities.

3.2 FUGITIVE DUST CONTROL

Fugitive dust control shall be as specified in Part 6 and in accordance with the approved Fugitive Dust Control Plan.

3.3 CONSTRUCTION FENCE/RADIOLOGICAL FENCE

- A. Install T-posts as shown on the Construction Drawings at the boundary between the Radiological Buffer Area and the excavation areas in the STP. The buffer area shall consist of asphalt paved roads within the STP. Posts shall be adjusted as directed by the Construction Manager.
- B. Prior to initiating excavation activities install and/or relocate construction fencing as shown on the Construction Drawings. T posts less than 4-foot in height above grade shall be capped with rebar safety cap.

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- C. Initial radiological control fence will generally be the existing chain link fence at the perimeter of the STP. This radiological control fence will be removed and the Radiological Control Boundary relocated upon completion of 6 inch stripping activities outside the fence. Contractor shall install T posts and radiological control fence at the Radiological Control Boundary, as needed.
- D. Maintain and repair construction fence and radiological control fence until completion of the Contract.

3.4 CLEARING

Remove all trees, shrubs, and woody undergrowth within areas to be excavated as noted on Construction Drawings. All trees, shrubs, etc. shall be cut one foot above grade and handled as non-impacted material. Vegetation shall be chipped and directly discharged into trucks prior to transporting to the Southern Waste Units (SWU) Woodchip Stockpile. Minimize contact with ground to prevent contamination of fallen trees.

3.5 STORM DRAINS AND APPURTENANCES

- A. Agricultural drain tiles encountered shall be handled as impacted material and excavated, transported, and unloaded as specified in Section 02205.
- B. Subject to the approval of the Construction Manager, the Contractor shall furnish and install additional temporary culverts(18" minimum size) and driveways as needed to access work areas. Unless otherwise directed by the Construction Manager, these temporary culverts and driveways shall be removed, transported and unloaded as specified in Section 02205.

3.6 HAULING

Materials shall be hauled to their appropriate locations shown on the Construction Drawings, as specified in the approved Traffic Plan, in accordance with Section 02150.

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3.7 PROTECTION OF EXISTING STRUCTURES

- A. Prior to commencing construction activities, install a protective barrier around existing groundwater wells designated to remain as shown on the Construction Drawings. Protective barrier shall consist of a minimum of standard construction fence offset 5 feet from the item requiring protection. If earthwork activities are to occur in proximity of monitoring wells and/or extraction wells and survey benchmarks designated to remain, hand excavate the area within the protective barrier. If damage to existing monitoring wells, extraction wells, existing properties or utilities occurs, repairs and/or replacement will be completed by the Construction Manager at the Contractor's expense. Survey benchmarks shall be replaced and verified as specified in Section 02050.
- B. Protect trees, plant growth, and features that are outside the work limits.
- C. Locate, identify, and protect from damage utilities that are to remain.
- D. Maintain existing roadways within work per the Contractor's approved fugitive dust control submitted in accordance this Section.

END OF SECTION

SECTION 02150
TRAFFIC CONTROL

PART 1 GENERAL

1.1 SCOPE

This section includes, but is not limited to, requirements for the Traffic Plan.

1.2 RELATED SECTIONS AND PLANS

- A. Section 02205 - Impacted Material Excavation.
- B. Part 6 - Statement of Work.
- C. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

- A. State of Ohio, Department of Transportation (ODOT):
 - 1. Construction and Material Specification, January 1, 1997, except as supplemented or otherwise modified herein and/or shown on the Construction Drawings.
 - 2. Ohio Manual of Uniform Traffic Control Devices (MUTCD) for Streets and Highways, current edition.

1.4 SUBMITTALS

- A. Submit a Traffic Plan in accordance with Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval. The Traffic Plan shall include as a minimum:
 - 1. Planned traffic routes for hauling excavated material from the following material sources to their appropriate destinations (sources may yield several material types):

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MATERIAL	SOURCE	DESTINATION
Topsoil	STP Backfill Borrow Area	STP Backfill Borrow Area Topsoil Stockpile
Non-Impacted Soil	STP Backfill Borrow Area	STP Haul Road; Utility Trench backfill outside STP deep excavation boundary
Wood chips	Clearing	SWU Woodchip Stockpile
Digester Sludge	Digester; East Sludge Drying Bed; West Chamber of Primary Sedimentation Tank; Piping	Above WAC Stabilized Digester Sludge Storage Area
SP-7 Above WAC Tc-99 Material	Above WAC Excavations	SP-7 Above WAC Tc-99 Area or mixed with digester sludge
Above WAC Uranium Material	Above WAC Excavations	SP-7 Above WAC Uranium Staging Area
Sludge Cake and geotextile material	East Sludge Drying Bed	Special Materials Transfer Area
Stockpiled material from the East Sludge Drying Bed	Distribution box components, brush, miscellaneous debris	OSDF
Impacted Material	STP 6" stripping; NAR-007 Stockpile; OSD-007 Stockpile; STP Deep Excavation; Utility Line Excavation; Stabilized Lead contaminated soil; sludge drying bed sands & gravels;	OSDF

Debris	STP excavation (general); Trickling Filter media; STP access road pavement; STP road pavements; foundations; handrails; pipe materials and appurtenances	OSDF
Above WAC debris	STP excavation, road pavement and utility excavations	Special Material Transfer Area or SP-7
Special Materials - ACM	STP excavation (general)	OSDF
Special Materials - Other	STP excavation (general)	Special Material Transfer Area
Non-Impacted Sediments	Ditches around STP Backfill Borrow Area	STP Backfill Borrow Area or as directed by Construction Manager
Impacted Sediments	Ditches or sumps designated by the Construction Manager	OSDF
Above WAC Sediments	Ditches or sumps designated by the Construction Manager	SP-7

2. Access routes from NAR-007 & OSD-007 stockpiles to the haul roads and associated support components.
3. Planned traffic routes within the STP work limits.
4. Crossings for pedestrians and equipment.
5. Maintenance of STP Haul Road
6. Maintenance and cleaning of paved traffic routes, pedestrian crossings and equipment crossings.
7. Description of impact to other site traffic control during construction activities and during long breaks in the work.
8. Access control to and from radiological controlled

- areas and certified areas. Include provisions to provide equipment and wheel washing as required
9. Use of signs, flaggers, and other items or methods used to control traffic.
 10. Planned crossings and protection of underground utilities. Planned crossings of utilities with the exception of the Mid-Valley oil pipeline and protection of existing utilities at crossings. With the exception of the equipment crossing at the Mid-Valley oil pipeline, which is detailed on the Construction Drawings, crossing protection should be a minimum of a 1 inch thick steel plate or an equivalent alternative. Length and width of steel plate shall be as required to protect existing utilities. Provide calculations to support equivalent alternatives to the 1 inch thick steel plate.
 11. North Entrance Road crossing times.
 12. Schedule of equipment traffic through the OSDF Wheel Wash Pad and OSDF Equipment Wash Facility. Coordination between Contractors will be performed by the Construction Manager.

- B. Catalog cut sheets and/or technical specifications for steel plate, Unimats and other utility crossing materials.

1.5 HEALTH AND SAFETY REQUIREMENTS

Environmental Health and Safety, and Training requirements shall be as specified in Part 8.

1.6 TYPE III CROSSINGS

A Type III crossing occurs from an uncontrolled area to an uncontrolled area crossing an uncontrolled road.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Construction materials for traffic control shall be as defined by the Traffic Plan and shall conform to ODOT

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specifications and MUTCD unless otherwise approved by the Construction Manager.

- B. Type III crossing: Supply all equipment and materials necessary to install a 4-way traffic signal system. System shall be portable, with traffic actuations in two of the four directions.
- C. Stop signs shall conform to ODOT specifications and MUTCD.

PART 3 EXECUTION

3.1 MATERIAL HAUL CROSSINGS

- A. General - Contractor may be stopped at any crossing for more than 5 minutes during an emergency event in which site Emergency Response Team or fire fighting force is activated, Utility Engineer is investigating, or a nearby utility is in need of immediate repair.
- B. Type III Crossings - Site traffic will yield to Contractor at Type III crossings. Type III crossing shall be located in the same location as the existing Type III crossing indicated on the Construction Drawings.
- C. Install stop signs on STP Access Road where it is crossed by the STP Backfill Borrow Area Haul Road.
- D. Install stop signs on Old North Entrance Road where it is crossed by the OSD-007 haul route.

3.2 PARKING

- A. Clean Contractor Laydown Area shall be within the Support Area as shown on the Construction Drawings.
- B. Contaminated Laydown Area
 - 1. The Contaminated Laydown Area shall be kept free of standing water.
 - 2. The Contaminated Laydown Area shall be kept free of debris.

3. The Contaminated Laydown Area shall be located as shown on the Construction Drawings.
4. See Section 02205 for additional requirements for contaminated equipment.

END OF SECTION

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SECTION 02205
IMPACTED MATERIAL EXCAVATION AND HANDLING

PART 1 GENERAL

1.1 SCOPE

This Section includes the requirements for the excavation, loading, hauling, and unloading of impacted materials and related activities including, but not limited to:

- A. Excavation of the following impacted materials: 6" stripping areas, stockpiles, debris, asphalt roads, underground utilities, soil, Above-Waste Acceptance Criteria (WAC) soil, sediment, Above-WAC sediment, Above-WAC Technetium-99 material, Above-WAC Uranium material, Above-WAC sludge cake, Above-WAC digester sludge, trickling filter media, Special Materials, unclassified impacted material, and existing STP access road and associated storm drains, as shown on the Construction Drawings.
- B. Loading and hauling of the excavated unclassified impacted materials from the Sewage Treatment Plant (STP) area, excavated soils from the abandoned underground utility line trenches and stockpiles, and unloading of this material in the On-Site Disposal Facility (OSDF).
- C. Excavating, handling, and sizing of abandoned underground utility lines and appurtenances, including but not limited to drinking water (DW), effluent (FT), fuel gas (FG), sanitary (SN), stormdrains (ST), culverts, and electrical duct shown on the Construction Drawings.
- D. Regrading and associated activities in the SP-7 Stockpile to create separate stockpiling areas for the Above-WAC Tc-99 material and the Above-WAC Uranium material. This shall include construction of a segregation ditch between the two materials and

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construction of the SP-7 berm on the Tc-99 area in which to place stabilized Above-WAC digester sludge and soil.

- E. Loading and hauling of excavated Above-WAC Tc-99 and Above-WAC Uranium material and unloading and placing at the designated SP-7 stockpile areas shown on the Construction Drawings.
- F. Loading, containerizing, and hauling Above-WAC sludge cake and staging of these containers in the Special Material Transfer Area shown on the Construction Drawings.
- G. Stabilizing Above-WAC digester sludge with Above-WAC Tc-99 material in the STP area.
- H. Loading and hauling stabilized Above-WAC digester sludge and Above-WAC Tc-99 material and unloading and placing in designated areas within SP-7.
- I. Additional stabilization of stabilized Above-WAC digester sludge and Above-WAC Tc-99 material in SP-7, if required.
- J. Loading and handling of Special Materials, if encountered, and transferring to the Special Material Transfer Area shown on the Construction Drawings.
- K. Size reducing and containerizing Above-WAC piping and debris and staging in the Special Materials Transfer Area.
- L. Size reducing stumps in impacted areas.
- M. Plugging existing ST-20 line at manhole 176B.
- N. Excavating or removing remaining structures, within the limit of work, excluding CG&E towers, including:
 - 1. Floor slabs.
 - 2. Foundation walls.
 - 3. Foundations, piers, and footings.

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4. Concrete block walls (UV building)
 5. Roof and roofing materials (UV building).
 6. Electric ductbank and manholes and electrical wiring within.
 7. Structural steel, miscellaneous metal and remaining equipment.
 8. Miscellaneous electrical and mechanical items.
 9. Remaining power poles and pole stubs.
 10. Chain link and other fencing.
- O. Size reduction of impacted debris as necessary to meet Impacted Materials Placement Plan (IMPP) Category 2 requirements.
- P. Excavating and handling other impacted material and debris encountered during excavation beyond the limits shown on the Construction Drawings, but within work limits, if required.
- Q. Supplemental excavation, as required, during pre-certification.
- R. Identification, handling, packaging, hauling and unloading Asbestos Containing Material (ACM).
- S. Equipment washing as necessary to transport material.
- T. Lead contaminated soil, which has been stabilized by others, may be excavated, loaded, hauled, and unloaded in the OSDF as an optional work item.

1.2 RELATED SECTIONS

- A. Section 02050 - Surveying.
- B. Section 02206 - Earthwork.
- C. Section 02270 - Erosion and Sediment Control.
- D. Section 02900 - Seeding.
- E. Part 6 - Statement of Work.

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- F. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3

REFERENCES

- A. State of Ohio, Department of Transportation (ODOT): Construction and Material Specification, January 1, 1997, except as supplemented.
- B. Impacted Materials Placement Plan (IMPP), On Site Disposal Facility (OSDF), 20100-PL-0007, current revision.
- C. Waste Acceptance Criteria (WAC) Attainment Plan for On Site Disposal Facility (OSDF), 20100-PL-00014, current revision.
- D. Fernald Environmental Management Project Plan (FEMP) PL-2194, Spill Prevention Control and Countermeasure (SPCC) Plan, current revision.
- E. Fernald Environmental Management Project (FEMP) Procedure RP-00100, Identification and Movement of Radioactive Material, current revision.
- F. Fernald Environmental Management Project (FEMP) Procedure PT-0007 Packaging Low-Level Radioactive Waste (LLRW) for Off-Site Shipment, current revision.
- G. EPA SW 846 Method 9095 Paint Filter Test.
- H. Technical Reference Document - Design and As-Built Drawings of the Structures in the Sewage Treatment Plant (STP) Area.
- I. Fernald Environmental Management Project Procedure (FEMP) RM-0045 , Fluor Daniel Fernald Hoisting and Rigging Manual.
- J. Ohio Administrative Code (OAC), Chapter 3745-20, Asbestos Emission Control.

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- K. Ohio Administrative Code (OAC), Chapter 3745-51, Identification and Listing of Hazardous Waste.
- L. Ohio Administrative Code (OAC), Chapter 3745-52, Generator Standards.
- M. Title 40, Code of Federal Regulations (CFR), Part 261, Identification and Listing of Hazardous Waste.
- N. Title 40, Code of Federal Regulations (CFR), Part 262, Standards applicable to Generators of Hazardous Waste.
- O. Title 29, Code of Federal Regulations (CFR), Part 1926.1101, Asbestos.
- P. Fenald Environmental Management Project Procedure, EW-1022, Onsite Tracking and Manifesting of Bulk Excavated Material.

1.4 SUBMITTALS

- A. Submit an Excavation and Demolition Work Plan Asbestos Abatement Safe Work Plan in accordance with Part 6 and Part 8.
- B. The Excavation and Demolition Work Plan shall be integrated into the Safe Work Plan specified in Part 6 and Part 8. The Excavation and Demolition Work Plan shall include, as a minimum, the following:
 - 1. Detailed methods and procedures for excavation of materials outlined in the scope of this Section. Include methods for segregating Category 2 and other categories of impacted material specified in the IMPP during excavation and size reduction methods to ensure the WAC in the IMPP are met.
 - 2. Technical approach for the coordination and implementation of excavation related activities including submittals, surveying, fence installation and removal, stump size reducing and removal, loading requirements, haul road maintenance, material identification and documentation, supplemental excavation during pre-

- certification, seeding, stabilization of exposed excavated areas, and dewatering.
3. Integrated schedule for impacted material excavation with Contractor's Project Schedule as specified in Part 6, for the excavation, including loading, hauling and unloading, and excavation related activities showing sequence, duration, critical activities, resources for each activity, equipment, number of crews and crew size, and start and completion date of each activity.
 4. Coordination of personnel and equipment in the excavation areas.
 5. Technical approach to construct and regrade SP-7 into separate Above-WAC Tc-99 and Above-WAC Uranium areas, areas to include construction of SP-7 berm in the Above-WAC Tc-99 area in which to place and stabilize (if required) Above-WAC digester sludge and Above-WAC Tc-99 soil.
 6. Methods for stabilizing Above-WAC digester sludge with Above-WAC Tc-99 soil within the STP area. Loading and hauling material to SP-7 (including spill prevention and control) and further stabilizing (if required) within SP-7.
 7. Methods for the excavation, management, loading, segregation, transfer, and staging of Special Materials, Above-WAC Tc-99 Material, Above-WAC Uranium Material, Above-WAC sludge cake, and Above-WAC digester sludge. Provide specific details to address separation of Above-WAC sludge cake, Above-WAC digester sludge and geotextile separating the two materials.
 8. Methods for loading, hauling and unloading methods for the Above-WAC Technetium-99 Material, Above-WAC Uranium Material and Above-WAC digester sludge to the SP-7 Stockpile including:
 - a. Inclement weather operations.
 - b. Spreading, grading, and compaction.
 - c. Maintenance of surface conditions and drainage.
 - d. Temporary shutdown and work stoppage.
 - e. Methods to prevent haul equipment tires from coming in contact with Above-WAC Material.

9. Methods for loading, containerizing, and hauling of the Above-WAC sludge cake and associated debris to the Special Materials Transfer Area.
 10. Methods for loading, hauling, and unloading impacted materials to the OSDF.
 11. Location, sequencing, and construction of interim working stockpiles, if necessary.
 12. Sequencing construction of ditches and sumps.
 13. Methods for complying with the FEMP Plan PL-2194 for spill prevention, control, and countermeasures.
 14. Detailed methods and procedures for concrete and structure removal including the following:
 - a. Detailed method and sequence of dismantlement, including equipment to be used and rigging requirements.
 - b. Methods of sizing, including equipment to be used.
 - c. Methods for control of contaminants, including control of fugitive dust emissions during sizing activities to control visible dust emissions.
 - d. Methods of dismantling remaining railing, internal equipment and components such as valves, switches and other devices.
 15. Methods for excavation and removal of trickling filter media.
 16. Methods for utility excavation and removal.
 17. Methods for plugging pipe into manhole 176B.
 18. Methods for identification and handling of ACM.
 19. Technical approach for loading, hauling, and unloading methods for stabilized lead contaminated soils from AlPII to the OSDF as directed by the Construction Manager (optional excavation).
- C. The Asbestos Abatement Safe Work Plan shall be in accordance with Part 7, Contractor Safe Work Plan Format Requirements, and Part 8, Asbestos Abatement Safe Work Plan Requirements. The plan shall include the following information:
1. The location and layout of storage and queing areas.

2. The method of applying poly sheeting, encapsulants, and or surfactants.
 3. The detailed methods of removal of the ACM. The descriptions of methods shall include methods to be employed to ensure the ACM is removed without cutting, abrading, or breaking.
 4. A detailed description of the methods to be employed to prohibit visible emissions in the work area.
 5. Description of the portable HEPA ventilation system, the containerization of removed asbestos debris, and the method of treating broken or damaged ACM.
- D. Prior to initiation of the work, the Contractor shall submit the following OSHA-required documentation for Asbestos Removal Contractors to FDF:
1. Documentation of training for workers, supervisor, and project designer.
 2. Medical surveillances.
 3. Respirator fit-test
 4. Employee exposure assessments
- E. Provide copy of notification to Ohio Department of Health (ODOH) (for asbestos work) five days prior to submittal to the Construction Manager for review and approval.
- F. Catalog cuts for Herculite.
- G. Catalog cuts and MSDS for non-shrink grout.
- H. Technical documents for mechanical and/or inflatable plug, if utilized.
- I. Technical documents for bedliners, diapers and other spill control devices.

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1.5 EXISTING CONDITIONS

- A. Prior to the start of excavation of impacted material, examine and verify the existing conditions as specified in Section 02050.

1.6 HEALTH AND SAFETY REQUIREMENTS

- A. Environmental Health, Safety, and Training requirements shall be as specified in Part 8 of the Contract Documents.

1.7 DEFINITIONS

- A. Impacted Material: Impacted material is defined as material placed by previous Department of Energy (DOE) operations and soil and debris with contaminant levels above the established Final Remediation Levels (FRLs).
- B. OSDF material categories: Categories into which the Contractor shall segregate impacted material as defined in the tables attached to this Section.
- C. Unclassified Impacted Material: Unclassified impacted material is defined as impacted material encountered during excavation, regardless of type, character, composition, and condition thereof, not otherwise specified in this Section. Categories of unclassified impacted material shall be as specified in the IMPP for the OSDF. Unclassified impacted material also includes debris encountered during excavation.
- D. Debris: Debris consists of impacted material such as construction materials, concrete, asphalt, steel rebar, ACM, trickling filter media, fencing and other materials not defined as a Special Material. Criteria for debris shall be as specified in the IMPP and WAC Attainment Plan for the OSDF.
- E. Above-WAC Uranium Material: Soil, soil mixed with debris, debris, or soil-like impacted material with total uranium concentrations above the OSDF total

Uranium WAC or any other material that does not meet the OSDF WAC because of Uranium concentrations.

- F. Above-WAC Tc-99 Material: Soil, soil mixed with debris, debris, or soil-like impacted material with Tc-99 concentrations above the OSDF WAC or any other material that does not meet the OSDF WAC because of Tc-99 concentrations.
- G. Sludge cake and associated debris: Sludge cake and associated debris, including geotextile, located in the East Sludge Drying Bed below the digester. Associated debris is debris with non-removable sludge cake. This material is a Resource Conservation and Recovery Act (RCRA) listed hazardous waste and above OSDF WAC.
- H. Above-WAC digester sludge: Sludge located in the STP Digester, East Sludge Drying Bed and west chamber of the Primary Sedimentation Tank.
- I. Stabilized Above-WAC digester sludge: Above-WAC digester sludge that has been mixed with Above-WAC Tc-99 soil in the STP area. Stabilized Above-WAC digester sludge shall be transported to SP-7.
- J. Special Material: Impacted material which requires special handling as listed below and further defined in Attachment 1:
 - 1. Nonpressurized containers, including drums, boxes, cans;
 - 2. Pressurized containers;
 - 3. Non-soil residues, including green salt, black oxide, orange oxide, sump cake and materials greater than 200,000 dpm;
 - 4. Transformers and electrical equipment;
 - 5. Lead acid batteries;
 - 6. Uranium metal, including derbies, ingots and irregularly shaped scrap;
 - 7. Medical/infectious waste;
 - 8. Tires;
 - 9. Miscellaneous debris, including oil and air filters, personal protective equipment (PPE),

- radiators, tools, heavy equipment, office materials and documents, and lead flashing.
10. Brick.
- K. Piping: Piping, conduit and appurtenances (pumps, valves, etc.).
- L. Sediment: Sediment material accumulated in ditches and in erosion and sediment control structures, excluding those accumulated from the STP Backfill Borrow Area, shall be managed as defined in this Section.
- M. STP Access Road: The STP Access Road is an existing asphalt road of which a section shall be removed after STP excavation, soil stripping, and trench backfill activities have been completed. The location of the road removal is shown on the Construction Drawings. For purpose of bid, the Contractor shall assume a typical section of 6 inch crushed stone base overlain by a 2 to 4 inch asphalt layer and as shown on the Construction Drawings.

PART 2 PRODUCTS

2.1 MATERIALS

- A. The Construction Manager will furnish metal boxes, lids, and fastening hardware at the Contractor's clean laydown area for containerizing Above-WAC sludge cake and associated debris. The Construction Manager will have previously prepared containers for loading per site procedures. Each box shall be approximately 4' by 4' by 7' and weigh approximately 1,100 pounds when empty.
- B. The Construction Manager will furnish materials, equipment, and personnel for radiological characterization and monitoring of impacted material.
- C. Signs for radiological control areas and certified areas will be furnished by the Construction Manager.

Sign posts shall be provided and installed by the Contractor.

- D. Contractor shall provide 20 mil sheets of Herculite or equivalent for loading areas within the STP area.
- E. Provide diapers, bed liners and/or other materials as required to prevent spillage of free liquids from stabilized Above-WAC digester sludge during loading and hauling.
- F. Grout Plug: Grout plug shall be constructed of non-shrink grout. Non-shrink grout shall be Masterflow-928 by Master Builders, Inc., or equivalent approved by the Construction Manager.
- G. Pipe Plug:
 - 1. Mechanical plug shall be compression-type, without bypass, suitable for permanent seal as manufactured by CHERNE Industries, Inc. or approved equivalent, or
 - 2. Inflatable plug shall be non stretch, Kevlar matting imbedded in neoprene, without bypass, suitable for permanent seal as manufactured by Zumro, Inc. or approved equivalent.
- H. ODOT Item 304: As specified in Section 02206.
- I. Rope fence shall be 3/8 inch yellow nylon.
- J. Deliver materials in original, new, and unopened containers bearing manufacturer's name, label, and the following information:
 - 1. Name or title of material.
 - 2. Manufacturer's stock number and date of manufacture.
 - 3. Manufacturer's name
 - 4. Thinning and application instructions.
Encapsulants shall be as specified by the following:
 - a. Childers - CP-240 CHIL-LOCK.
 - b. Certified Technologies - Certane 2050.

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- c. Expert Environmental Products - EPPCO #1.
- d. International Protective Coatings - Serpiloc.
- e. Or approved equivalent.

Note: Encapsulants shall have a coloring agent or dye so that, when applied, there is obvious verification that a coating has been applied.

F. Deliver materials in original, new, and unopened containers bearing manufacturer's name, label, and the following information:

- 1. Name or title of material.
- 2. Manufacturer's stock number and date of manufacture.
- 3. Manufacturer's name
- 4. Thinning and application instructions.

Surfactants:

- a. Childers CP-225 CHIL-SORB
- b. Certech.
- c. Expert Environmental Products
- d. International Protective Coatings Corp.

G. Fiber-reinforced polyethylene or polyester sheeting approved for outdoor storage: color, yellow; minimum thickness of 6 mils; ultraviolet resistant, as manufactured by Griffolyn or Herculite for packaging of ACM.

2.2 EQUIPMENT

A. Provide equipment of size and type to excavate, size reduce, load, haul, and unload impacted material to meet the Contract requirements. Haul equipment must be equipped with placard carriers and mounted sealable PVC tubes to serve as manifest carriers. Equipment used for excavating impacted material shall be clearly marked. The Construction Manager will provide signs stating "Radioactive Material" in accordance with FEMP Procedure RP-00100.

B. Provide equipment of size and type to excavate, load, haul, unload, place, manage, and compact Above-WAC Tc-

99 Material and Above-WAC Uranium Material from the STP to the SP-7 Stockpile area.

- C. Equipment used to haul impacted material over the existing Southern Waste Units (SWU) Impacted Material Haul Road, STP Haul Road, OSDF Impacted Material Haul Road, and OSDF Borrow Area Haul Road as shown on the Construction Drawings shall be equal to or less than the gross vehicle weight, tire pressure and axle loading for a Caterpillar CAT D300E truck (gross vehicle weight of 106,700 pounds, tire pressure of 60 psi, and axle load of 37,400 pounds). Pavement width of the existing two-way SWU Impacted Material Haul Road is 24 feet. Select equipment and equipment width to ensure safe operation on this road.
- D. SP-7 shall be divided into separate Above-WAC Uranium and Above-WAC Tc-99 areas. Provide equipment to regrade and maintain SP-7 stockpile for duration of placement operations.
- E. Provide equipment to handle, mix and stabilize the Above-WAC digester sludge to reduce free liquids to acceptable levels. Equipment shall be capable of thoroughly mixing the materials for stabilization.
- F. All excavation and haul equipment shall have enclosed cabs. Enclosed cab is defined as equipment cab isolated from outside environment (intact windows, doors, panels and floors surrounding driver with all windows and doors shut) which provides a barrier from intrusion of outside airborne particles. Any HVAC (heating, ventilating or air conditioning) units associated with the equipment cab must not provide a direct path for outside air. Air conditioned cabs shall either recirculate air within the cab or HEPA filter external air entering the cab.
- G. Provide water tank trucks, tank trucks for the dust suppressant/crusting agent, portable tanks, pressure distributors, or other equipment designed to apply water, dust suppressant and crusting agent uniformly

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and in controlled quantities to variable surface widths to provide dust suppression/erosion control as required in Part 6.

- H. Provide, install and maintain piping, valves, tanks and appurtenances as necessary to utilize the OSDF Construction Water Well as shown on the Construction Drawings.
- I. Provide portable wash equipment to wash vehicle tires and vehicle exteriors prior to entering haul roads, as necessary.
- J. Trucks used for hauling of the impacted material shall be equipped with automatic load cover tops.
- K. Provide stump grinder or other equipment to size reduce stumps.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Provide documentation of material movements per the Construction Drawings (Material Tracking Plan and FEMP procedure EW-1022).
- B. Continuously observe excavations and utility removal trenches. Stop excavation in the area and immediately notify the Construction Manager when Special Material or unidentified utilities are encountered.
- C. The Construction Manager and regulatory agencies may collect impacted material samples from the excavation, haul equipment and in the OSDF at any time during the project.
- D. During excavation, segregate materials by category (See Attachment 1) and maximize volume of Category 1 material. Size reduce material to meet physical WAC specified in IMPP.

- E. Stump Grinding in Impacted Areas: Grind stumps or otherwise size reduce to a minimum depth of 12 inches below grade or to the bottom of the root-mass, within 18 inches of the stump in all horizontal directions. Grind wood chips in pieces generally smaller than 12 inch dimensions. Excavate and dispose of ground stump wood chips with the surrounding soils. The volume of organic material shall be less than 20 percent of the volume of the truck, as determined by visual observation by the Construction Manager.
- F. Impacted material interim working stockpiles shall be located within the limits of A1PII as approved by the Construction Manager. Interim working stockpiles shall be removed within a maximum of thirty (30) calendar days.
- G. Blasting, including use of explosives or explosive devices, is not permitted.
- H. Unexpected discovery of cultural resources: Upon the unexpected discovery of any object suspected to be historic, prehistoric, or archeological site, feature or object, immediately cease ground disturbing activities around the find and contact the Construction Manager.
- I. The following requirements shall apply to equipment for excavating, stabilizing, mixing, handling, loading, segregating, size reducing, hauling, and unloading for impacted material:
1. Equipment shall be kept within the boundary of the area being worked during non-work periods.
 2. Equipment shall not be permitted to leave the radiological controlled, Above-WAC excavations or lead contaminated areas (optional) until equipment decontamination activities are completed by the Contractor and radiological survey of the equipment is approved by the Construction Manager for the radiation control areas and for the lead contaminated areas (optional). The automatic cover shall be in place during all periods of

equipment movement on-site, whether empty or full. Loaded equipment shall be covered at all times.

J. Loading requirements:

1. During loading, haul equipment shall be loaded in a buffer area that will be maintained administratively by the Construction Manager as an area between the controlled excavations and the radiologically non-controlled area outside the STP boundary. The buffer area shall consist of existing paved areas within the STP. Buffer areas will be delineated in the field. The Contractor shall not access the buffer area directly from the active excavation areas. Contractor shall install T-posts at the boundary between the buffer area and excavations. The Construction Manager will install rope fence on the T-posts. The Contractor shall keep the buffer area clear and free of dirt and mud.
2. During loading, haul equipment shall remain in the buffer area and on asphalt pavement to the extent practical.
3. During loading, loading equipment shall be in the excavation area, outside the buffer area. Loading equipment shall load the haul equipment by reaching over and into the buffer area and dumping directly into the haul equipment.
4. Haul equipment shall be loaded in a manner that prevents spillage and accumulation of impacted material on the wheels and components of haul equipment. Remove all visible material that accumulates on exterior of truck.
5. If spillage occurs, or at the discretion of the Construction Manager, the buffer area may be covered with a 20 mil sheet of Herculite or approved equivalent.
6. The Construction Manager will inspect and monitor haul equipment in the buffer area. The Construction Manager will allow haul equipment to move after monitoring indicates that the equipment is not contaminated. The Contractor should allow 15 minutes for scanning of each piece of dry haul

equipment if no contamination is found. Working in rain and/or wet weather will increase scanning time.

7. If radiological contamination is found on the outside of haul equipment, the Contractor shall wash the equipment within the buffer area (with low volume, high pressure washer or approved equivalent). Construction Manager's radiological surveys of the exterior of haul equipment must be made on dry surfaces. Drying time will delay scanning. Contractor shall allow 60 minutes for scanning for each piece of equipment that is washed with water; This shall include trucks exiting the OSDF Equipment Wash Facility. Wash water shall be collected in the STP excavation sumps.
8. The Contractor may use multiple loading areas within the buffer area at any one time.
9. Haul equipment shall be loaded so as to minimize load shifting during transit.
10. Haul equipment shall be loaded to minimize spillage during loading. Material shall be loaded to be below the top of the bed.
11. Prior to loading and hauling, all material designated for the OSDF, shall be void of free liquid under the guidelines of the EPA Paint Filter Test (EPA SW 846 Method 9095). The Construction Manager reserves the right to perform an EPA Paint Filter Test at any time. Any material that fails the Paint Filter Test shall be reworked as directed by the Construction Manager.

K. Hauling requirements:

1. The Construction Manager will perform radiological monitoring before equipment is released from the loading area. If monitoring results indicate contamination, haul equipment shall be decontaminated by Contractor prior to leaving the loading area.
2. During off work hours and when not in use, park haul equipment in the buffer area or other areas designated by the Construction Manager.

3. Upon exiting the OSDF haul equipment will be decontaminated and radiologically monitored by others at the OSDF Equipment Wash Facility.
 4. Haul equipment shall remain on haul roads designated on the Construction Drawings. Equipment that enters these roads shall not be allowed to exit, except at the OSDF, STP Excavation Area, SP-7 Stockpile Area, other stockpiles, and/or Special Material Transfer Area without approval by the Construction Manager.
 5. Operation of tracked equipment is prohibited on the SWU Impacted Material Haul Road and North Entrance Road.
- L. Perform stabilization of excavated areas using crusting agent or seeding in accordance with Sections 02270 and 02900, respectively.
- M. Tolerances for excavation depths as shown on the Construction Drawings shall be 0 to +6 inches of over excavation. Tolerances for excavation of impacted surface soil (i.e., excavation depth of six (6) inches) shall be 0 to +6 inches of over excavation.
- N. Immediately notify the Construction Manager if any material suspected of or known to contain asbestos is encountered. Move excavation to another location at no additional cost to FDF until asbestos work is approved to proceed:
1. When applicable, the Contractor shall notify the Ohio Department of Health (ODOH) and FDF shall notify the EPA and all other applicable governmental agencies before the start of work.
 2. The Contractor shall adhere to and comply with work practices and procedures set forth in the most current and applicable Federal, State, and local codes, regulations, and standards.
 3. The Contractor shall obtain certifications and licenses if ACM becomes friable.

3.2

ABOVE-WAC MATERIAL EXCAVATION

- A. Prior to initiating excavation activities, survey and stake limits of Above-WAC Uranium and Above-WAC Tc-99 areas, shown on the Construction Drawings, in accordance with Section 02050.
- B. Prepare SP-7 Stockpile Area to receive Above-WAC material. Requirements for unloading and stockpiling Above-WAC material at the SP-7 stockpile shall include:
1. Constructing ingress/egress to the stockpile, including access roads, ramps (separate ramp for Tc-99 and Uranium), and drainage improvements.
 2. Constructing separate unloading areas (Tc-99 and Uranium) that prevents haul equipment tires from coming in contact with the Above-WAC Material.
 3. Placing material in the stockpile at locations designated by the Construction Manager.
 4. Immediately repairing damage to the stockpile structures to the original condition (i.e., silt fence, perimeter fence, etc.) caused by the Contractor, at no additional cost to FDF.
 5. Applying crusting agent within seven (7) calendar days, upon completion of the stockpile or if the stockpile is to be inactive for more than forty-five (45) calendar days as specified in Section 02270. Dust suppressant shall be in accordance with Part 6 and the approved Fugitive Dust Control Plan.
 6. Compacting/sealing the surface of the stockpile in use at the close of each work day to prevent fugitive dust and runoff.
 7. Ensuring that equipment and material used in placing and managing Above-WAC impacted material in either the SP-7 Uranium or Tc-99 areas is not be removed from either area without the approval of the Construction Manager. Equipment shall not be removed from either area before washing. Equipment washing shall be performed within the SP-7 Stockpile Area. --Wheels, tires, undercarriage and body of equipment shall be washed free of visible mud, dirt and debris.

8. Stockpile side-slopes shall not exceed a maximum slope of 3H:1V and a height to base ratio 0.2.
- C. Perform Above-WAC digester sludge excavation and stabilization.
1. Stabilization shall occur in the Primary Sedimentation Tank and/or digester. Stabilization shall include placing material in the stabilization stockpiles and mixing with soil. Provide geomembrane liner and/or other methods to prevent contamination of adjacent WAC material during excavation and stabilization activities.
 2. Soil shall be added at a ratio of 2 parts digester sludge to 1 part Above-WAC Tc-99 soil. Thoroughly mix materials with auger or other mixing equipment.
 3. Add Above-WAC Tc-99 material to reduce free liquids.
 4. Transport to SP-7 using spill prevention measures in accordance with this Section.
 5. Mix additional Above-WAC Tc-99 soil, as required, to meet guidelines of the EPA Paint Filter Test (EPA SW 846 Method 9095).
- D. Excavate Above-WAC Tc-99 areas to a depth of six (6) inches and mix with digester sludge or haul directly to SP-7.
- E. Above-WAC Sludge cake
1. After excavating Above-WAC digester sludge from within the Sludge Drying Bed, remove the geotextile and excavate the sludge cake from the Sludge Drying Beds. Depth is anticipated to range from zero (0) to six (6) inches, actual limits of sludge cake will be determined by the Construction Manager in the field. Excavate sand filter layer and gravel base layer as unclassified impacted material. Cross-section of Sludge Drying Bed is as shown on the Construction Drawings.
 2. Construction Manager will deliver metal containers with lids and hardware to the Contractor's clean laydown area. The Construction Manager will have

previously prepared containers for loading per site procedures. Notify the Construction Manager fourteen (14) days prior to the start of excavation for delivery of containers. Load the sludge cake and geotextile into metal containers and haul to the Special Material Transfer Area. The Construction Manager may sample the material prior to the Contractor fastening the container lids and hauling to the Special Material Transfer Area. The containers shall be loaded and fastened per FEMP PT-0007.

3. Loaded containers shall not exceed 9000 pounds in gross weight. Contractor shall estimate weight using volume and density. The sludge is expected to have bulk unit weights ranging from 90 to 125 pounds per cubic foot (pcf).
 4. Clean the exterior of loaded containers for monitoring by the Construction Manager prior to hauling to the Special Material Transfer Area.
- F. Excavate Above-WAC Uranium areas to a depth of six (6) inches and haul to SP-7. Allow two dry working days for monitoring by the Construction Manager prior to excavating beyond the depth of six inches.
- G. During excavation of Above-WAC material, maintain adjacent areas at a higher elevation than the Above-WAC area such that no stormwater from the Above-WAC excavation drains over adjacent areas. Loading area shall be graded to drain into the Above-WAC excavation or the STP deep excavation.
- H. Maintain sumps within the Above-WAC excavation to collect water encountered during excavation and to prevent runoff of water onto adjacent areas. Water collected in these sumps shall be pumped to the Primary Collection Sump and then to the STP Excavation Sump as shown on the Construction Drawings.
- I. Management of Above-WAC materials associated with utility removal shall be as specified elsewhere in this Section.

- J. The bottom 4 feet of manhole 175 and sediment contained therein is Above-WAC Tc-99 material and shall be excavated and hauled to SP-7.

3.3 UNCLASSIFIED IMPACTED MATERIAL EXCAVATION

- A. Select equipment and excavation methods to minimize obstruction of continuous visual observation of the excavation by the Construction Manager.
- B. Excavate the Stripping Areas outside the STP Deep Excavation Boundary to a depth of six (6) inches using standard excavation techniques as shown on the Construction Drawings and haul to the OSDF as Category 4 material.
- C. After excavation of Above-WAC material, excavate to the STP deep excavation boundary. All underground pipelines and underground utilities shall be excavated and removed as they are encountered as specified herein. The excavation shall proceed using standard excavation techniques to the lines and grades shown on the Construction Drawings. Contractor shall refer to the Technical Reference Document for information on the STP Area. In no case will the Contractor be paid for over excavation without written approval from the Construction Manager.
- D. If unexpected Above-WAC or Special Materials are encountered, stop excavation, notify the Construction Manager, and move the excavation operation to another location as directed by the Construction Manager.

3.4 STRUCTURE REMOVAL AND TRANSPORT

- A. Dust control shall be in conformance with Part 6 and the Fugitive Dust Control Plan.
- B. Prevent damage to any adjacent structures, materials, and equipment including underground utilities that are to remain intact, or those installed for performance of this work.

- C. All lifting and rigging required shall be in accordance with FEMP RM-0045, FDF Hoisting and Rigging Manual.
- D. Size reduction shall be in accordance with Attachment 1. If torch-cutting painted materials, an eight inch strip shall be removed in the area of the cut prior to torch cutting.
- E. All structural material will be loaded in bulk and hauled to the OSDF in accordance with this section, including chain link fencing, posts, gates and appurtenances. Chain link fence fabric shall be reduced to ten foot maximum length sections.
- F. Structural removal shall also include all handrails, equipment or other appurtenances attached or affixed to the concrete.

3.5 UTILITY REMOVAL

- A. Piping removed shall be visually monitored by the Construction Manager during excavation. Piping visibly stained with process related waste or having process related waste clinging to it, as determined by the Construction Manager, shall be size reduced and containerized as Above-WAC debris per FEMP procedure PT-0007. Filled containers shall be transferred to the Special Materials Transfer. All other piping shall be size reduced per Attachment 1 and disposed in the OSDF, unless otherwise directed by the Construction Manager.
- B. All utility lines indicated to be abandoned shall be excavated as indicated on the Construction Drawings. All utility lines indicated to be removed will have been capped, drained, purged and plugged prior to removal. Notify Construction Manager and stop work if material is encountered in utility lines. All soil material, pipe materials and bedding materials removed during excavation of utilities, with the exception of FT and SN lines, shall be considered impacted material.

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Construction Manager may obtain grab samples of the material during excavation. The Contractor shall provide labor and equipment to assist in collection of soil samples from sides and bottom of utility trenches.

- C. Backfill utility lines outside the STP Deep Excavation boundary as specified in Section 02206.
- D. If utilities within the STP deep excavation boundary are deeper than the proposed excavation limits indicated on the Construction Drawings, excavate the utilities to a maximum depth of 6 inches below the pipe and pipe bedding. Trench side slopes shall be excavated on a two horizontal to one vertical slope.
- E. Utility poles shall be size reduced to a maximum length of ten feet.
- F. For the FT and SN lines, excavate trench backfill to the top of the pipe bedding material. The material above the pipe bedding shall be handled as unclassified impacted material. Allow seven (7) working days for the Construction Manager to sample and analyze the pipe bedding material. The pipe and bedding material shall then be excavated and dispositioned in the OSDF, SP-7 or placed in containers in the Special Materials Transfer Area as directed by the Construction Manager.

3.6 PLUGGING MANHOLE 176B

- A. Water typically discharges through Manhole 176B on a continuous basis. In order to assist the Contractor in plugging of the storm drain (ST-20") in Manhole 176B, The Construction Manager will reduce flow through this manhole for a maximum of 4 hours. The Contractor shall give the Construction Manager a minimum of 3 weeks advance notice to schedule a reduction in flow.
- B. Grout plug shall be mixed in accordance with manufacturer's recommendations.

- C. After grout plug has been installed and after removal of the remainder of the storm drain, backfill the area within 18 inches of Manhole 176B with ODOT Item 304 as directed by the Construction Manager. Remainder of excavation shall be backfilled with trench backfill material in accordance with Section 02206.

3.7 REMOVAL OF SEDIMENT

- A. Notify Construction Manager two (2) weeks prior to removal of sediment and debris in ditches and erosion control devices. Construction Manager will sample and test sediment in ditches and at erosion and sediment control measures prior to removal.
- B. Remove accumulated sediment from existing ditches and erosion and sediment control measures as described in Section 02270 or as directed by the Construction Manager.
- C. Haul removed sediment to the OSDF as unclassified impacted material unless otherwise directed by the Construction Manager.
- D. Sediments accumulated in SP-7 shall be excavated, collected and placed in the Above-WAC Tc-99 area of SP-7

3.8 STOCKPILE EXCAVATION

- A. Excavation of existing stockpiles NAR-007 and OSD-007 shall proceed to an elevation 6 inches below the original surface grade, followed by pre-certification monitoring by the Construction Manager. Original surface grade shall be considered the ground surface of the surrounding area at the base of the stockpile. Excavated material from the stockpiles shall be considered unclassified impacted material and hauled to the OSDF.
- B. Construct/install temporary wheel wash facility (gravel wash pad and portable spray equipment), as shown on the

Construction Drawings, to wash haul vehicles prior to entering the North Entrance Road and OSDF Borrow Area Haul Road.

- C. Temporary culverts, access ramps, wheel wash facilities and fencing shall be in place prior to excavation and shall be removed after pre-certification or as directed by the Construction Manager.
- D. Remove gravel road from west and north sides of OSD-007.

3.9 **SPECIAL MATERIAL EXCAVATION**

- A. Special Materials identified during excavation shall be excavated, segregated, handled in accordance with Attachment 1, and staged at the Special Materials Transfer Area or as directed by the Construction Manager.
- B. The Construction Manager will be responsible for final disposition of the Special Materials.
- C. Special Materials Transfer Area shall be located as shown on the Construction Drawings.

3.10 **SUPPLEMENTAL EXCAVATION AND PRE-CERTIFICATION**

- A. After excavation is completed in an area to the limits shown on the Construction Drawings, the Contractor shall survey the excavated area in accordance with Section 02050. After survey, the Construction Manager will perform monitoring to pre-certify the areas as having attained FRLs. The Construction Manager will take up to ten (10) calendar days to perform monitoring of an area. If the monitoring indicates an area has not attained FRLs, perform supplemental excavation as directed by the Construction Manager until FRLs have been attained.
- B. After pre-certification has been achieved, install rope fencing along the perimeter of the pre-certified area

as directed by the Construction Manager and maintain erosion controls and drainage in the area. The Construction Manager will install signs.

- C. Supplemental excavation shall be considered as Unclassified Impacted Material excavation unless otherwise directed by the Construction Manager.

3.11 EXCAVATION AND REMOVAL OF ROAD

- A. Remove STP Access Road from support area to STP, including crushed stone base as shown on the Construction Drawings and haul to OSDF.
- B. Remove STP Haul Road and geotextile fabric and haul to OSDF.

3.12 ASBESTOS CONTAINING WASTE MATERIAL

- A. FDF has provided the necessary notification of these activities as required by OAC 3745-20. The OSDF is an active asbestos waste disposal site in accordance with OAC 3745-20-06.
- B. The Contractor shall be responsible for:
 - 1. Adherence and compliance to work practices and procedures set forth in applicable federal regulations (CFR) and state codes (OAC).
 - 2. Ensuring Contractor's (inclusive of Subcontractor) employees are informed of the presence of ACM in the project work area(s) in accordance with 29 CFR 1926.1101(d) and OAC 3745-20-06(B)(4).
 - 3. Establishing a restricted area adequate to deter the entry of unauthorized personnel within 100 feet of the ACM work areas in accordance with OAC 3745-20-06(B)(4) and 29 CFR 1926.1101(k)(8).
 - 4. Obtaining required training as defined in Part 8, 29 CFR 1926.1101(k)(9) and 29 CFR 1926.1101(o)(4).
 - 5. Dust control in accordance with Part 6 and the Dust Control Plan.

6. Using wet methods and other work practices and engineering controls to prevent creation of visible asbestos emissions during handling of ACM.
 7. Personal air monitoring in accordance with 29 CFR 1926.1101(f) including sampling necessary to complete initial exposure assessment.
- C. The Contractor shall ensure an asbestos competent person is on-site anytime ACM is being disturbed, excavated, handled, loaded, hauled, or unloaded.
- D. Contractor shall use the following project specific handling methods:
1. ACM, which is determined not to be friable or to have the potential to become friable (non-friable ACM), shall be considered as unclassified impacted material and shall be excavated, loaded, hauled and unloaded as specified in this Section.
 2. ACM, which is determined to be friable or to have the potential to become friable (friable ACM), as well as pieces of transite panels greater than 12 inches in greatest dimension, shall be considered ACM and shall be either wetted with amended water (water mixed with surfactant) or encapsulated, and separated from the impacted material.
 3. Care shall be taken so that the ACM does not break or crumble during handling. In the event that it breaks or crumbles during handling, encapsulate the exposed surfaces.
 4. ACM components meeting the OSDF Waste Acceptance Criteria (WAC) physical size criteria and removed intact in large pieces shall be wrapped in two layers of polyethylene sheeting, secured with duct tape, and labeled in accordance with OAC 3745-20-05(C)(2). Multiple pieces may be grouped prior to wrapping, provided WAC physical size criteria are still met.
 5. Surfactants or encapsulants shall be applied during sizing of any large pieces of ACM to meet the OSDF WAC physical size criteria.
 6. Pieces of ACM not conducive to wrapping shall be bagged in a polyethylene bag, sealed, bagged in a

second polyethylene bag, sealed, and labeled in accordance with OAC 3745-20-05(C)(1) & (2) and 29 CFR 1926.1101(k)(8).

7. ACM with sharp-edged components (e.g., nails, screws, metal lath, tin sheeting) capable of tearing the polyethylene bags or sheeting shall be handled as follows:
 - (a) Pad or wrap and secure the sharp-edged components in a manner to prevent tearing of the polyethylene, then wrap or bag in accordance with the respective preceding entries.
8. Wrapped, bagged, or containerized ACM shall be segregated from other excavated material and staged on pallets. When a sufficient quantity for a segregated load is accumulated, it shall be loaded and hauled to the OSDF. Loads shall be prepared and secured to prevent any visible emissions, load loss, and spillage or leakage of liquids.
9. No ACM shall be left exposed at the surface of the excavation at the end of the work day.
10. Provide a personnel decontamination area adjacent to the Asbestos Regulated Area for HEPA vacuuming of anti-Cs and doffing of outer anti-Cs prior to workers proceeding to the Radiological Control Point Facility.
11. Contact the Construction Manager to obtain Asbestos Work Permit as described in Part 8.

E. Wrapped, bagged, or containerized ACM shall be unloaded in the OSDF as Category 5.

F. Each work day during disturbance, excavation, handling, hauling, loading, unloading or placement of ACM, the Contractor's asbestos competent person shall conduct a daily inspection of the ACM work area(s) and adjacent areas. If there is visual evidence of asbestos contamination (e.g., spills of ACM) outside the demarcated ACM work area(s), the Contractor shall take immediate action to abate the hazard. The incident

shall be reported immediately to the Construction Manager.

3.13 STABILIZED LEAD SOIL (OPTIONAL ITEM)

- A. Stabilized Lead contaminated soil, within boundaries shown on Construction Drawings, which has been stabilized by others, shall be excavated so as to remove all stabilized soil. Lead contaminated soil will be stabilized insitu (Option A) or in a stockpile (Option B) within the Trap Range as shown on the Construction Drawings.
- B. Load trucks in a manner that keeps the vehicle out of the excavation area or provide a method to load and haul clean. Excavation shall be planned to eliminate tracking of equipment from unexcavated areas or active excavation areas to previously excavated areas to prevent cross contamination. Use portable wheel wash as necessary to prevent tracking soil out of the work area.
- C. The material shall be hauled and unloaded in the OSDF as indicated on the Construction Drawings and as directed by the Construction Manager.
- D. Regrade and seed the areas excavated to provide non-erosive positive drainage upon written direction from the Construction Manager. This direction will be based on verification that all remediation requirements have been met in accordance with Section 02900.

END OF SECTION

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ATTACHMENT 1

MATERIAL SEGREGATION GUIDANCE

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Attachment 1 - Material Segregation Guidance Part 1 - OSDF Material Segregation Categories for Bulk Material

Profile No. ⁽¹⁾	OSDF Category No.	Category Description	Physical Requirements	Examples	Decision Process ⁽²⁾
91000	Category 1	Soil and soil-like	<ul style="list-style-type: none"> o Any hard agglomerations ≤12" o Other than till or ash, at least 80% of particles finer than 1" * ⁽³⁾ o Compatible using standard construction equipment * 	<ul style="list-style-type: none"> o Fly ash o Majority of OU2 and OUS soils 	<p>[1] Evaluate impacted soil and soil-like material for Category 1. If it fails, proceed to Category 2.</p>
92000	Category 2	Materials that can be transported, placed, spread and compacted <i>in masse</i> , and meet the size criteria	<ul style="list-style-type: none"> o Irregularly shaped metals & finish/superstructure components ≤10' long and 18" thick o Concrete reinforcement bars cut within a nominal 12 inches of the mass o General building rubble (concrete, masonry, similar materials) - ≤10' long and 18" thick o Equipment - drained of all oils and liquids o Piping ≥12" diameter - split in half o Intact drums must be empty and crushed (P) ⁽⁴⁾ o D&D project debris may not include acid brick (P) o Material from soil excavations may not include any brick (P) o Transformers must be crushed or filled with grout (P) ⁽⁵⁾ o Moderately compactible using Caterpillar D-8 dozer or 815C compactor type equipment * 	<ul style="list-style-type: none"> o Broken-up concrete foundations o Soil mixed with broken-up concrete o Other debris not requiring individual placement (see Category 3) o General building rubble, e.g., drywall, HVAC systems, electrical systems, plumbing systems, minor equipment 	<p>[2.a] Evaluate impacted soil and soil-like materials for Category 2. If it fails, proceed to Category 5.</p> <p>[2.b] Evaluate impacted debris for Category 2. If it fails, proceed to Category 3.</p>
93000	Category 3	Materials that require individual handling and placement, and meet the size criteria	<ul style="list-style-type: none"> o Height ≤4' o Rectangular shaped o Concrete protrusions ≤18" o Void spaces ≥1 ft³ filled with cohesionless material or a quick set grout o Concrete reinforcement bars cut within a nominal 12 inches of the mass o Equipment - drained of all oils and liquids o Transformers must be crushed or filled with grout (P) o Suitable for having soil/soil-like material placed around/against them * o Not compactible with standard compaction equipment * 	<ul style="list-style-type: none"> o Equipment 	<p>[3] Evaluate impacted debris for Category 3. If it fails, proceed to Category 5.</p>
94000	Category 4	Materials with high organic content (e.g., humus or vegetation) or that are highly compressible	<ul style="list-style-type: none"> o Highly compressible * 	<ul style="list-style-type: none"> o Vegetation, i.e., trees, limbs, underbrush o Materials from the solid waste landfill o Lumber from building demolition 	<p>[4] Evaluate organic materials for Category 4.</p> <p>Note: Soils which contain organic materials should not be classified as Category 4. See Category 1.</p>

**Attachment 1 - Material Segregation Guidance
Part 1 - OSDF Material Segregation Categories for Bulk Material**

Profile No. ⁽¹⁾	Impacted Material Category No.	Category Description	Physical Requirements	Examples	Decision Process ⁽²⁾
95000	Category 5	Materials that require case-by-case evaluation	<ul style="list-style-type: none"> o Regulated ACM - Double-bagged (or equivalent) and delivered unmixed with other material o ACM brick and commingled debris - double-contained and segregated from other materials o ACM insulated piping - delivered unmixed with other material o Equipment - drained of all oils and liquids o Transformers must be crushed or filled with grout (P) 	<ul style="list-style-type: none"> o Double bagged asbestos o ACM insulated pipe o Sludges 	[5] Submit a request for disposal (RFD) to OSDF. Note: At this time, the OSDF does not anticipate accepting oversized debris under Category 5.

- (1) Each of the listed Profile numbers represents a root Impacted Material Category waste stream. Numeric extension Profiles (e.g. 91001, 91,002...95,999) will be used to facilitate further delineation of waste streams, on an as-needed basis.
- (2) The selection of the appropriate category is a process of elimination beginning with Category 1. The majority of impacted material will be Category 1, second largest volume being Category 2, with the majority of the remainder being Category 3. Category 4 has limited applicability. Category 5 is for material that requires a Request For Disposal (RFD) per EW-1021, "Preparation of a PWID Report".
- (3) Items marked with an asterisk (*) are primarily a material specification rather than WAC item. They are provided for information only.
- (4) Items marked with (P) reflect specific OSDF IMP Plan prohibitions. (P) indicates a high probability of applicability to the identified category. A complete list of prohibitions is provided in the Prohibited Items table.
- (5) Transformers and other types of debris may be classified under more than one OSDF material category, based on size.

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Attachment 1 - Material Segregation Guidance
Part 2 - Materials that Require Special Handling, Regardless of WAC Status

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Material	Examples	Protocols
Asbestos	Transite panels, floor tile, feeder cable, piping insulation	General: Unprotected ACM may not be staged in the excavation area. If delays are expected prior to OSDF disposition, containerize and transport to interim storage. Wrapped pipe: Size reduce, double bag or equivalent for OSDF Category 3 or 5. Pipe may be split axially or radially. Transite sheets: Band and manage as OSDF Category 3. Other ACM that meets OSDF Category 5: Double bag ACM that does not meet OSDF WAC: Containerize and transport to interim storage for off-site evaluation. Note: OSDF Category 5 is evaluated on a case-by-case basis. A Request For Disposal (RFD) is required.
Non-pressurized Containers	Intact drums, metal and wood boxes, cans	Intact containers: Visually inspect for leaks and indication of contents. Overpack or repack leaking containers prior to movement from area of discovery. If safety considerations allow, open container and record description of contents on Visual Inspection Form. Transport to interim storage for further evaluation. Empty containers: Crush or size reduce and manage as OSDF Category 2.
Pressurized Containers	Aerosol cans, freon containers, gas cylinders, propane tanks, fire extinguishers	General: Handle intact containers as though they contain material. Evaluate container integrity. Intact containers: Overpack and move to FEMP interim storage area for evaluation. If container is to be dispositioned in OSDF, it must be punctured, crushed or cut so that the interior is open to the atmosphere. Breached containers: Evaluate for OSDF Categories 2, 3 and 5. Category 5 is evaluated on a case-by-case basis and requires a RFD.
Piping and Pumps	Drain lines, sewer lines, process piping, pumps	General: Elevate one end of exposed pipe, cut, and empty flowable material into a container. Transport containers to interim storage for evaluation. Process piping: Cap and remove pipe after emptying. Evaluate piping for OSDF Category 2. Containerize any piping that requires off-site disposition. General piping: Cap and remove pipe after emptying. Manage as OSDF Category 2. Pumps: Remove after emptying. Manage as OSDF Category 2.
Non-soil Residues	Green salt, black oxide, sump cake	Field screen to determine radionuclide content. Segregate uranium-bearing residues, containerize, and transport to interim storage for evaluation. Stockpile non-uranium residues and evaluate for OSDF Category 1 or 5. Category 5 requires a RFD.
Transformers & other electrical equipment	Transformers, switch gears, capacitors	General: Segregate and evaluate to determine if contains fluids. Empty transformers: Manage as OSDF Category 2, 3, or 5. Fill void spaces greater than 1 cf. with flowable, cohesionless material or a quick set grout. Category 5 requires an RFD. Transformers containing fluids: Drain fluids into a container and transport to interim storage. Evaluate fluids for off-site disposition. Manage emptied transformer as described above.
Lead Acid Batteries	Forklift and cart batteries	Segregate, containerize and transport to interim storage for evaluation by WM&SP.

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**Attachment 1 - Material Segregation Guidance
Part 2 - Materials that Require Special Handling, Regardless of WAC Status**

Material	Examples	Protocols
Uranium Metal	Derbies, ingots, billets, irregularly shaped scrap	Segregate, containerize, and transport to interim storage area for off-site evaluation by WM&SP.
Medical/Infectious Waste	Syringes, vials	Evaluate on case-by-case basis for OSDF Category 5 (requires a RFD). Containerize and move to interim storage if field operations do not allow timely completion of this evaluation. Medical/infectious waste not meeting OSDF requirements will be containerized and transported to interim storage for off-site evaluation by WM&SP.
Miscellaneous Debris	Oil/air filters, radiators, cable/wire, tools, heavy equipment, office materials, documents	Evaluate on case-by-case basis for OSDF Category 5 (requires a RFD). Containerize and move to interim storage if field operations do not allow timely completion of this evaluation. Miscellaneous debris not meeting OSDF requirements will be containerized and transported to interim storage for off-site evaluation by WM&SP.
Tires	Tires from miscellaneous equipment	Containerize and transport to interim storage for off-site evaluation by WM&SP.

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**Attachment 1 - Material Segregation Guidance
Part 3 - Prohibited Items**

This table is based on summary information derived from the "Waste Acceptance Criteria Plan for the OSDF (WAC Plan)". The table summary is provided as a reference, only, and is not intended to be used in lieu of the WAC Plan. The user should refer to the WAC Plan for further detail or clarification.

PROHIBITED ITEM	EXAMPLES / COMMENTS
Off-site waste that was not generated as a direct result of FEMP remediation (e.g. FEMP analytical residual waste from off-site laboratories is permitted)	Categorically excluded by ROD. OSDF is designated for Fernald material only.
Lead bullets from the South Field Firing Range and the associated soil that is identified as RCRA characteristic.	Categorically excluded by ROD. Material from the South Field Firing Range that does not pass TCLP will be sent off-site for disposal.
Acid-resistant brick generated from OU3 facility D&D activities. (1)	Categorically excluded by OU3 ROD.
Process related metals (i.e., piping and equipment that does not pass visual inspection), as defined in the OU3 ROD	Categorically excluded by ROD. Examples include derbies, ingots, billets, and uranium scrap.
Product, residues, other special materials (e.g., uranium and thorium inventories) as defined in the OU3 ROD	Categorically excluded by ROD. Examples include green salt and black oxide.
Contents of Silos 1, 2, and 3 from OU4	Categorically excluded by ROD.
Concrete from OU4 Silos 1 and 2 that exhibits highly-elevated direct radiation fields	Categorically excluded by ROD. A definitive threshold criterion for identifying the affected concrete will be established as part of the Remedial Design for OU4.
Waste pit contents from OU1, including any debris found within the waste pits	Categorically excluded by ROD.
Waste pit covers and liners from OU1	Categorically excluded by ROD.
Solvent saturated soils	Categorically excluded by ROD.
RCRA toxicity characteristic soil from the six geographic areas designated in the OU5 ROD, as well as any other material types excavated from these areas (4)	Material must be treated to below characteristic level to qualify for OSDF placement.
Lead sheeting generated from facility D&D activities within the boundaries of Operable Unit 3	Lead sheeting is prohibited unless it has been treated.
Equipment >4' height	Equipment must be cut to meet Category 3, or request approval for disposition as Category 5.
Pressurizable gas cylinders that are still mechanically able to be pressurized	Must be non-pressurizable and meet size and void space requirements to qualify for OSDF disposal.

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Attachment 1 - Material Segregation Guidance
Part 3 - Prohibited Items

This table is based on summary information derived from the "Waste Acceptance Criteria Plan for the OSDF (WAC Plan)". The table summary is provided as a reference, only, and is not intended to be used in lieu of the WAC Plan. The user should refer to the WAC Plan for further detail or clarification.

PROHIBITED ITEM	EXAMPLES / COMMENTS
Intact drums	Drums must be empty and crushed.
Transformers	Transformers must be crushed, or filled with grout or another acceptable material. Used oil must be drained from all transformers.
Materials containing free liquids	Categorically excluded by OSDF IMP Plan. The intent of the exclusion of free liquids is to prevent contaminated liquid waste from being directly disposed in the OSDF. Materials that contain rainwater or, like sludges, that have an inherent moisture content are not prohibited.
Whole or shredded scrap tires	Categorically excluded by OSDF IMP Plan.
Used Oil	Categorically excluded by OSDF IMP Plan.
Planned blending	Dilution is not to be used to satisfy the WAC.
Material not meeting the physical WAC	Must be size reduced or repackaged to meet WAC, to qualify for OSDF disposal.
Soil and other materials from soil areas that exceed the chemical or radiological WAC	Soil and other materials that exceed the radiological WAC may not be dispositioned to the OSDF. Soil and other materials that exceed the chemical WAC, as generated, must be treated to meet the WAC to qualify for OSDF disposal.
Combustible liquids as defined in 29 CFR 1910.106 or flammable wastes as defined in Ohio Administrative Code 1301.7	Prohibited by OSDF Safety Assessment. Compliance with all other prohibitions will result in compliance with this safety requirement.

(1) Actual or suspected acid brick from the FEMP's soil excavation activities, including the excavation of the OU2 waste units, will be segregated from other debris during excavation and sent off site for disposal. The objective is to remove the vast majority of the brick (i.e., that brick which can be readily identified and safely removed during soil excavation and OSDF placement activities) to further minimize the chance that brick containing process residuals is placed in the OSDF

(2) POTENTIALLY RCRA CHARACTERISTIC AREAS IDENTIFIED IN OUS ROD:

- a Area between the KC-2 Warehouse and the adjacent railroad tracks (Remediation Area 3)
- b Trap Range (Remediation Area 1)
- c Paddy's Run streambank fill material, west of the Silos (Remediation Area 7)
- d Scrap Metal Pile (Remediation Area 3)
- e Area North of the Maintenance Building (Remediation Area 3)
- f Abandoned Sump West of the Pilot Plant (Remediation Area 4b)

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SECTION 02206
EARTHWORK

PART 1 GENERAL

1.1 SCOPE

This Section includes: Development and excavation of backfill and fill materials at the STP Backfill Borrow Area, excavation and placement of fill for ditch and berm, placement of backfill material in trenches excavated during utility removal outside of STP excavation area and for underground installation of Transfer Line, incidental earthwork and subgrade preparation for gravel parking area.

1.2 RELATED SECTIONS

- A. Section 02100 - Site Preparation.
- B. Section 02205 - Impacted Material Excavation and Handling.
- C. Section 02270 - Erosion and Sediment Control.
- D. Section 02506 - Aggregate Surface.
- E. Section 02900 - Seeding.
- F. Part 6 - Statement of Work.
- G. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 DEFINITION OF TERMS

- A. Earth Excavation: Removal of materials not classified as rock within limits shown on Construction Drawings.
- B. Unauthorized Excavation: Excavation not required by specifications or drawings or not authorized in writing by the Construction Manager.

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- C. Trench backfill: CL classified material obtained from the STP Backfill Borrow Area.
- D. Fill: Earth used to bring an existing grade to a specified grade.
- E. Undercutting: Removal of soft or undesirable materials determined by Construction Manager, encountered in undisturbed subgrade below grades specified for excavation.
- F. Shoring: A structure, such as a metal hydraulic, mechanical, or timber shoring system that supports sides of an excavation and which is designed to prevent cave-ins.
- G. Topsoil: Unless directed otherwise by the Construction Manager, topsoil shall be considered as the upper horizon extending from existing grade to a depth of 6 inches.

1.4 REFERENCES

- A. State of Ohio, Department of Transportation (ODOT): Construction and Material Specifications, January 1, 1997, except as supplemented or otherwise modified herein and/or shown on the Construction Drawings.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM D2487-93 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- C. Occupational Safety and Health Administration (OSHA), Code of Federal Regulations (CFR):
 - 1. 29 CFR 1926.650 Subpart P - Excavations, latest revision.
- D. *Geotechnical Data and Evaluation Report for Southeast Field Borrow Areas* [Parsons, 1998].

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1.5 SUBMITTALS

- A. Submit an STP Backfill Borrow Area Development Plan in accordance with Part 6.
- B. The STP Backfill Borrow Area Development Plan shall contain the details to develop the borrow area including: Plan of area to be developed, topsoil removal, depth and grading of anticipated excavation, surface water management, erosion and sediment control, topsoil stockpile management, and interim restoration. Plan shall also include a schedule outlining start dates and duration for earthwork activities.
- C. Submit for approval, name, address, and qualifications of an independent soil testing laboratory and resume of field technician. Provide copies of all lab/field soil tests performed by soil testing laboratory and contractor within seven (7) calendar days of obtaining samples for performing field test, or upon request by the Construction Manager.

1.6 PROJECT/SITE CONDITIONS

- A. Existing site surface and subsurface conditions, based on available site data, are indicated on the Construction Drawings and in the Geotechnical Data and Evaluation Report for Southeast Field Borrow Areas.
- B. The Contractor shall use the STP Backfill Borrow Area as the source of fill and backfill materials unless otherwise shown on the Construction Drawings. The STP Backfill Borrow Area is in a certified area.

1.7 QUALITY ASSURANCE

- A. Independent Soil Testing Laboratory:
 - 1. The Contractor shall arrange and pay for the services of an independent soil testing laboratory to perform the laboratory and on-site construction quality testing of materials and construction activities specified in this Section.

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2. The independent soil testing laboratory shall have a minimum of 5 years experience in providing the construction quality testing services and shall be equipped with the required equipment. Field technician(s) shall have a minimum of 3 years experience in construction quality testing.

1.8 HEALTH AND SAFETY REQUIREMENTS

Environmental Health and Safety, and Training requirements shall be as specified in Part 8.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Suitable compacted fill material and backfill material shall be free of debris, foreign objects, large rock fragments, organics, and other deleterious materials. Visible rock shall not exceed a maximum dimension of 3 inches in any dimension.
- B. Material used to backfill utility trenches outside the STP Deep Excavation Boundary shall be CL material from the STP Backfill Borrow Area as determined by ASTM D2487.
- C. Pipe bedding shall be ODOT Item 304.

2.2 EQUIPMENT

- A. Choice of equipment to perform required operations in conformance with these specifications shall be the responsibility of the Contractor. However, any equipment that results in waste or damage of material, or inaccurate work, or is otherwise objectionable is to be promptly replaced as directed by the Construction Manager.
- B. Equipment used to haul impacted material over the existing Southern Waste Units (SWU) Impacted Material Haul Road, STP Haul Road, OSDF Impacted Material Haul Road, and OSDF Borrow Area Haul Road as shown on the Construction Drawings shall be equal to or less than the

gross vehicle weight, tire pressure and axle loading for a Caterpillar CAT D300E truck (gross vehicle weight of 106,700 pounds, tire pressure of 60 psi, and axle load of 37,400 pounds).

- C. Furnish hand compaction equipment, such as walk-behind padfoot compactor, hand tampers, or vibratory plate compactor, for compaction of trench backfill and any other areas inaccessible to large compaction equipment.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that subgrade is not soft, spongy, or composed of otherwise unstable materials. If unstable materials are encountered, notify Construction Manager.
- B. Verify that areas to be filled or backfilled are free of debris, snow, ice, or water and that surfaces are not frozen.
- C. Prior to any earthwork activity, verify that erosion and sediment control measures required for the drainage area are in place and functional.

3.2 GENERAL

- A. Haul equipment or other equipment that travels between certified areas and non-certified areas shall remain on roads constructed of certified material or shall be wheel washed by the Contractor. Notify the Construction Manager for monitoring prior to re-entry into certified areas.
- B. Perform construction activities in such a manner that stormwater runoff from non-certified construction areas does not flow into certified areas.
- C. Unexpected discovery of cultural resources: Upon the unexpected discovery of any object suspected to be historic, prehistoric, or archeological site, feature or

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object, immediately cease ground disturbing activities around the find and contact the Construction Manager.

- D. Dust control shall be in accordance with Section 02100 and Part 6.

3.3 EXCAVATION

- A. STP Backfill Borrow area development:

1. The Contractor shall be responsible for providing sediment controls during borrow area operation. As a minimum, provide silt fence on the downhill side of proposed areas to be excavated. Silt fence shall be in accordance with Section 02270 and the Construction Drawings. After installation of erosion and sediment control measures, remove the top 6 inches of soil in areas proposed for borrow operations. This material shall be considered topsoil and stockpiled within the boundary of the STP Backfill Borrow Area or as directed by the Construction Manager.
2. The boundary of the STP Backfill Borrow Area is located on the Construction Drawings. The Contractor shall excavate and grade in such a manner that positive drainage is provided to the OSDF Borrow Area Sediment Basin. Bottom slopes shall be a minimum of 1 percent at all times. Final side slopes shall be no steeper than 4H:1V.
3. Topsoil shall not be removed more than 5 calendar days prior to beginning excavation activities. Topsoil shall be removed only from the area of anticipated excavation.
4. Topsoil stockpile location shall be such that positive drainage to the OSDF Borrow Area Sediment Basin is provided.
5. Construct topsoil stockpiles no steeper than 3H:1V (horizontal:vertical), grade to drain, seal by tracking perpendicular to the slope contours with a bulldozer. Ensure working stockpiles are graded and compacted at the end of each day when they are in use.
6. Topsoil stockpile shall be stabilized using a crusting agent in accordance with Section 02270.

7. After borrow area activities are completed, seed in accordance with Interim Seeding requirements. The seeding seasons and seeding requirements shall be in accordance with Section 02900.
8. Maintain newly seeded areas until final acceptance by the Construction Manager. Prior to final acceptance, settled, eroded, or rutted areas shall be reestablished at the Contractor's expense.

C. Runon Diversion Ditch

1. A runon diversion ditch shall be excavated around a portion of the STP excavation area at the locations shown on the Construction Drawings.
2. Material excavated from ditch construction shall be used to create a berm adjacent to the ditch.
3. After construction of the runon diversion ditch to the required lines and grades, the area shall be seeded and fertilized in accordance with Section 02900.
4. After seeding and fertilizing, an erosion control blanket shall be installed in accordance with Section 02270.

3.4 BACKFILL AND FILL

A. Utility Trenches outside of STP Excavation Area

1. After utility removal has been completed in accordance with Section 02205, FDF will perform monitoring and scanning. Allow 10 calendar days for monitoring. Promptly begin trench backfill activities when directed by the Construction Manager.
2. Any water collected in trenches shall be removed and disposed in the STP excavation sump as directed by Construction Manager.
3. Backfill materials shall be placed into open trench in 6 inch compacted lifts until reaching existing grade. Each lift shall be compacted with 5 passes of a mechanical tamper. Backfill material should be compacted to provide a firm surface as directed by the Construction Manager.

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4. Trench excavation and backfilling activities shall be conducted in accordance with OSHA 1926, Subpart P.
- B. Berm
1. The Contractor shall construct a berm around the perimeter of the STP Deep Excavation Area at locations shown on the Construction Drawings. The locations may be field adjusted as directed by the Construction Manager.
 2. Minimum height for diversion berm shall be 18 inches and shall be constructed by placing fill material from the STP Backfill Borrow Area on top of existing grade. Side slopes for berms shall not exceed 2H:1V.
 3. After construction of diversion berms the berms shall be seeded and fertilized in accordance with Section 02900.
- C. Material excavation from Transfer Line trench shall be excavated, loaded, and hauled as impacted material in accordance with Section 02205. Transfer Line trench shall be backfill (above bedding) with material from the STP Backfill Borrow Area.
- D. Transfer Line trench excavation and backfilling activities shall be conducted in accordance with OSHA 1926, Subpart P.

3.5 INCIDENTAL EARTHWORK AND SUBGRADE PREPARATION

- A. Following site clearing, the subgrade of parking area shall be proofrolled. Proofrolling shall be conducted with a tandem-axle truck, fully loaded, or other construction equipment with similar axle loads.
- B. Areas that pump, rut, or deform excessively during proofrolling shall be scarified, conditioned, and recompacted to stabilize areas. Subgrade material which cannot be conditioned to achieve a surface acceptable to the Construction Manager shall be undercut and replaced with fill material or other acceptable material as required by the Construction Manager.

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- C. Subgrade material shall consist of soil free of debris, foreign objects, organics, and other deleterious materials.

END OF SECTION

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SECTION 02270
EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 SCOPE

This Section includes but is not limited to:

- A. Soil erosion and sedimentation control measures for work included in this contract, including additional areas disturbed by the Contractor.
- B. Installation, maintenance, and removal of all temporary erosion control facilities, including maintenance of existing erosion and sediment control measures and facilities as shown on the Construction Drawings.
- C. Control of surface water and management of ponded water in construction and excavation areas.

1.2 RELATED SECTIONS AND PLANS

- A. Section 02205 - Impacted Material Excavation and Handling.
- B. Section 02206 - Earthwork.
- C. Section 02900 - Seeding.
- D. Part 6 - Statement of Work.
- E. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

- A. Title 40, Code of Federal Regulations, Part 261, Hazardous Waste Management System, Identification and Listing of Hazardous Waste.

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- B. State of Ohio, Department of Natural Resources (ODNR):
Rainwater and Land Development, Ohio's Standard for
Stormwater Management, Land Development, and Urban Stream
Protection - 1996.

1.4 SUBMITTALS

- A. Provide submittals as required in Part 6.
- B. For each product proposed for use, submit the following:
1. Manufacturer's product data and recommended methods of installation and maintenance; and
 2. Certification from supplier or manufacturer that the product meets the material requirements of this Section to include test results.
 3. Material Safety Data Sheet (MSDS) data, if applicable.
- C. Prepare and submit a Surface Water Management and Erosion and Sediment Control Plan that includes the following, at a minimum:
1. Descriptions of the surface water management and erosion and sediment control measures to be implemented throughout the duration of the contract;
 2. Methods for installing and maintaining surface water management and erosion and sediment control measures;
 3. Drawings illustrating, in plan view, the location and sequencing of the surface water management and erosion and sediment control measures;
 4. Methods and measures for collection and discharge of surface water from the excavated areas and measures to minimize erosion of the excavated areas during progress of the work, inclement weather and at the end of each work day;
 5. Methods of minimizing sediment to the STP Excavation Dewatering Transfer Sump.
 6. Sequence of work to ensure that stormwater management and erosion and sediment control measures are maintained until completion of work.

- D. Contractor's records of inspection of erosion and sediment control measures as described herein shall be submitted weekly upon completion of the inspection report.

1.5 INSPECTION

- A. Inspect erosion and sediment control measures to evaluate the effectiveness of, and need for maintenance of, the control measures. Any repairs to the erosion and sediment control measures shall be corrected within 24 hours of problem discovery. Inspections shall occur, at a minimum, at the following frequencies by a representative of the Contractor and the Construction Manager:
 - 1. Weekly;
 - 2. Daily after each rain event exceeding 0.5 inches at the Fernald Environmental Management Project (FEMP). Information can be obtained from the Construction Manager for rain events.
 - 3. Daily inspections during rainfall events after two consecutive days of rainfall at the FEMP.
- B. All inspections shall be conducted and documented in accordance with this Section. The Contractor shall maintain a copy of the inspection records on site with the original submitted as specified in this Section.
- C. The inspection report shall summarize the scope of the inspection, name of the inspector(s), inspection date, observations relating to the implementation of the erosion and sediment control measures, destination of pumping ponded water, estimated quantity of ponded water and corrective action measures, if any, that are required. The report shall indicate if any areas are not in compliance or contain a certification that control measures are effective and in compliance with this Section.

1.6 HEALTH AND SAFETY REQUIREMENTS

- A. Environmental Health and Safety, and Training requirements shall be as specified in Part 8.

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PART 2 PRODUCTS

2.1 MATERIALS

- A. Silt fence shall at a minimum be composed of strong rot-proof polymeric fibers formed into a woven or non-woven fabric which have fabric and fence post properties and minimum dimensions as shown on the Construction Drawings.
- B. Seeding shall be in accordance with Section 02900.
- C. The erosion control blanket shall be a woven blanket-like fabric made of a biodegradable coir yarn and shall contain the following material properties:
 - 1. Coconut fiber content: 100 percent.
 - 2. Weight: 22 ounces per square yard.
 - 3. Thickness: 0.3 inches.
 - 4. Open Area: 38 percent.
 - 5. Tensile Strength: 1350 lb/ft by 626 lb/ft (length times width).
 - 6. Elongation: 34 percent by 38 percent (length times width).
- D. Blanket Anchors - Made of wood, biodegradable, specifically made to anchor erosion control blankets.
- E. Crusting agent shall be as approved by the Construction Manager and shall meet the following requirements:
 - 1. The crusting agent shall be a pine sap emulsion comprised of a 100% organic emulsion produced from naturally occurring resins (pine sap). The crusting agent shall not be comprised of chloride, lignosulfonate, petroleum, or asphaltic type emulsions. The crusting agent must provide dust suppression and surface stability for exposed soils, both disturbed and undisturbed soils. The crusting agent shall be compatible with application via a hydro seeder, and must not require intense cleaning of equipment after application. Once cured, the crusting agent shall be non-tracking (i.e., will not stick to boots or tires).

2. The crusting agent shall not have hazardous characteristics of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR 261 for a hazardous waste in either its pre-applied or cured states.
3. The crusting agent shall have a flash point greater than 200°F. The crusting agent shall be neither a flammable nor combustible liquid per DOT definition. The crusting agent must not be susceptible to significant deterioration from exposure to the elements, including sunlight.

PART 3 EXECUTION

3.1 GENERAL

- A. Construct and maintain erosion and sediment control measures as specified in this Section and as shown on the Construction Drawings. Maintain existing erosion and sediment control facilities and measures in accordance with this Section.
- B. Construction of diversion ditches and diversion berms shall be in accordance with Section 02206.

3.2 SILT FENCES

- A. Place at locations shown on Construction Drawings prior to start of excavation activities. Remove accumulated sediment when deposition reaches one-third the height of the silt fence or sooner if accumulated sediment prevents performance of silt fence as directed by the Construction Manager; remove accumulated sediment within 24 hours of discovery. Sediment shall be removed as specified in this Section.
- B. Install breaks and overlaps to allow equipment access to the construction area.

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3.3 EROSION CONTROL BLANKETS

Install in accordance with manufacturer's recommendations in the ditches or as shown on the Construction Drawings. Anchor spacing shall be per ODNR requirements.

3.4 STABILIZATION OF INACTIVE EXPOSED EXCAVATION AND CONSTRUCTION AREAS

- A. Stabilization of disturbed areas that are planned to be left idle for more than 45 calendar days shall be stabilized as soon as possible, but no longer than seven (7) days after the last activity. Soils shall be stabilized by one of the following methods as directed by the Construction Manager:
 - 1. Crusting agents shall be applied in accordance with manufacturer's recommendations as specified in this Section.
 - 2. Interim seeding shall be applied as specified in Section 02900.
 - 3. Permanent seeding shall be applied as specified in Section 02900.

- B. Forty-five (45) calendar days shall be the maximum time that a stockpile can be left in an exposed condition without stabilization. Stockpiles that are expected to be inactive for a period of more than 45 calendar days, as determined by the Construction Manager, shall be stabilized soon as possible, but no longer than seven (7) calendar days after the last activity. Stockpiles shall be stabilized by means of a crusting agent, as specified in this Section.

- C. Any area or stockpile expected to be left exposed for more than 6 months shall be stabilized with both interim seeding and crusting agents.

3.5 SEDIMENT REMOVAL

- A. Remove accumulated sediment from temporary sumps, STP Excavation Dewatering Sump, ditch from Trap Range Area to A1PII Sediment Basin, trap range ditches, other ditches, and sediment control measures as directed by the

Construction Manager. In no case shall sediment reduce the available depth in the ditches and sediment control measures to less than two-thirds the depth shown on the Construction Drawings.

- B. Dispose of sediment as specified in Section 02205.
- C. Protect the STP Excavation Dewatering Transfer Sump Pump during removal of sediment.

3.6 CRUSTING AGENT

- A. The material shall be applied at the rates recommended by the manufacturer or as directed by the Construction Manager. Reapply as necessary to inhibit erosion and dust.
- B. Apply crusting agent according to manufacturers directions. Unless specified otherwise by manufacturer, dilute concentrate pine sap emulsion to ratio of four parts water to one part concentrate. Apply diluted solution at the rate of 2,500 gallons per acre.
- C. Dilution ratio and application rate are subject to further adjustment at direction of Construction Manager to optimize performance of crusting agent.

3.7 REMOVAL OF TEMPORARY EROSION CONTROL FACILITIES

Remove silt fence at the direction of the Construction Manager after the disturbed areas are established with satisfactory conditions of seeding as specified in Section 02900.

END OF SECTION

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SECTION 02506
AGGREGATE SURFACE

PART 1 GENERAL

1.1 SCOPE

This Section includes but is not limited to: Materials placement and compaction requirements for aggregate surfaces on parking area, equipment wash facilities and Special Material Transfer Area.

1.2 RELATED SECTIONS

- A. Section 02206 - Earthwork.
- B. Part 6 - Statement of Work.

1.3 REFERENCES

- A. State of Ohio, Department of Transportation (ODOT), Construction and Material Specifications, January 1, 1997, except as supplemented or otherwise modified herein and/or shown on the Construction Drawings.

1.4 SUBMITTALS

- A. Provide submittals as required in Part 6.
- B. Submit the following for review and approval:
 - 1. Submit Certificate of Compliance of aggregate material attesting to conformance with the material requirements in Article 2.1.
 - 2. Manufacturer of geotextile along with technical data and certification from the manufacturer or supplier that the geotextile fabric meets the material requirements specified in this Section.

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PART 2 PRODUCTS

2.1 MATERIALS

- A. Aggregate Base materials for parking areas and Special Materials Transfer Area shall conform to ODOT Item 304.
- B. Coarse Aggregate materials for wash pad shall conform to ODOT Item 703, #2 stone.
- C. Geotextile fabric shall conform to ODOT Item 712.09, Type D.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that subgrade has been prepared in accordance with Section 02206.
- B. Subgrade surface shall be free of sticks, stones, or other materials which could damage the geotextile fabric.

3.2 GEOTEXTILE PLACEMENT

- A. Place geotextile on the prepared subgrade under the aggregate material in accordance with manufacturer's installation instructions and as follows:
 - 1. Take precautions to prevent damage to underlying subgrade, including rutting during placement of geotextile fabric.
 - 2. Geotextile fabric shall be placed directly over the subgrade. The geotextile fabric shall be placed and temporarily anchored in such a manner that placement of overlying materials will not tear or excessively stretch the fabric.
 - 3. Geotextile fabric shall be installed to the limits of aggregate surface as indicated on the Construction Drawings. The geotextile fabric shall be unrolled as smooth as possible on the prepared subgrade. Wrinkles and folds in the geotextile fabric shall be removed by stretching and placing of sod staples or small aggregate

piles as required. The fabric shall be installed according to the manufacturer's suggestion at curve locations.

- 4. The geotextile fabric shall be field joined, factory seamed, or manufactured in seamless width. Methods of field joining shall include overlapping of adjacent edges and ends of geotextile fabric a minimum of 18-inches. Sand bags or other weights may be used for temporary anchoring.
- 5. The geotextile fabric shall extend to the edges of the aggregate surface.
- 6. Geotextile fabric shall be covered with the required aggregate the same day as fabric laydown.
- 7. Construction traffic shall not be permitted directly on the geotextile fabric.
- 8. Geotextile fabric is not required when additional aggregate material is to be added to existing aggregate surface, unless otherwise directed by the Construction Manager.

3.4 AGGREGATE BASE AND COARSE AGGREGATE MATERIAL PLACEMENT

- A. Construct the aggregate surface to the limits and thicknesses indicated on the Construction Drawings.
- B. End dumping or tailgate dumping shall not be permitted directly onto the geotextile fabric. The aggregate shall be dumped adjacent to the fabric or on previously placed stone. The aggregate shall be spread from the backdumped pile using a bulldozer, loader, track hoe, or grader, with care being taken to avoid damage to the fabric by blades, tracks, tires, or buckets.
- C. Immediately following spreading, the aggregate material shall be shaped to the required smoothness and thickness, and compacted. The initial lift of aggregate on the geotextile shall be a minimum thickness of 6 inches after compaction. The desired degree of compaction will be 90%.

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considered to have been reached when the surface is tightly bound and shows no undue rutting or displacement under operations of the roller or other equipment. The determination of undue rutting or displacement will be made by the Construction Manager.

- D. When additional aggregate material is to be added to existing compacted aggregate, scarify existing aggregate to a depth of 3 inches.

3.5 QUALITY CONTROL

Tolerances:

1. Grade the aggregate surface to a smooth uniform surface.
2. The thickness of the finished aggregate surface shall be no less, at any point, than the thickness indicated on the Construction Drawings.

END OF SECTION

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SECTION 02668
TRANSFER LINE**PART 1 GENERAL****1.1 SCOPE**

This Section includes, but is not limited to:

- A. High density polyethylene and steel pipe and fittings for transfer line.
- B. Tie-in to existing Leachate Conveyance System clean-out.

1.2 RELATED SECTIONS AND PLANS

- A. Section 02100 - Site Preparation.
- B. Section 02206 - Earthwork.
- C. Section 02270 - Erosion and Sediment Control.
- D. Part 6 - Statement of Work.

1.3 REFERENCES

- A. American Society of Mechanical Engineers (ASME):
 - 1. ASME B31.3-96 Process Piping.
- B. American Society for Nondestructive Testing (ASNT):
 - 1. ASNT-SNT-TC-1A-96 Personnel Qualifications and Certification Recommended Practice, December 1992 Edition.
- C. American Society for Testing and Materials (ASTM) Standards:
 - 1. ASTM A53-96 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

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2. ASTM A105/
A105M-96 Standard Specification for Carbon Steel Forgings for Piping Applications.
3. ASTM A126-95 Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
4. ASTM D1248-84
(1989)e1 Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.
5. ASTM D2657-90 Standard Practice for Heat Joining Polyolefin Pipe and Fittings.
6. ASTM D3350-96 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
7. ASTM F714-97 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

D. American Water Works Association (AWWA):

1. AWWA C207-94 Steel Pipe Flanges for Waterworks Service.
2. AWWA C600-93 Installation of Ductile-Iron Water Mains and Their Appurtenances.

1.5 SUBMITTALS

- A. Provide submittals as required in Part 6.
- B. Product Data: Provide data on all pipe materials, pipe fittings, valves, accessories, the methods and equipment for HDPE fusion welding.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements of this section.
- D. Submit welder and examiner qualifications, procedure qualification records, and welding procedure specifications for steel piping.

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- E. Submit documentation of training and certification of personnel qualified to perform butt-fusion welding of HDPE pipe and fittings.
- F. Pressure test and examination reports, within 7 calendar days after completion of test or examination.
- G. Nondestructive testing personnel qualifications shall be in accordance with ASNT SNT-TC-1A.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All pipes shall be new material that has not been previously used.
- B. Pipe bedding shall be in accordance with Section 02206.
- C. Transfer Line and Fittings:
 - 1. Transfer pipe and fittings shall be Iron Pipe Size (IPS), high-density polyethylene (HDPE) PE 3408 pipe, Type III, Class C, Category 5, Grade P34, in accordance with ASTM D1248, with cell classification 345434C in accordance with ASTM D3350, Minimum Pressure Class 150. All piping and fittings shall be of the same material and shall have a Dimension Ratio (DR) of 11 (ASTM F714). Pipe and fittings shall be from the same manufacturer. The manufacturer's name and DR shall be marked on the side of the pipe. Transfer line and fittings shall be of the size indicated on the Construction Drawings.
 - 2. Water Transfer Hose: Synthetic rubber tube, reinforced with synthetic fabric and wire helix; 100 psig working pressure; Goodyear Plicord Con-AG, or equal.
 - 3. Mechanical Joints:
 - a. Mechanical joints shall be made using HDPE flange adapters. Provide nipple-end for butt fusion to transfer pipe. Flat-face suitable for use under pressure with flange sealing gasket.

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- b. Metal back-up rings shall be Class D, slip-on type, in accordance with ANSI/AWWA C207. Back-up rings shall be supplied by the manufacturer or supplier of HDPE pipe.
 - c. Bolts used with back-up rings on mechanical joints shall be semifinished hex head, Type Grade B8, UNC threads.
 - d. Nuts shall be semifinished regular hex head, Grade 8F, UNC threads.
- 4. Butterfly Valves: Class 150, cast iron, ASTM A126, Class B, wafer style, 316 SS stem and disc, EPDM seat, integral flange seals, lever handle operator. Equip valve with locking device with not less than 3/8-inch diameter hole for lock.
 - 5. Polyethylene Spacers: Provide 1" polyethylene spacers between flange face and valve as required to allow butterfly disc to swing freely.
 - 6. Check Valve: Class 150, cast iron, ASTM A126, Class B, ball check valve type construction, flanged type with bolted cover. The ball shall be cast iron ASTM A126-B construction, coated with vulcanized Buna-N rubber.

D. Carbon Steel Pipe and Fittings (shop fabricate):

- 1. Materials, manufacture, welding, inspections, and testing shall be in accordance with ASME B31.3 for Category D fluid service.
- 2. Hose Couplings:
 - (a) Coupler: Aluminum with Buna-N gasket, installed on hose; Civacon Twin-Cam No. 633-C, or equal.
 - (b) Adaptor: Aluminum, female NPT; Civacon No. 633-A, or equal.
- 3. Pipe: Seamless carbon steel, ASTM A53 Grade B, standard weight, beveled ends.
- 4. Flanges: Class 150, carbon steel, RFSF, ASTM A105, weld neck (STD wt. bore).
- 5. Gaskets: Teflon, 1/8-inch thick.
- 6. Butterfly Valve: Same as for Transfer Line and Fittings.

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- D. Geotextile Fabric: Geotextile fabric shall be the same fabric as used for silt fence in accordance with Section 02270.
- E. Construction Fencing: Construction Fencing shall be in accordance with Section 02100.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions in area of work. Any discrepancies should be brought to Construction Manager's attention in a written statement immediately upon discovery.
- B. Verify that tie-in connection, line size, location, and inverts are as indicated.

3.2 PREPARATION

- A. Remove scale and dirt on inside and outside prior to assembly of pipe and fittings.

3.3 ERECTION/INSTALLATION/APPLICATION

- A. Installation - Pipe: From carbon steel to HDPE transition at pipe support to the tie-in with the Leachate Conveyance System (LCS) Clean-out, as indicated on the Construction Drawings.
- B. Sections of pipe with cuts, gouges or scratches on the outside diameter (OD) surface that exceed 10 percent of the wall thickness of the pipe shall be removed completely and the ends of the pipeline rejoined. The inside diameter (ID) surface shall be free of cuts, gouges and/or scratches.
- C. Join HDPE piping and fittings by butt weld fusion method, in accordance with manufacturer's recommendations and ASTM D2657. Extrusion welding shall only be used where butt-fusion welding cannot be

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performed and as approved by the Construction Manager. Hot gas welding shall not be used.

- D. Route pipe as shown on Construction Drawings. The minimum bending radius shall be as specified by the pipe manufacturer. Pipe shall be in a straight route at LCS Clean-out connection.

- E. Above Ground Installation:
 - 1. Locations of above ground installation shall be as indicated on the Construction Drawings.
 - 2. Place a geotextile fabric, 3 ft minimum width, on top of ground. Anchor edges every three (3) feet with biodegradable stakes as specified in Section 02270. At edges of geotextile, overlap a minimum 12 in. and stake.
 - 3. Install pipe on top of geotextile fabric allowing for expansion and contraction without stressing pipe or joints as per manufacturer's recommendation.
 - 4. The Contractor is responsible for the design and implementation of restraints for the transfer line.

- F. Below Ground Installation:
 - 1. Locations of below ground installations shall be as indicated on Construction Drawings.
 - 2. Trenching and backfilling shall be in accordance with Section 02206.

- G. Steel Pipe: Welding procedures and qualifications, fabrication, assembly, and erection shall be in accordance with ASME B31.3.

3.4 FIELD QUALITY ASSURANCE

- A. Perform hydrostatic tests on Transfer Line in accordance with AWWA C600. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe or any valved section thereof to maintain pressure within 5 pounds- per-square-inch of the specified test pressure after that pipe has been filled with water and the air expelled. Leakage shall

not be measured as a drop in pressure in a test section over a period of time.

<u>SERVICE</u>	<u>MEDIUM CODE</u>	<u>MATERIAL CODE</u>	<u>DESIGN PRESSURE (psig)</u>	<u>TEST PRESSURE (psig)</u>
Stormwater	ST	A	100	100

- B. Notify Construction Manager at least 24 hours in advance of planned testing. Submit report to Construction Manager within 1 week after completion of test. The Construction Manager will observe hydrostatic test. Coordinate disposal of test water with Construction Manager.

END OF SECTION

SECTION 02900
SEEDING

PART 1 GENERAL

1.1 SCOPE

This Section includes but is not limited to:

- A. Soil preparation.
- B. Interim seeding.
- C. Application of fertilizer.
- D. Application of mulch and mulch binder.
- E. Application of crusting agent.

1.2 RELATED SECTIONS AND PLANS

- A. Section 02270 - Erosion and Sediment Control.
- B. Part 6 - Statement of Work.
- C. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

Title 40, Code of Federal Regulations (CFR), Part 261, Identification and Listing of Hazardous Waste.

1.4 SUBMITTALS

- A. Provide submittals as required in Part 6.
- B. Submit the following:
 - 1. Proposed seed mixes and application rates for seed, mulch, mulch binder, and fertilizers.
 - 2. Manufacturer's product data and recommended methods of application for seed, mulches, mulch binder, and fertilizer. Product data for

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fertilizer shall also include chemical analysis including uranium analysis to assure there is no resultant or derived uranium from fertilizer use, unless waived by the Construction Manager.

3. Material Safety Data Sheet (MSDS) for fertilizer and mulch binder.

C. Submit certificate of compliance for the following. Do not sow seed until the Construction Manager has reviewed and approved the certificates.

1. Certificate stating seed mixture, guaranteed percentages of purity, weed content, germination of seed, name of seller, the test date for the seed, and the net weight and date of shipment;
2. Manufacturer's certificate stating the available nutrients contained in the proposed fertilizer;
3. Manufacturer's certificate stating the wood cellulose mulch meets the requirements of this Section; and
4. Manufacturer's certificate stating the mulch binder meets the requirements of this Section.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver containerized materials in uniform packages bearing the name of the manufacturer, the net weight and a statement of content. Deliver containerized materials to the site in original, properly labeled, unopened, clean containers each showing the manufacturer's guaranteed analysis conforming to applicable regulations and standards.
- B. Store materials in a dry area in a manner to prevent physical damage from the elements.

1.6 HEALTH AND SAFETY REQUIREMENTS

Environmental Health and Safety, and Training requirements shall be as specified in Part 8.

PART 2 PRODUCTS**2.1 MATERIALS**

- A. Furnish seed labeled in accordance with the U.S. Department of Agriculture (USDA) Rules and Regulations under the Federal Seed Act and applicable State seed laws. Furnish seed in sealed bags or containers bearing the date of expiration. Do not use seed after its expiration date. Each variety of seed shall: have a purity of not less than 90 percent, have a percentage of germination not less than 80 percent, have a weed to seed content of not more than 0.75 percent and contain no noxious weeds. The above percentages are by weight.
- B. For interim seeding, the seed mixture shall be:
1. Annual Rye - 60 pounds pure live seed (pls)/acre
 2. Perennial Rye - 60 pounds pls/acre
- Interim seeding may be applied from October through May.
- C. Obtain water from the on-site sources shown on the Construction Drawings or specified in Part 6, unless otherwise approved by the Construction Manager.
- D. Fertilizer:
1. Use fertilizer that is dry or liquid commercial grade fertilizer, uniform in composition that meets the requirements of all State and Federal regulations and standards of the Association of Agricultural Chemists.
 2. Fertilizer for summer and interim seeding shall be VCOTE 34-4-14 as manufactured by George W. Hill or equal.
 3. Fertilizer for permanent seeding shall be VCOTE 0-4-4 or approved equal. Chemical analysis shall be submitted in accordance with this Section.
- E. Furnish mulch meeting the following requirements:
1. Mulch shall be straw or wood cellulose fiber, free of clay, stone, foreign substances, and reasonably free of weeds.

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2. Furnish straw that does not contain sticks larger than 1/4-inch diameter or other materials that may prevent matting down during application. Use straw that is free from mold and other objectionable material and in an air-dry condition suitable for placing with mulch blower equipment or other equipment as approved by the Construction Manager. Straw shall be generally 6 inches or more in length.
3. Mulch applied by hydrospraying shall be a wood cellulose processed into a uniform fibrous physical state. Use wood cellulose fiber containing a green dye that will provide for easy visual inspection for uniformity of slurry spread. The wood cellulose fiber including dye, shall contain no growth or germination inhibiting properties. The wood cellulose fiber shall be manufactured in such a manner that, after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous material. When sprayed on the ground, the material shall allow absorption and percolation of moisture. The wood cellulose fiber shall meet the following requirements:

<u>Item</u>	<u>Specification Limit</u>
Particle Length	0.375 inch (maximum)
Particle Thickness	0.047 inch (maximum)
pH	4.0 to 8.5
Ash Content	1.6 percent (maximum)
Water Holding Capacity (based on fiber dry weight)	500 percent (minimum)

- F. Mulch binder agent shall be as approved by the Construction Manager and shall meet the following requirements:
1. The mulch binder shall be a pine sap emulsion comprised of a 100% organic emulsion produced from naturally occurring resins (pine sap) or an approved equal and be nontoxic to plants. The

mulch binder shall not be comprised of chloride, lingsulfonate, petroleum, or asphaltic type emulsions. The mulch binder shall be compatible with application via a hydro seeder, and must not require intense cleaning of equipment after application. Once cured, the mulch binder shall be non-tracking (i.e., will not stick to boots or tires).

2. The mulch binder shall not have hazardous characteristics of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR Part 261, Subpart C, for a hazardous waste in either its pre-applied or cured states.
 3. The mulch binder shall have a flash point greater than 200°F. The mulch binder shall be neither a flammable nor combustible liquid per DOT definition. The mulch binder must not be susceptible to significant deterioration from exposure to the elements, including sunlight.
 4. The mulch binder shall be provided in concentrated solution and prepared so that it will not change in transportation or storage.
- G. Erosion Control Blanket and Crusting Agent shall be in accordance with Section 02270.

2.2 EQUIPMENT

Provide equipment of size and type to perform work specified in this Section.

PART 3 EXECUTION

3.1 GENERAL

- A. Stabilization of disturbed areas by seeding or by use of a crusting agent shall be performed at completion of excavation or within seven (7) calendar days of knowing a disturbed area will be idle for more than forty-five (45) calendar days, whichever is sooner.
- B. Interim seeding is required for disturbed areas and soil piles which are scheduled to or may be further

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disturbed within two (2) years, but do not have significant potential of spreading contamination.

- C. Disturbed areas and soil piles which are scheduled to be significantly disturbed within two (2) years, are destined for the On-Site Disposal Facility, and/or need effective erosion control immediately, are to be stabilized with use of a crusting agent as specified in Section 02270.
- D. Stabilization of permanent slopes exceeding 2H:1V shall utilize an erosion control blanket as specified in Section 02270 after application of seed mixture. This does not include slopes within the STP excavation that will be backfilled upon certification.
- E. Area(s) to be seeded shall be generally free of debris, rock, root material, and other objects which may impede soil preparation and seeding activities. Perform soil preparation by tilling/cultivating, to a depth of approximately 2 inches, to eliminate uneven areas and low spots. Maintain lines, levels and contours.
- F. Repeat cultivation in areas where equipment used for hauling and spreading has compacted subgrade.

3.2 APPLICATION

- A. Seeding season for interim seeding is October through May.
- B. Apply fertilizer, seed, mulch, and mulch binder to disturbed areas and areas excavated and graded in this Contract requiring seeding unless otherwise indicated or directed by the Construction Manager. All seeding seasons and all application rates for seed and related materials are subject to adjustment as directed or approved by the Construction Manager.
- C. Application of Fertilizer:
 - 1. Apply fertilizer at a uniform rate of 1 pound per 1000 square feet.
 - 2. Disc fertilizer thoroughly into upper 2 inches.

3. Lightly water to aid the distribution of fertilizer.
- D. Sequence of application of seeding mixture, mulch and mulch binder.
1. Apply seed mixture at the minimum rate as specified in this Section. Seeding shall be done by hydroseeding, broadcasting, or by drilling to a depth of 1/4 inch followed by cultipacking. When hydroseeding, the mixture tank shall be cleaned prior to use to ensure remnant seed is not introduced to the proposed seed mixture.
 2. Do not seed areas in excess of that which can be mulched within 24 hours.
 3. Apply mulch within 24 hours of seeding.
 4. Spread straw mulch in a uniformly thick layer.
 5. Apply water with a fine spray immediately after each area has been straw mulched. Wet soil at approximately a rate of 120 gallons per 1,000 square feet.
 6. Apply mulch binder at the rate specified in this Section.
- E. Spread straw mulch, either by hand or by blowing method, at the rate of 2 air-dried tons per acre. During June through September, increase straw mulch application rate to 3 air-dried tons per acre. Application of straw mulch by the blowing method is exempt from the dust control requirements specified in Part 6.
- F. Apply sprayed wood cellulose fiber at a net dry weight of 2,000 pounds per acre. Mix the wood cellulose fiber with water at a ratio of 50 pounds of wood cellulose fiber per 100 gallons of water.
- G. Maintain mulching material in place with a pine sap emulsion binder. Apply mulch binder according to manufacturer's directions. Unless specified otherwise by the manufacturer, dilute concentrated pine sap emulsion to ratio of four (4) parts water to one (1) part concentrate. Apply diluted pine emulsion at a rate of 2,500 gallons per acre.

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3.3 MAINTENANCE

- A. Maintain the seeded areas in satisfactory condition until acceptance of the seeding by the Construction Manager. Maintenance of the seeded areas includes repairing eroded areas, revegetating when necessary, watering and mowing (if applicable). A satisfactory condition of the vegetated area is defined as follows:
 - 1. An area shall have a predominant stand of the seeded vegetation.
 - 2. Within 3 weeks, germination must occur over 95 percent of the area with no single bare area greater than 3 square feet.
 - 3. Within 3 months, 95 percent of the area must be covered with mature vegetation.

- B. Areas that fail to meet these requirements shall be repaired or reseeded as necessary to produce an acceptable stand of vegetation, as specified in this Section.

- C. Maintain areas applied with a crusting agent to ensure proper erosion control. The crusting agent shall be reapplied to eroded and bare areas as necessary.

3.4 WARRANTY

- A. Seeded areas shall be subject to a warranty period of not less than 12 months from initial establishment of vegetation over 100 percent of the seeded areas.

- B. At the end of the warranty period, the Construction Manager will perform an inspection upon written request by the Contractor. Seeded areas not demonstrating satisfactory condition of vegetation as specified herein, shall be repaired, reseeded and maintained to meet all requirements as specified herein at the Contractor's expense.

3.5 ACCEPTANCE

- A. The seeded areas shall be accepted at the end of the warranty period if a satisfactory condition exists as defined in this Section.

- B. After all disturbed areas are stabilized and all necessary corrective work has been completed, the Construction Manager will certify in writing the final acceptance of the seeded areas.

END OF SECTION

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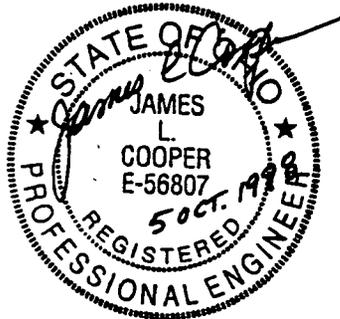
REMEDIAATION AREA 1, PHASE II
SEWAGE TREATMENT PLANT EXCAVATION PACKAGE
TECHNICAL SPECIFICATIONS

Division 13

PARSONS

Prepared by: *Oscar W. Carlson* *Thomas P. Fells*

Checked by: *Dave Tope* *by Carlton Schroeder*
James L Cooper *by Carlton Schroeder*



INFORMATION
ONLY

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SECTION 13125
RADIOLOGICAL CONTROL POINT FACILITY

PART 1 GENERAL

1.1 SCOPE

- A. A personnel radiological control point facility (T-188) composed of two nominal 14 feet by 60 feet modular units combining separate men's and women's locker rooms. Interior ceiling height shall be 8 feet 0 inches minimum. The facility shall consist of designed and shop fabricated modular trailer units. Units shall be hauled to the FEMP to a location designated by FDF. Installation will be by others.
- B. Mechanical and electrical systems.

1.2 REFERENCES

- A. Conform to the OBBC and local building code. Where Hamilton County code requirements vary from the OBBC, the Hamilton County code shall govern.
- B. Cooperate with regulatory agency or authority and provide data as requested.
- C. American Society of Mechanical Engineers (ASME).
- D. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE).
- E. National Fire Protection Association (NFPA):
 - 1. NFPA 70 National Electrical Code, 1996 Edition.
- F. Underwriter's Laboratories, Inc. (UL):
 - 1. Electrical Construction Materials Directory - 97.
- G. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)

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- H. SK-A-04613, Floor Plan (See Attachment A).
- I. 44X-5500-E-00370, Electrical Installation for T-188 (See Attachment B). (Note: This drawing is for reference only. It is for installation of the facilities to be procured under this contract. In Elevation A-A North End T-188, panels PP-T188 and LP-T188 are indicated as existing, since to the installing agency they will be because they will have been furnished with the facilities under this procurement.)

1.3 SYSTEM DESCRIPTION

A. Design Requirements - Structural

1. System and components shall withstand dead loads, live loads, snow load, and wind load calculated in accordance with the Ohio Basic Building Code, OBBC. Design constants shall be as follows:
 - a. Ground Snow Load (P_g): 25 psf
 - b. Snow Exposure Factor (C_e): 0.7
 - c. Importance Factor (I): 1.0
 - d. Effective Velocity Pressure (P_e) Criteria: 80 mph basic wind speed, Exposure C
 - e. Floor Live Load: 50 psf
2. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.
3. Assembly shall permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.
4. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.
5. Maximum load at any support point: 7,000 lbs.

B. Design Requirements - Mechanical

1. Thermal resistance of Wall System: R value of 11 minimum.
2. Thermal Resistance of Roof System: R value of 30 minimum.
3. Thermal Resistance of Floor System: R value of 19 minimum.

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4. Heating & Cooling: One 48,000 Btu/hr. capacity air source wall mount heat pump for each module. Each heat pump shall be equipped with supplemental electric resistance heaters, 15 kW @ 480 V, 3 phase, balanced across 3 phases. (5 kW each phase).
5. Ductwork: Design in accordance with ASHRAE. Fabricate in accordance with methods given in the SMACNA Manuals.
6. Plumbing: Design cold potable water, hot water, and sanitary systems in accordance with OBBC. Sanitary waste water shall be collected in hold tanks located beneath the trailer facility. The tanks shall be configured to provide a total storage capacity of 500 gallons. The tanks shall be interconnected with a discharge pipe located so as to protrude through the trailer skirting. The tanks will be installed by others.
7. Design pressurized potable water system as shown in conceptual schematic on Attachment A. For sizing purposes, use a maximum facility occupancy of 40 persons. Pump cut-in/cut-out pressure shall be 60/80 psig.
8. Provide rough-in plumbing (supply and drain) for the toilets. Provide protective covers over toilet closet flanges.

C. Design Requirements - Electrical

1. Electrical work shall be designed and installed in accordance with NFPA 70.
2. Electrical equipment shall be listed for the purpose specified and indicated according to Underwriter's Laboratories (UL) Electrical Construction Materials Directory.
3. Provide a 480 Volt, 3 phase, 4-wire, 60 Hz, electrical panel. The panel shall be NEMA 3R, with 225 A mains, 150 A main circuit breaker, and shall have space for a minimum of four 3-pole circuit breakers. A 50 A, 3 pole circuit breaker shall be provided to serve a 30 kVA, 480-120/208 V, 3 phase transformer, to be provided by others. All 480 Volt, 3 phase equipment shall be wired to this panel, with circuit breakers sized for the respective equipment load.

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4. Provide a 120/ 208 Volt, 3 phase, 4-wire, 60 Hz, electrical panel. The panel shall be NEMA 3R, with 100 A mains, minimum, a 100 A main circuit breaker, and shall have 30 pole spaces.
5. The panels shall be provided and mounted on the same end of the trailer as the HVAC unit. Panel schedules shall be complete and accurate.
6. The HVAC units shall be 480 Volt, 3 phase.
7. Wire: Use insulated copper wire in electrical circuits. Minimum wire size shall be 12 gauge unless noted otherwise.
8. Conduit: Electrical wiring shall be installed in EMT conduit, using compression fittings. Minimum size shall be 1/2-inch conduit. A separate green grounding wire shall be installed. No conduit runs shall be used for equipment grounding.
9. Receptacle circuits shall be rated at 20 amps. Receptacle and light switches shall be labeled identifying the appropriate circuit breaker and shall have fixed labels to identify switched circuits. Provide dedicated circuits for PCMs, fire and evacuation alarm systems. Outside WP receptacles, shall be GFCI, (5 mA), class A type with while in use covers, except for heat tracing receptacle. Provide a duplex 120 Volt WP receptacle with while in use cover, mounted under the trailer for heat tracing service. Receptacle shall be GFCI, (30 mA), class B type. Heat tracing will be by others.
10. Exit Signs: Install low energy consumption solid state, LED, exit signs with battery back-up at exits.
11. Emergency Lights: Provide emergency egress lighting with battery back-up to illuminate the paths to exits.
12. A lighting level of 60 footcandles shall be provided at a height of three feet above the floor.
13. Lighting shall be controlled by switches, not breakers.
14. General interior lighting shall be 4 feet 0 inches double tube surface fluorescent (T8) fixtures each with diffusers, electronic ballast and lights. Other interior and exterior lighting shall be incandescent.

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15. Provide one 50 watt high pressure sodium light fixture with photo cell and light, outside of each exterior door. Teron Catalog No. CA50 or equal.
16. Telephone: The trailer shall be equipped with a minimum of three telephone outlets. Telephone raceways shall be 3/4 inch EMT conduits. Run conduit from each outlet to central junction box at the front of the trailer. Locate outlets as shown in Attachment A. Pull wires shall be provided in all telephone conduits.
17. Telephone/communication junction boxes shall be located at the electrical end of the trailer and shall be surface mounted. Exterior junction boxes shall be rated NEMA 3R minimum and shall be mounted with taps to accommodate two-inch conduits.
18. Telephone/communication outlets shall be provided with a blank ivory cover plate for single outlet box (wire and receptacle to be supplied by telephone company, minimum three telephone outlets).
19. Electrical outlet devices shall be ivory with ivory cover plates.
20. Grounding: Trailer frame and metallic sheathing shall be grounded to breaker panel.

1.4 SUBMITTALS

- A. Provide submittals to FDF for review and approval before fabrication.
- B. Shop drawings shall have an Ohio PE seal and signature. Submit a complete set of shop drawings indicating the following:
 1. Recommended location of structural supports and loads at each support point.
 2. Number and location of intermediate support columns and loads at each support point.
 3. Wall, roof, and floor framing system with dimensions, including required cross-sections and details.
 4. Number and location of downspouts.
 5. Tie-down locations and requirements for design wind loads.

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- C. Product Data: Provide data on mechanical components.
- D. Submit manufacturer's installation Instructions.
- E. Provide three sets of Operation and Maintenance Manuals for mechanical components.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with a minimum ten years of experience.
- B. FDF will inspect the modules after electrical and mechanical installations are complete prior to installation of drywall. Notify FDF two weeks prior to inspection.

1.6 WARRANTY

- A. Provide one-year warranty.
- B. Warranty: Include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading.

PART 2 PRODUCTS

2.1 MANUFACTURERS - BUILDING SYSTEM

- A. Manufactured Structures Corporation, System OBBC.
- B. Other acceptable manufacturers offering equivalent systems.

2.2 MATERIALS - MODULAR UNITS

- A. Materials - Architectural/Structural
 1. Framing: Steel I beam with cross member outrigger.
 2. Under-floor Bottom Plate: Manufacturer's standard.
 3. Floor Underlayment: 3/4-inch plywood, pressure treated.

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4. Walls: Stud framing with gypsum board interior.
5. Insulation: Batt glass fiber type, faced with reinforced foil.
6. Roofing: Galvanized steel, 30 ga.
7. Ceiling: 1/2-inch vinyl coated gypsum, Group 2 vinyl weight.
8. Exterior Siding: Manufacturer's standard corrugated aluminum.
9. Skirting: Manufacturer's standard corrugated aluminum.
10. Interior Wall Covering: 1/2-inch vinyl coated gypsum, Group 2 vinyl weight.
11. Flooring: Commercial grade 12-inch by 12-inch vinyl tile.
12. Doors, Exterior: Hollow Metal type, 36 inches by 80 inches, 16 gauge, insulated, 6-inch by 30-inch wire reinforced glass vision panel, door closer, shop primed and finish painted. Keyed lock-set to accept "Best" core. Exterior door hardware shall be lever type, exit all time.
13. Doors, Interior: Wood solid core, 36 inches by 80 inches, 24-inch square door grill, passage-set.
14. Windows: Manufacturer's standard horizontal slider with insect screen where required by building code and where shown on Attachment A. Translucent glass in locker, shower or sink areas.
15. Gutters & Downspouts: Fabricate of same material and finish as siding metal.

B. Materials - HVAC

1. Heat Pump: Wall mounted self-contained air cooled, with hermetic reciprocating compressor, crankcase heater, and pressure service ports on refrigerant piping to evaporator and condenser. Adjustable outside air intake and return air through wall grille with two inch cleanable media filter. Thermostat shall be programmable and located five feet above floor in break room.
2. Ductwork: Galvanized steel, fabricated and installed per SMACNA. Insulated with two inch fiberglass having vapor barrier. Flexible joint at HVAC unit outlet.

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Ceiling diffusers shall be white enamel aluminum with adjustable dampers.

3. Exhaust Fans: 300 CFM ceiling mount with roof cap in each shower room and break room. Fans in shower areas shall be corrosion resistant. Interlock fans with light switches.

C. Materials - Plumbing

1. Showers: Heavy gauge steel with baked enamel finish, 32-inch square nominal, center drain with tempered glass door in aluminum frame.
2. Water Heater: Electric 40 gallon storage type, 18 gallon per hour recovery, glass-lined tank with anode rods and ASME pressure-temperature relief valves.
3. Shower Supply: Fixed spray shower head with 3 gpm maximum flow, single lever thermostatic mixing valve.
4. Faucets: Centerset with gooseneck spout and aerator, 4-inch wrist action handles.
5. Waste, Vent, and Overflow Piping: ABS DWV with solvent welded joints. Each unit shall have waste lines manifolded to one outlet under the unit.
6. Water Piping: Type "L" copper with soldered sweat fittings manifolded to one inlet. Solder shall contain no lead. Provide a single stub for a future connection to water service supply line. Stub shall be under the trailer in an accessible location for future installation. Stub shall be sealed and protected from damage. Stubs for interunit connection must be accessible for installation and future relocation of units.
7. Fixture Traps and Drains: Chromium plated brass traps with screen inlet drains in lavatories. Shower drains, PVC or ABS with screen inlet. Provide adapters for dissimilar materials where required.
8. Water Tanks: Cold rolled steel with urethane finish; ASME certified pressure tank. Inside of storage tank shall have non-corrosive finish suitable for potable water. Pressure tank shall be pre-charged type with food grade butyl diaphragm and ASME pressure relief valve.

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9. Water Pump: Electric motor driven centrifugal type. Cast iron housing; non-corrosive impeller, shaft, and trim.
10. Lavatories: Porcelain drop-in type.
11. Waste water hold tanks shall be constructed of polyethylene and shall be interconnected with PVC pipe. Tanks shall have ribbed design for added strength.
12. Backflow Preventer: Reduced pressure zone type; bronze construction; ball valves and test cocks; stainless steel screen and replaceable seats.

D. Materials - Accessories

1. Lockers: Enamel finish sheet steel, double tier type, 12 inches wide by 15 inches deep by 72 inches high.
2. Fire Extinguisher: 10 lb. capacity, ABC type, one mounted at each exit door.
3. Hand/Hair Dryers: Surface mount, cast iron with porcelain enameled finish, 115V, 20 amp. McMaster-Carr #2876k71 or equal.
4. Anti-C Storage Cabinets: Minimum 22 gauge metal with enamel finish, 36 inches wide by 18 inches deep by 72 inches high, 5 or 6 shelves.
5. Locker Room Benches: Lengths as indicated on Drawings. Benches shall be anchored to floor.
6. Counter Tops: Laminated plastic "Formica" top finish.
7. Soap Dispenser (One per sink): McMaster-Carr #2379K32 or equal.
8. Paper Towel Dispensers (One per each sink grouping): 22 gauge steel minimum.
9. Coat & Hat Wall Racks (Two per break room): Two shelf type, aluminum tubing construction, 72 inches long, McMaster-Carr #4711T31 or equal.
10. Coat & Hat Wall Hooks (Four units per monitoring room): Horizontal type, chrome plated steel, with 6 each double hooks per 36 inches long unit.
11. Mirrors (One per sink): 1/4-inch plate glass, stainless steel frame.
12. PCMs: Furnished by FDF.

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2.3 FINISHES

- A. Framing Members: Clean, prepare, and coat with black asphalt undercoating, 3 mil minimum thickness.
- B. Exterior Surfaces of Wall Components and Accessories: Precoated enamel on aluminum, color as selected by FDF from manufacturer's standard range.
- C. Vinyl Tile Flooring: Color and pattern as selected by FDF from flooring manufacturer's standard range.

PART 3 EXECUTION

Not Used.

END OF SECTION

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ATTACHMENT A

SKETCH SK-A-04613

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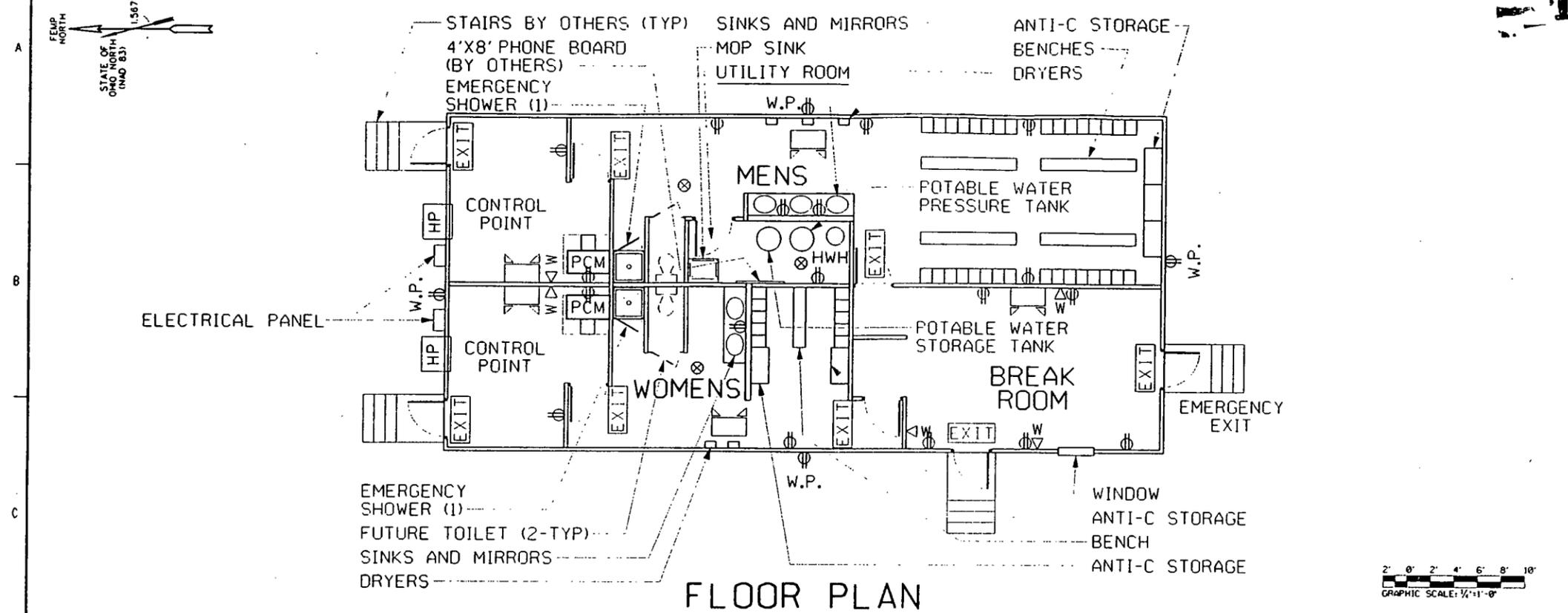
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RADIOLOGICAL CONTROL POINT FACILITY (T-188)

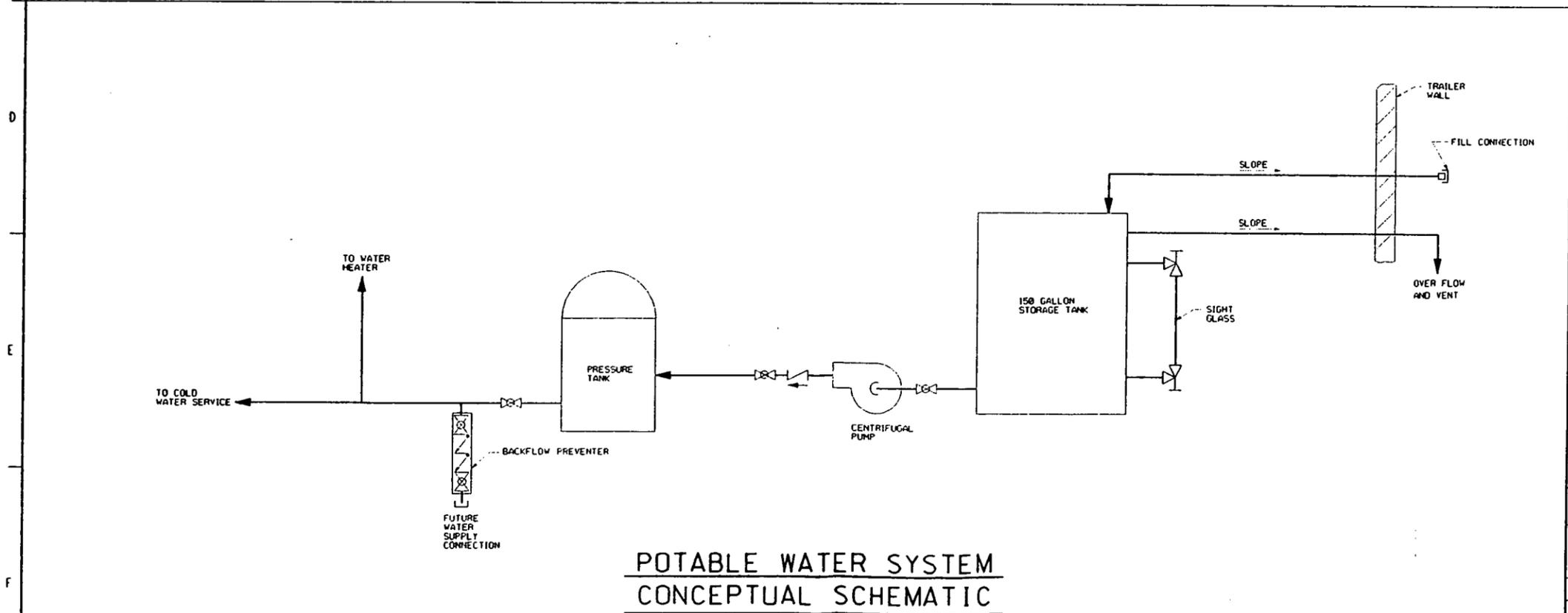


FLOOR PLAN

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LEGEND

- LOCKERS: DOUBLE
12" WX 15" DX 72" H
- PERSONNEL
CONTAMINATION MONITOR
(FDF PROVIDED)
- HP HEAT PUMP
- HWH HOT WATER HEATER
- W PHONE OUTLET LOCATIONS
- W.P. EXTERIOR WEATHERPROOF
RECEPTACLE LOCATIONS
- Ⓢ DUPLEX RECEPTACLE
LOCATIONS
- EXIT EXIT LIGHT
- TWO-LAMP EMERGENCY
EGRESS LIGHT FIXTURE
WITH RECHARGEABLE
BATTERIES
- Ⓢ BALL VALVE
- ⊗ FLOOR DRAIN



**POTABLE WATER SYSTEM
CONCEPTUAL SCHEMATIC**

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0	CERTIFIED FOR CONSTRUCTION	DATE	INITIALS AND DATE
REV. NO.	SCALE OF REVISION PURPOSE - DESCRIPTION	DATE	INITIALS AND DATE

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - PARSONS MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME
**REMEDIATION
AREA I, PHASE II**

DRAWING TITLE
**ARCHITECTURAL
PLAN
RADIOLOGICAL CONTROL POINT FACILITY**

DRAWN BY D.L. EGOSPI	DATE 10-06-97	TECH LEAD S. GHANTOUS	DATE 10/11/97
PLANT/REV. NO.	TECH	SCALE 1/4"=1'-0"	CLASS
SUBMITTED FOR 30% ISSUE TECH LEAD DATE	SUBMITTED FOR 60% ISSUE TECH LEAD DATE	SUBMITTED FOR 100% ISSUE TECH LEAD DATE	

PROJECT NO. TOP-012	PROJECT NO. 20712	DRAWING SHEET CODE NO. SK-A-04613	SHEET NO. A0001 0
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ATTACHMENT A

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ATTACHMENT B

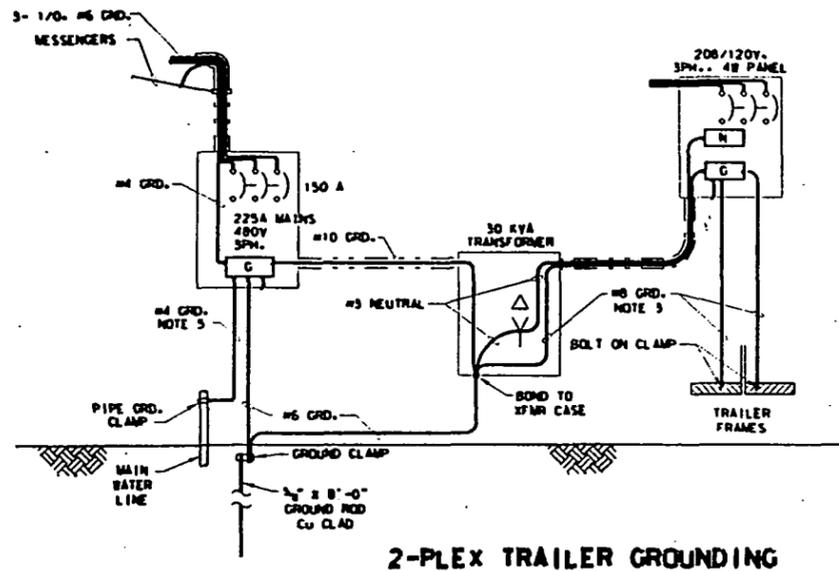
DRAWING 44X-5500-E-00370

Date: 10/07/98
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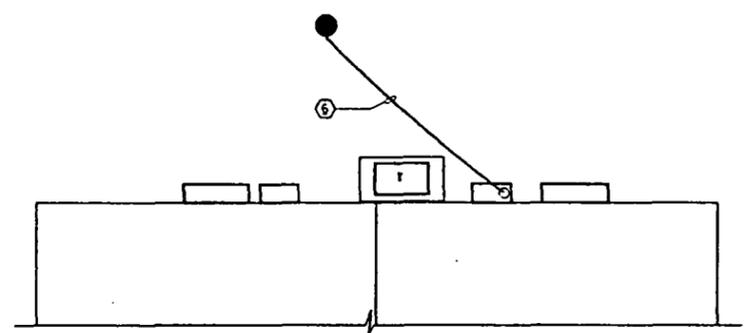
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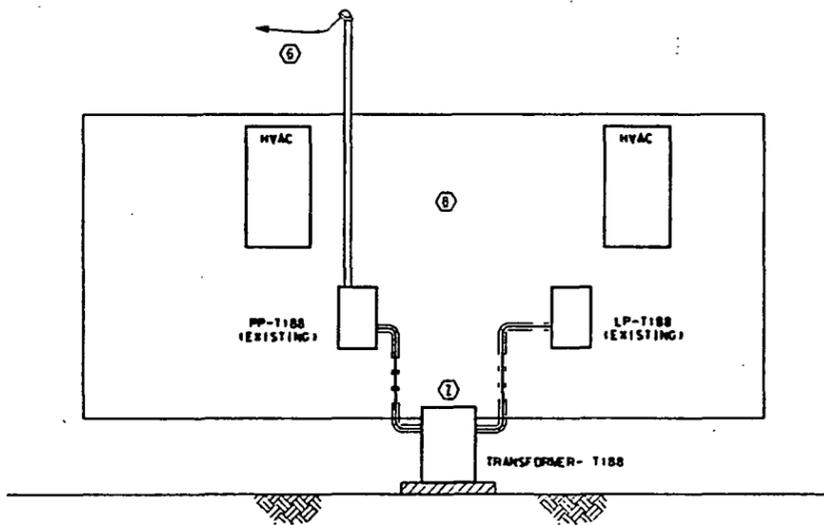
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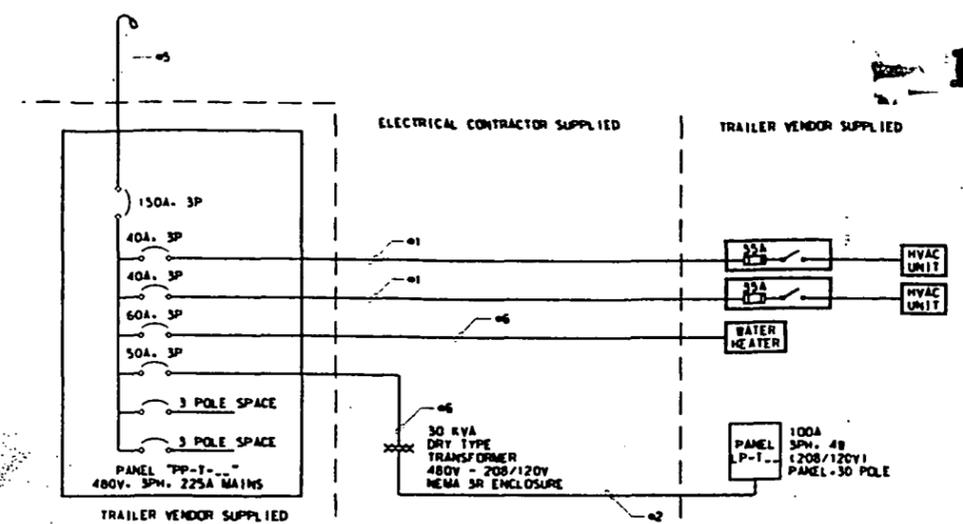
2-PLEX TRAILER GROUNDING



NORTH END T-188 PLAN

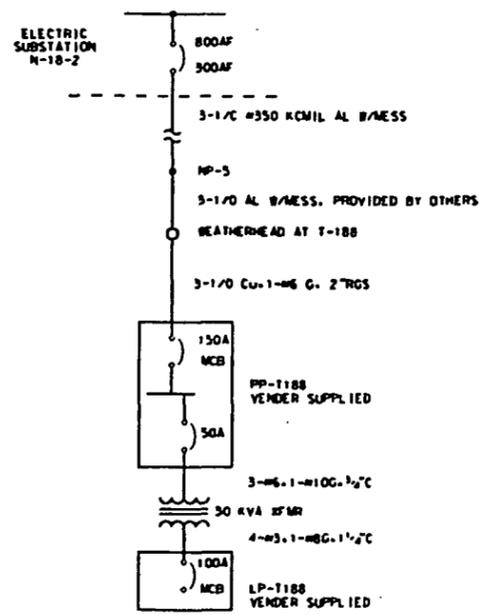


ELEVATION A-A NORTH END T-188



2-PLEX ELECTRICAL POWER DISTRIBUTION

- NOTES
1. ALL WIRING TO BE COPPER WITH THW INSULATION UNLESS NOTED.
 2. ALL GROUND WIRE IS TO BE COPPER.
 3. TRAILER VENDOR TO INSTALL
 4. USE SEALTIGHT CONDUIT WHERE REQUIRED
 5. REQUIRED WHEN WATER LINE IS METAL
- #1 = 3-#8 AND 1-#10 GRD. 3/4" C
 #2 = 4-#3 AND 1-#8 GRD. 1 1/2" C
 #3 = 3-#4 AND 1-#8 GRD. 1 1/2" C
 #4 = 2-3" CONDUITS EACH WITH 3-350 KCMIL AND 1-#10 GRD
 #5 = 3-1/0 AND 1-#6 GRD. 2" C
 #6 = 3-#6 AND 1-#10 GRD. 3/4" C
 #7 = 3-#12 AND 1-#12 GRD. 3/4" C



SINGLE LINE DIAGRAM

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NO	REVISIONS	DATE	DWN. BY	APPD. NO.	REVISIONS	DATE	DWN. BY	APPD. NO.	REF. DWG. NO.

NOTE: FERMCO C.A.D. DRAWING NOT TO BE REVISED MANUALLY

PERFORMANCE GRADE	1	2	3	4	5
BY:					
DATE:					

APPROVALS	
CIVIL & STR. ENGINEER	SAFETY ENG. MAINTENANCE
INSTRUMENT MECHANICAL	O.A.
CHECKED	FIRE PROTECT.
APPROVED	WASTE MANAGE.
	SECURITY
	CRU3 ENG.
	RAD. ENG.

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION

Environmental Management Project

U.S. DEPARTMENT OF ENERGY

PRODUCTION AREA TRAILERS

ELECTRICAL INSTALLATION FOR T-188

RES 3692
 DATE 09/29/98
 DRAWN R.S. ORR

44A-5500-E-00370 A

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U.S. DEPARTMENT OF ENERGY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REMEDATION AREA 1, PHASE II
SEWAGE TREATMENT PLANT EXCAVATION PACKAGE
TECHNICAL SPECIFICATIONS

Division 15

PARSONS

Prepared by:

Oscar W. Carlson

Checked by:

Dave Tope by Carlton Schroeder



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Date: 10/07/98
Rev.: 0 RE: CS

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WBS No: 0.1.2.2.5
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SECTION 15160
STP EXCAVATION DEWATERING PUMPS

PART 1 GENERAL

1.1 SCOPE

This Section includes, but is not limited to:

- A. One automatically controlled dewatering transfer sump pump (No. PMP-1) and motor.
- B. Two automatically controlled dewatering pumps (No. PMP-2 and 3) and motors.

1.2 RELATED SECTIONS

- A. Part 6 - Statement of Work.
- B. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI B16.1-89 Cast Iron Pipe Flanges and Flanged Fittings.

1.4 SUBMITTALS

- A. Provide submittals as required in Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.
- B. Product Data: Certified pump curves showing performance characteristic with pump and system operating point plotted, including minimum and maximum flow.
- C. Completed Pump Data Sheets.

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- D. Motor Product Data: Provide full load amps, impedances, normal and short-circuit current ratings, NEMA frame size, and additional standard nameplate data. Provide efficiency and power factor for each of 1/2, 3/4, and full load. Provide dimensional enclosure details.
- E. Certificates: Certificates of conformance to specification requirements, and certificates guaranteeing performance at design point.
- F. Installation instructions, start-up and troubleshooting instructions, operational and maintenance data, lubrication instructions, and spare parts list.
- G. Test results.
- H. Transfer Pump Plan: The Excavation Work Plan shall include a section on transfer pump installation and operation which shall include, as a minimum, the following:
 - 1. Installation layout of the transfer pump in the existing U.V. Building.
 - 2. Methodology to be utilized for sediment removal from building and provision for access to pump when building is submerged.
 - 3. Layout of discharge line at U.V. Building.
 - 4. Structure or apparatus on which pump will sit in an upright position in intermediate and final locations.
 - 5. Methodology to be used for placing transfer pump in intermediate and final locations as indicated on the Construction Drawings.
 - 6. Layout of discharge pipe lines at intermediate and final or secondary pump locations.
 - 7. Methodology to be used for moving and placing the dewatering pumps in their intermediate and final locations.

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1.5 QUALITY ASSURANCE

- A. The Excavation Work Plan shall include system operability testing (SOT) criteria which shall be submitted to the Construction Manager for approval.
- B. Tests will be witnessed by the Construction Manager. The Contractor shall provide testing procedures fifteen days prior to the test.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry place and protect from weather prior to shipment. Provide protection from weather and from damage during transit.
- B. Loose items shall be tagged and delivered in a standard commercial package. The package shall be protected from the weather, from climate conditions including temperature and humidity variations, and from dirt, dust, and other contaminants that could adversely affect assembly and operation.

PART 2 PRODUCTS**2.1 MANUFACTURER**

- A. KSB, Inc. Model KRT, or equal.

2.2 EQUIPMENT

- A. See Attachment A - Pump Data Sheet. Written exception shall be taken to any requirements a proposed pump - motor combination does not meet.
- B. Motor Requirements.
 - 1. Motors shall be suitable for driven equipment.
 - 2. Motor Service Factor: Furnish motors with service factor not less than 1.1. Motor size in hp shall be selected to serve the driven equipment over its full design performance range as though the service factor were 1.0. (This is not to be

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confused with the pump desired operating range of the Pump Data Sheet.)

3. Motor shall be pump manufacturer's high efficiency standard motor for this application.
4. Watertight Integrity: Static seals at watertight mating surfaces shall be of the "O" ring type. Use of auxiliary sealing compounds shall not be required. The power and control cables shall enter the motor through a terminal housing. The pump and electrical cables shall be capable of continuous submergence without loss of waterproof integrity. The watertight integrity of the motor housing and shaft seal shall be tested during manufacture by pressurizing the motor cavity and submerging in water with motor operating.
5. Motor Protection: The motor shall be equipped with internal thermal and moisture switches. Three separate thermostatic switches (minimum) shall be embedded into the stator windings (one per phase). Each switch shall open independently and terminate motor operation if temperature of the protected winding reaches the high temperature setpoint. A mechanically activated, moisture-sensing, micro switch shall be installed in the motor housing. The switch shall be capable of detecting airborne moisture and terminate operation of motor before liquid enters the cavity. Use of probes or floats that rely on the presence of liquid to initiate signal are not acceptable.
6. Starts per hour: Motor shall be capable of 10 starts per hour.

C. Impeller shall be of cast iron and precision balanced. Balancing shall not deform or weaken the impeller. Impeller fasteners shall be non-corroding.

D. Components: Other major pump components such as stator housing, seal housing, and bearing brackets shall be of structural grade steel or cast iron. Exposed fasteners and lock washers shall be of stainless steel.

E. Shaft Seal: **000120**

1. The pump shaft shall be sealed against leakage by a double mechanical seal.
2. The rotating seal faces shall be lubricated from an oil-filled reservoir between pump and motor, the oil serving as both lubricating and cooling media. The reservoir shall have separate oil fill and drain plugs to ensure accuracy when measuring lubricant level, and for ease of maintenance.
3. Seal shall require no special maintenance or routine adjustment. However, it shall be easily inspected or replaced. No seal damage shall result from operating the pump for short periods without liquid.

2.3 FABRICATION

- A. Prior to shipment, the pump shall be cleaned of all dirt, dust, grease, grime, weld spatter, and other foreign material. Open end connections shall be sealed to prevent the entrance of foreign material.

2.4 LABELING

- A. Equipment Identification: Pumps shall be provided with permanently attached stainless steel nameplates indicating equipment name, number, model number, and rated capacity. Lettering shall be a minimum of 3/8-inch high and shall be stamped.

PART 3 EXECUTION

3.1 ERECTION/INSTALLATION/APPLICATION

- A. The installation of the equipment specified and shown on the drawings shall be in accordance with the manufacturer's instructions.
- B. A copy of the manufacturer's installation instructions, start-up and troubleshooting instructions, operation and maintenance data, lubrication instructions, and spare parts list shall be available at the site.

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3.2 QUALITY CONTROL

- A. Acceptance operating tests shall be performed by the Contractor after installation. If the results are unsatisfactory, the Contractor shall adjust or replace the equipment to meet the specification requirements and retest the equipment.

- B. The Contractor shall notify the Construction Manager of testing and inspection activities at least 24 hours prior to the start of all tests and inspections.

- C. Testing shall not start until the testing procedure has been approved by the Construction Manager.

- D. Demonstrate ability to meet operating point as shown on pump curve. Vibration shall be within manufacturer's acceptable range.

3.3 TURN OVER

- A. Upon completion of project, pumps shall be turned over to the Construction Manager in good working condition.

END OF SECTION

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ATTACHMENT A
PUMP DATA SHEETS

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PUMP DATA SHEET									
PROJECT TITLE: Remediation Area 1, Phase II					PROJECT ORDER: 175				
PUMP NAME: STP Excavation Dewatering Transfer Sump Pump					QUANTITY: 1				
TYPE PUMP: Submersible centrifugal					DRAWING NUMBER				
TYPE DRIVER: Submersible electric motor		SUPPLY W/PUMP			X YES		NO		
MANUFACTURER AND MODEL NO.: KSB, Inc., Model KRT K40-250, or equal					EQUIP NO.: PMP-1				
OPERATING CONDITIONS									
FLUID PUMPED: Stormwater					AT A PUMPING TEMPERATURE OF: 60°F				
SPECIFIC GRAVITY: 1.0		AT 60°F		AT P.T.		VISCOSITY:		AT P.T.	
SOLIDS IN FLUID: 1-5		WT%		DENSITY: NA		SIZE: 1/2" dia.		ABRASIVE: Yes	
NATURE OF SOLIDS: See Note 2					FLUID VAPOR PRESSURE:		N.A. FT. of FLUID @ P.T.		
DESIGN CAPACITY: 100 GPM AT 40 FT. TH at P.T.					DESIRED RANGE: 80 GPM TO 110 GPM				
SUCTION PRESS: NA FT. PSIG			DISCHARGE PRESS: FT. PSIG			NPSH AVAIL: NA at P.T.			
PUMP SPECIFICATIONS									
TYPE PUMP: Centrifugal, direct-connected					NO. STAGES: 1		RPM: 1750 max.		
TYPE IMPELLER: Non-clogging					SIZE: IN.		MAX SIZE: IN.		
EFFICIENCY AT DESIGN CAPACITY: 52 (min)%			BHP @ DESIGN CAPACITY: 1.9		MAXIMUM BHP: 2.5				
TYPE BEARINGS: Oil-lubricated, anti-friction					LUBRICATION:				
TYPE COUPLING:					LUBRICATION:				
TYPE OF SEAL: Double Mechanical									
CONNECTIONS - SIZE & RATING									
SUCTION: Note 4 IN. LB.			Flange		DISCHARGE: 3 IN. Hose Conn. Note 3				
VENT: IN. LB.					DRAIN: IN.				
CONSTRUCTION MATERIALS									
RESTRICTIONS:									
CASING: Cast iron					IMPELLER: Cast iron				
SHAFT: Carbon steel					SHAFT SLEEVE: Stainless steel				
CASE RING:					IMP. RING:				
DISCHARGE ELBOW:					RELIEF VALVE:				
ELECTRIC MOTOR									
VOLTS	PHASE	HERTZ	H.P.	NON-OVERLOAD	CLASS	GROUP	RPM	TYPE	
460	3	60	5.5	YES			1750		
NOTES:									
1) Vendor shall complete data sheet as required.									
2) Suspended solids (silt and clay-sized); some sharp grained fine to medium sand									
3) Connection shall have a 3-inch hose shank in a vertical orientation. Pump flanges, if used, shall be ANSI Class 125.									
4) Provide pump with suction strainer sized to match pump's solids handling capability.									

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PUMP DATA SHEET

PROJECT TITLE: Remediation Area 1, Phase II				PROJECT ORDER: 175				
PUMP NAME: STP Excavation Pumps				QUANTITY: 2				
TYPE PUMP: Submersible centrifugal				DRAWING NUMBER: 92X-5900-N-00502				
TYPE DRIVER: Submersible electric motor		SUPPLY W/PUMP		X YES		NO		
MANUFACTURER AND MODEL NO.: KSB, Inc., Model KRT K40-250, or equal				EQUIP NO.: PMP-2 and 3				
OPERATING CONDITIONS								
FLUID PUMPED: Stormwater				AT A PUMPING TEMPERATURE OF: 60°F				
SPECIFIC GRAVITY: 1.0		AT 60°F		AT P.T.		VISCOSITY: AT P.T.		
SOLIDS IN FLUID: 1-5		WT%		DENSITY: NA		SIZE: 1/2" dia.		
NATURE OF SOLIDS: See Note 2				FLUID VAPOR PRESSURE:		N.A. FT. of FLUID @ P.T.		
DESIGN CAPACITY: 50		GPM AT 30		FT. TH at P.T.		DESIRED RANGE: 30		
SUCTION PRESS: NA		FT.		PSIG		DISCHARGE PRESS: FT.		
						PSIG		
						NPSH AVAIL: NA		
						at P.T.		
PUMP SPECIFICATIONS								
TYPE PUMP: Centrifugal, direct-connected				NO. STAGES: 1		RPM: 1750 max.		
TYPE IMPELLER: Non-clogging				SIZE: IN.		MAX SIZE: IN.		
EFFICIENCY AT DESIGN CAPACITY: 42 (min)%				BHP @ DESIGN CAPACITY: 1.0		MAXIMUM BHP: 1.5		
TYPE BEARINGS: Oil-lubricated, anti-friction								
TYPE COUPLING:				LUBRICATION:				
TYPE OF SEAL: Double Mechanical								
CONNECTIONS - SIZE & RATING								
SUCTION: Note 4		IN.		LB.		Flange		
DISCHARGE: 3 IN.		Hose Conn.		Note 3				
VENT: IN.		LB.		DRAIN: IN.				
CONSTRUCTION MATERIALS								
RESTRICTIONS:								
CASING: Cast iron				IMPELLER: Cast iron				
SHAFT: Carbon steel				SHAFT SLEEVE: Stainless steel				
CASE RING:				IMP. RING:				
DISCHARGE ELBOW:				RELIEF VALVE:				
ELECTRIC MOTOR								
VOLTS	PHASE	HERTZ	H.P.	NON-OVERLOAD	CLASS	GROUP	RPM	TYPE
460	3	60	5.5	YES			1750	
NOTES: <ol style="list-style-type: none"> 1) Vendor shall complete data sheet as required. 2) Suspended solids (silt and clay-sized); some sharp grained fine to medium sand 3) Connection shall have a 2-inch hose shank in a vertical orientation. Pump flanges, if used, shall be ANSI Class 125. 4) Provide pump with suction strainer sized to match pump's solids handling capability. 5) If necessary, provide discharge orifice sized to allow pump to meet specified total head. Orifice shall be mounted between pump discharge flange and hose shank. 								

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

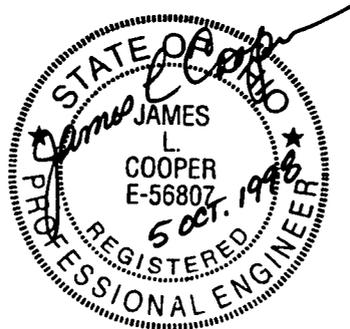
REMEDATION AREA 1, PHASE II
SEWAGE TREATMENT PLANT EXCAVATION PACKAGE
TECHNICAL SPECIFICATIONS

Division 16

PARSONS

Prepared by: James P. Farrell

Checked by: James L Cooper by Carleton Schoeder



SECTION 16050
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 SCOPE

This Section includes, but is not limited to:

- A. Circuit breakers.
- B. Disconnect switches.
- C. Combination magnetic motor starters.
- D. Selector switches, push-button switches and indicating lights.
- E. Receptacles.
- F. Relays.
- G. Conduit.
- H. Wire and cable.
- I. Instrument cable.
- J. Nameplates.
- K. Wire markers and cable tags.
- L. Wireway and auxiliary gutters.
- M. Splicing and termination components.
- N. Boxes.
- O. Supporting devices.
- P. Electrical testing.

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1.2 RELATED SECTIONS

- A. Section 15160 - Dewatering Pump.
- B. Section 16170 - Grounding and Bonding.
- C. Section 16370 - Overhead Power Distribution.
- D. Section 16462 - Dry Type Transformer/Panelboards.
- E. Part 6 - Statement of Work.
- F. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI C80.1-90 Rigid Steel Conduit (RGS) - Zinc Coated.
 - 2. ANSI C80.6-94 Intermediate Metal Conduit (IMC) - Zinc Coated.
- B. InterNational Electrical Testing Association (NETA):
 - 1. NETA ATS-95 Acceptance Testing Specification for Electrical Power Distribution Equipment.
- C. National Fire Protection Association (NFPA):
 - 1. NFPA 70 National Electrical Code, 1996 Edition.
- D. National Electrical Manufacturers Association (NEMA):
 - 1. NEMA AB 1-93 Molded Case Circuit Breakers and Molded Case Switches.
 - 2. NEMA ICS 1-93 Industrial Control and Systems General Requirements.

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- 3. NEMA ICS 2-93 Industrial Control and System Controllers, Contactors, and Overload Relays Rated Not More Than 2000 Volts AC or 750 Volts DC.
- 4. NEMA ICS 4-93 Industrial Control and Systems Terminal Blocks.
- 5. NEMA ICS 6-93 Industrial Control and Systems Enclosures.
- 6. NEMA KS 1-90 Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
- 7. NEMA OS 1-89 Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- 8. NEMA WD 1-83 General Requirements for Wiring Devices.
- 9. NEMA WD 6-88 Wiring Devices - Dimensional Requirements.
- 10. NEMA 250-91 Enclosures for Electrical Equipment (1,000 Volts Maximum).

E. State of Ohio, Department of Transportation (ODOT):
 Construction and Material Specifications, January 1, 1997, except as supplemented or otherwise modified herein and/ or shown on the Construction Drawings.

F. Underwriters Laboratories Inc. (UL):

- 1. UL 360-96 UL Standard for Safety Liquid-Tight Flexible Steel Conduit.
- 2. UL 486A-91 UL Standard for Safety Wire Connectors and Soldering Lugs for Use with Copper Conductors.
- 3. UL 510-94 UL Standard for Safety Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
- 4. UL 854-96 Service-Entrance Cables.

5. UL 870-95 UL Standard for Safety Wireways, Auxiliary Gutters, and Associated Fittings.
6. Electrical Construction Materials Directory - 97.

1.4 SUBMITTALS

- A. Provide submittals as required by Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.
- B. Submit the following after Notice to Proceed:
 1. Catalog sheets for all equipment and materials.
 2. All procedures and record forms for required testing.
- C. Submit all test reports after completing of tests.

1.5 QUALITY ASSURANCE PROGRAM

- A. Work shall comply with NFPA 70. Use of conduit for equipment ground is prohibited.
- B. Products shall be listed in the UL Electrical Construction Materials Directory, for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 EQUIPMENT

- A. Molded Case Circuit Breaker for Existing Substation
 1. NEMA AB 1 with integral thermal and instantaneous magnetic trip in each pole. Provide common trip handle for all poles. Terminals, minimum 75 degrees C rated.

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2. Provide one Siemens ITE SBA800, circuit breaker with 800 AF, trip as indicated for existing Substation N18-2. Do not procure this breaker until authorized by the Construction Manager. FDF may have an existing spare available (previously used in substation N78-1).
 3. Substation N18-2 Nameplate Information: Siemens ITE RC III, Series 6, S. O. 17-18930-1, 480V/277Y, MAWF 3/93.
- B. Disconnect Switches - Fusible Switch Assemblies: NEMA KS 1, Type HD quick-make, quick-break, visible blade, load interrupter knife switch in Type 3R or 4 enclosures, NEMA 250, for outdoor use, with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: FS W-F-870. Designed to accommodate Class R fuses. Terminals, minimum 75 degrees C rated.
- C. Combination Magnetic Motor Starters
1. Combination Magnetic Motor Starters: NEMA ICS 1, NEMA ICS 2, AC general purpose Class A magnetic starter for induction motors for the rated horsepower combined with a magnetic circuit breaker, NEMA AB 1, with instantaneous magnetic trip in each pole. Starter, circuit breaker, and control power transformer shall be in a common enclosure. Terminals, minimum 75 degrees C rated.
 2. Provide externally operable handle interlocked to prevent opening of cover with circuit breaker in the ON position. Allow handle to be lockable in the OFF position.
 3. Contactor Coil Operating Voltage: 120 V, 60 Hz.
 4. Overload Relay: NEMA ICS 2, bimetal.
 5. Control Power Transformer: 120 V secondary, 50 VA minimum. Provide fused secondary of transformer, and ground unfused leg of secondary to enclosure.
 6. Enclosure: mounted in NEMA ICS 6, Type 4X, outdoor cabinet as indicated.

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7. Heater elements shall be included, as required, for the described service conditions.
 8. Two auxiliary contacts (electrically dry), one each, normally closed and normally open, in addition to the hold-in contact, shall be provided.
- D. Selector Switches
1. Enclosure, NEMA ICS 6, Type 3R or 4.
 2. Three-position, spring return, push-button, and indicating lights as indicated.
- E. Receptacles - Convenience Receptacle: 125 V, 15/20 A, NEMA WD 1, heavy-duty, general use with metal cover plate; conforming to NEMA WD 6, Configuration 5-20. 125 V, 30 A, NEMA WD 1, heavy-duty, general use with metal cover plate; conforming to NEMA WD 6, Configuration 5-30. Furnish with weatherproof "while in use" covers for outdoors, wet or industrial locations.
- F. Relays - NEMA ICS 2, contacts rated 5A at 120 V.
- G. Time delay relays.

2.2 MATERIALS

- A. Conduit
1. Rigid steel, heavy wall, galvanized conduit conforming to ANSI C80.1. Intermediate metal conduit (IMC), conforming to ANSI C80.6, shall be acceptable for interior spaces. Conduit shall be 1/2-inch diameter minimum.
 2. Liquid-tight flexible metal conduit conforming to UL 360. Conduit shall be 1/2 inch diameter minimum, 5 feet in length (maximum) unless indicated on Construction Drawings .
 3. Conduit connections shall be threaded.
- B. Wire and Cable - Single and multi-conductor, 600 volt insulated copper conductor. Conductors for power and

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lighting branch circuits shall not be smaller than No. 12 AWG. Conductors No. 14 AWG and larger shall be stranded. Conductors for control shall not be smaller than No. 14 AWG stranded. Conductors for Class 1 remote-control and signal circuits shall be enclosed in cable and shall comply with NFPA 70. Power and lighting conductor insulation shall be rated 90 degrees C in accordance with NFPA 70 and shall be insulation Type THHN, THWN-2, XHHW, XHHW-2. Direct burial cable shall be type USE-2, conforming to UL 854. Armored cable shall be for outdoor use with Al interlocked armor.

C. Nameplates shall be engraved, three-layer laminated plastic, 5/16-inch bold style, black letters on white background.

D. Wire Markers and Cable Tags

1. Wire markers shall be single-conductor slip on, heat-shrinkable sleeve with typed or printed black letters on a white background. Wire markers shall be W. H. Brady Co. computer-printable "Bradysleeve" or approved equal.
2. Cable tags shall be rectangular, flat, non-heat shrinkable tags with 1/8-inch-high letters. Cable markers shall be Raychem-type TMS or approved equal.

E. Wireway and Auxiliary Gutters

1. Wireway and Auxiliary Gutters: General purpose, NEMA ICS 6, Type 3R enclosure with knockouts on bottom.
2. Size: As required.
3. Cover: Screw cover with full gasketing.
4. Fittings: UL 870, lay-in type with removable top, bottom, and side; captive screws.
5. Material: Carbon steel.
6. Finish: Rust-inhibiting primer coating with gray enamel finish.

F. Splicing and Termination Components

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1. Wire connectors, UL 486A, as applicable.
2. Insulation tape, UL 510.
3. Provide solderless terminal lugs, rated 75 degrees C minimum, on stranded conductors.

G. Boxes and Cover Plates

1. Junction and Pull Boxes
 - a. Junction and pull boxes shall be sized as indicated in accordance with NFPA 70, Article 370.
 - b. Junction and pull boxes located indoors shall be code-gauge, galvanized sheet steel and shall be of welded construction with conduit knockouts or raceway openings and hinged or screwed covers as indicated. Type 3R, according to NEMA 250.
 - c. Junction and pull boxes located outdoors shall be code-gauge, galvanized sheet steel and shall be of welded construction and have screwed, gasketed covers, and watertight hubs. Type 3R, according to NEMA 250.
2. Device and Outlet Boxes
 - a. Device and outlet boxes shall be pressed steel, zinc, or cadmium coated in accordance with NEMA OS 1 unless otherwise indicated.
 - b. Outlet boxes shall not be smaller than 4 inches octagonal by 1-1/2 inches deep and shall be provided with the proper size knockouts for the conduits intended. Unused knockouts shall remain closed or shall be sealed with knockout closures.
 - c. Device or outlet boxes shall be of unit construction of a size required for the number of switches or outlets called for on the Construction Drawings. No sectional device boxes shall be permitted.
 - d. Surface-mounted outlet boxes for receptacles, switches, or similar devices shall be cast type.

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- H. Supporting Devices
 - 1. Support Channel shall be galvanized or painted steel.
 - 2. Support hardware and accessories shall be corrosion resistant.
 - 3. Supports shall be of all-welded construction.

- I. Underground Warning Tape - 4-inch-wide plastic tape, colored yellow with suitable warning legend describing buried electrical lines.

PART 3 EXECUTION

3.1 SITE CONDITIONS

- A. Ensure site is ready to receive work before start of construction.

3.2 ERECTION/INSTALLATION/APPLICATION

- A. Conduit
 - 1. Route conduit parallel or at right angles to building lines. Provide conduit supports at approximately 8-foot intervals. Route conduit so as not to create a hazard for tripping or to compromise head clearance. Minimum height above floor shall be 7 feet, 6 inches.
 - 2. Cut conduit square using saw or pipecutter. Cut ends of conduit shall be reamed smooth.
 - 3. Install no more than the equivalent of three 90 degree bends between junction boxes. Use hydraulic one-shot conduit bender or factory elbows for conduit diameter larger than 1-1/2 inch.
 - 4. Use Form 8 conduit bodies to make sharp changes in direction. Avoid moisture traps, provide junction box with weep hole.
 - 5. Provide cast metal boxes such as FS or FD in damp or wet locations.

6. Provide 1/8-inch nylon pull cord in empty conduits. Cap empty conduits to prevent entry of moisture and foreign objects.
7. Final conduit connections to motors or other vibrating equipment shall be made with approximately 3-foot liquid-tight flexible metal conduit.
8. Conduit and supports are to be field routed. They are not indicated explicitly on Construction Drawings .

B. Wire and Cable

1. Swab conduit before installing cable. Remove burrs, dirt, or other debris. For existing conduit, pull a mandrel through before pulling cable to verify roundness and bending radii.
2. When pulling cable into conduit, use wire pulling compound.
3. Splices shall be made only in outlet or junction boxes.
4. Provide equipment grounding conductor along with phase conductors in conduits.
5. Multiconductor cables shall contain an integral ground conductor.
6. Grounding conductors shall be connected to equipment with compression lugs. Grounding connections shall be made to clean, dry surfaces. Scale, rust, grease, and dirt shall be removed from surfaces to which grounding connections are to be made.
7. Conductors shall be color coded. Conductors No. 6 AWG and larger shall be identified using colored tape at terminals and splice points. Conductors No. 8 AWG and smaller shall be identified using colored insulation or jacket. Color coding shall be as follows:

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480Y/277V	Phase A	Yellow
	Phase B	Orange
	Phase C	Brown
	Neutral (grounded)	Gray
	Ground	Green
208Y/120V	Phase A	Black
	Phase B	Red
	Phase C	Blue
	Neutral (grounded)	White
	Ground	Green
	Plant Fire	Red and Yellow
	Alarm System	Brown and Yellow

8. Armored cable shall be installed exposed in accordance with anchoring requirements on drawings.

C. Nameplates

1. Clean surfaces prior to installing nameplates.
2. Install nameplates parallel to equipment lines. Secure nameplates to equipment fronts using self-tapping screws.

D. Wire and Cable Markers

1. Provide wire markers on each conductor in pull boxes and junction boxes and at each load connection. Provide cable tags in pull boxes for multiconductor cables.
2. Wire and cable tags shall identify panel and circuit number or control wire number, as required.

E. Disconnect Switches

1. Mounting supports shall not be fastened to or penetrate wall panels.

F. Receptacles

1. Install convenience receptacles 48 inches above finished grade. Receptacle mounting supports shall not be fastened to or penetrate wall panels.

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2. Label receptacles with panelboard and circuit number from which they are served.
- G. Combination Magnetic Motor Starters
1. Motor controllers in cabinet indicated on Construction Drawings.
 2. Install overload heater element in motor controller to match motor characteristics.
 3. Provide engraved nameplate identifying motor served.
- H. Selector Switches and Pushbuttons
1. Install selector switches and pushbuttons in cabinets as indicated on Construction Drawings.
- I. Clearances
1. Clearances from points of access to electrical equipment and other devices shall conform to the requirements of NFPA 70.
 2. Equipment control devices and other electrical equipment requiring operation or maintenance shall have a minimum working clearance of 3 feet from the surface of operation or access, unless greater clearance is required by NFPA 70.
- J. Boxes
1. Coordination of Box Locations
 - a. Provide electrical boxes as indicated and as required for splices, taps, wire pulling, and equipment connections.
 - b. Electrical box locations indicated are approximate unless dimensioned.
 - c. Locate and install boxes to allow access.
 - d. Do not install boxes back to back in walls. Provide 6-inches (minimum) separation in non-acoustic rated walls and 24 inches (minimum) separation in acoustic rated walls.

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- e. Coordinate mounting heights of boxes and locations of outlets mounted above counters, benches, and backsplashes to ensure locations are useful.
 - f. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.
2. Outlet Box Installation
- a. Firmly secure in place outlet or utility boxes concealed in the construction. Set outlet or utility boxes true, square, and flush with the finish surfaces for the application of the appropriate cover plate.
 - b. Provide knockout closures for unused knockout openings.
 - c. Support boxes independently of conduit except for cast boxes when connected to two rigid metal conduits, both supported within 12 inches of the box to be supported.
 - d. Use multiple gang boxes where more than one device is mounted together. Do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.
3. Pull and Junction Box Installation
- a. Support pull and junction boxes independently of conduit.

K. Cabinets

- 1. Install cabinet fronts and sides plumb.

L. Supporting Devices

- 1. Installation of structural steel framing, concrete pads, etc., shall be complete before installing supporting devices.
- 2. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structures in accordance with manufacturer's recommendations as indicated.
- 3. Use expansion anchors for support on concrete surfaces.

4. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
5. Do not drill structural steel members for installing support devices.
6. Fabricate supports from structural steel or steel channel. Rigidly bolt to structural steel to present a neat appearance. Use hexagon head bolts with spring lock washers under nuts.
7. Install freestanding electrical equipment on concrete pads. Concrete shall conform to ODOT Item 499, Class F, 3000 psi compressive strength at 28 days, and Item 511.
8. Install surface mounted cabinets and enclosures with four anchors (minimum). Provide steel channel supports to stand cabinets and enclosures 1 inch from the wall.

3.3 QUALITY CONTROL

A. Electrical Inspection and Testing - General

1. Electrical inspection and testing for work in this Section and in other electrical Sections shall conform to the following requirements and to NETA ATS. Tests required by NETA ATS for electrical work on this project shall be performed unless specific instruction is provided otherwise. Any additional requirements or exceptions shall be as noted in the other electrical sections for the specific electrical work of that Section only.
2. Testing shall be witnessed by FDF, CQC Consultant-Quality Control personnel (who must approve results) and manufacturer's service representative(s), if required. Notice of testing must be furnished seven (7) days in advance.
3. Submit test results and calibration data on approved forms.
4. Perform operational tests to demonstrate control and interlocking wiring.

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5. Visual inspections shall be performed for phasing and connections. Phasing shall be A, B, C clockwise at all three phase disconnects.
6. Repair or replacement of components where test results are unacceptable, including those damaged during testing process, is required.

B. Electrical Inspection and Testing

1. Perform continuity and operation tests on power and control circuits. Low voltage thermographic survey of cable connections required by NETA ATS are not required. Wire insulation for conductors No. 6 AWG and larger shall be megger tested between each conductor and ground. A 1000-volt megger shall be used for insulation rated 600 volts. Minimum resistance shall be 100 megohms.
2. Insulation resistance tests shall not be performed on solid state equipment unless authorized by its manufacturer and in strict accordance with the manufacturer's recommendations. Solid state equipment includes static ground fault devices, such as ground fault circuit interrupters.
3. Confirm that electrical connections to utilization equipment have been made in accordance with manufacturer's instructions.
4. Perform motor tests according to NETA ATS.
5. Motor windings shall be checked for continuity.
6. Motor windings rated 460 volts nominal shall be megger tested with a 1,000-volt megger prior to connection of power leads. Minimum acceptable resistance shall be 100 megohms. Motor and phase rotation shall be checked with a phase rotation tester manufactured by G. Biddle Company (Catalog No. 56060) or equal on equipment which could be damaged by reverse rotation.
 - a. Motor and phase rotation shall be verified before energizing motors.

- b. Motors shall be "bumped" to check for proper direction of rotation prior to performing operational tests on the equipment in the presence of the Construction Manager.

END OF SECTION

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SECTION 16170
GROUNDING AND BONDING**PART 1 GENERAL****1.1 SCOPE**

This section includes, but is not limited to:

- A. Grounding electrodes and conductors.
- B. Equipment grounding conductors.
- C. Bonding.

1.2 RELATED SECTIONS

- A. Section 16050 - Basic Electrical Materials and Methods.
- B. Section 16370 - Overhead Power Distribution.
- C. Part 6 - Statement of Work.
- D. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

- A. InterNational Electrical Testing Association (NETA):
 - 1. NETA ATS-95 Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 70 National Electrical Code, 1996 Edition.

- C. Underwriters Laboratories, Inc. (UL):
 - 1. UL 467-93 UL Standard for Safety Grounding and Bonding Equipment.
 - 2. Electrical Construction Materials Directory-97.

1.4 SYSTEM DESCRIPTION

- A. Rod electrode and grounding connections.
- B. Grounding System Resistance: 5 ohms maximum.

1.5 SUBMITTALS

- A. Provide submittals as required by Part 6. Unless specified otherwise, submittal shall be made to the Construction Manager for review and approval.
- B. Submit the following after Notice to Proceed:
 - 1. Catalog sheets for all equipment and materials.
 - 2. Certification of ground testing instrumentation.
 - 3. All procedures and record forms for required testing.
- C. Submit the following after completing of tests:
 - 1. All test reports.
 - 2. Record of as-built locations of grounding electrodes.

1.7 QUALITY ASSURANCE PROGRAM

- A. Conform to requirements of NFPA 70.
- B. Furnish products listed in the UL Electrical Construction Materials Directory as suitable for the purpose specified and indicated.
- C. Provide certification of ground testing instrumentation according to NETA ATS.

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PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers
 - 1. Mechanical Connectors
 - a. Burndy.
 - b. Ideal.
 - c. Ilsco.
 - 2. Exothermic Connections
 - a. Cadweld.
 - b. Thermoweld.

2.2 MATERIALS

- A. Rod Electrode
 - 1. Copper-clad steel, 3/4-inch diameter, 10-foot length.
- B. Mechanical Connectors
 - 1. Bronze.
- C. Wire
 - 1. Stranded copper.
 - a. Grounding Conductor: Size to meet NFPA 70 requirements.
- D. Grounding and bonding materials shall conform to UL 467.

PART 3 EXECUTION

3.1 SITE CONDITIONS

- A. Verify that final backfill and compaction have been completed before driving rod electrodes.
- B. Verify that underground utilities will not interfere with the proposed rod locations prior to driving rod electrodes.

3.2 ERECTION/INSTALLATION/APPLICATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install additional rod electrodes as required to achieve specified resistance to ground.
- C. Equipment Grounding Conductor: Provide separate, insulated conductor with each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.
- D. Connect ground conductors to reinforcing bars in foundation before pouring concrete. Tie to structural steel members when they are installed, by exothermic connection.
- E. Ground metal equipment enclosures by attachment to ground rod system, the building steel, or existing periphery grounding system.
- F. Ground pole-mounted equipment and static line conductors as indicated on the Construction Drawings.
- G. Drive ground rods until the top is below grade.

3.3 QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation as defined by specifications, Construction Drawings and manufacturer's instructions. Accurately record as-built locations of grounding electrodes if required, and submit as specified in this Section. Test instrumentation shall conform to NETA ATS. Provide certification for instrumentation.

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- B. Measure the system's resistance to the ground; perform testing in accordance with instrument manufacturer's recommendations. Measure resistance at each pole and at each 480 V service as a minimum. Provide written test reports indicating overall resistance to ground and resistance of each electrode to ground.

END OF SECTION

SECTION 16370
OVERHEAD POWER DISTRIBUTION

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PART 1 GENERAL

1.1 SCOPE

This section includes, but is not limited to:

- A. Poles.
- B. Pole hardware.
- C. Line conductors.
- D. Anchors.

1.2 RELATED SECTIONS

- A. Section 16050 - Basic Electrical Materials and Methods.
- B. Section 16170 - Grounding and Bonding.
- C. Part 6 - Statement of Work.
- D. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

- A. National Fire Protection Association (NFPA):
 - 1. NFPA 70 National Electrical Code, 1996 Edition.
- B. American National Standards Institute (ANSI):
 - 1. ANSI C2-97 National Electrical Safety Code.
 - 2. ANSI C135.1-79 Galvanized Steel Bolts and Nuts for Overhead Line Construction.
 - 3. ANSI O5.1-92 Wood Poles Specifications and Dimensions.

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- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM A36/A36M-96 Standard Specification for Carbon Structural Steel.
 - 2. ASTM A475-95 Standard Specification for Zinc-Coated Steel Wire Strand.

- D. American Wood-Preservers Association (AWPA):
 - 1. AWPA C4-89 Poles - Pressure Process.
 - 2. AWPA C25-89 Standard for the Preservative Treatment of Crossarms by the Pressure Process.

- E. National Electrical Manufacturers Association (NEMA):
 - 1. NEMA WC 7-88 Cross-Linked Thermosetting Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

- F. Underwriters Laboratories, Inc. (UL):
 - 1. Electrical Construction Materials Directory-97.

1.4 SUBMITTALS

- A. Provide submittals as required by Part 6. Unless specified otherwise, submittals shall be made to the construction manager for review and approval.

- B. Submit the following after Notice to Proceed:
 - 1. Catalog sheets for all equipment and materials.
 - 2. All procedures and record forms for required testing.
 - 3. Any MSDSs where applicable.

- C. Submit all test reports after completing of tests.

1.5 QUALITY ASSURANCE PROGRAM

- A. Conform to requirements of NFPA 70 and ANSI C2.

- B. Furnish products, where available, listed in the UL Electrical Construction Materials Directory, as suitable for the purpose specified and indicated.

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- C. Installation shall comply with ANSI C2, Heavy Loading District, Grade B Construction.

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1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect poles from damage and decay by stacking to provide free circulation of air. Maintain 1 foot minimum spacing between bottom pole and ground or ground vegetation. Do not store poles above decayed or decaying wood.
- B. Stack poles stored for more than 2 weeks on decay-resistant skids arranged to support poles without noticeable pole distortion.
- C. Handle treated poles with tools which will not produce an indentation greater than 1 inch deep. Do not drag treated poles along ground. Do not apply tools to that section of treated poles between 1 foot above and 2 feet below ground line.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Poles
1. Wood Poles: ANSI O5.1; treated southern pine poles of length and class indicated.
 2. Select poles for straightness, minimum sweeps, and short crooks.
 3. Preservative: ANSI O5.1 and AWWA C4, Pentachlorophenol.
 4. Apply preservative to poles as required by AWWA C4 with minimum net retention of 12 lbs/ft³. Obtain complete sapwood penetration.
- B. Pole Hardware
1. Pole Hardware: Hot-dipped galvanized after fabrication and as indicated on the Construction Drawings.
 2. Eye Bolts and Nuts: ANSI C135.1.
 3. Guy Strand: High strength, seven-strand steel cable galvanized to ASTM A475, Class A or B.

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- C. Line Conductors
 - 1. Secondary Conductors: aluminum, three insulated conductors and messenger/ground wire with 600 volt cross-linked polyethylene insulation for phase conductors conforming to NEMA WC 7.

- D. Anchors
 - 1. Helical Screw Anchors: Galvanized steel, ASTM A36/36M.

PART 3 EXECUTION

3.1 SITE CONDITIONS

- A. Verify that field measurements are as shown on Construction Drawings.

- B. Verify that there are no underground utilities located below the poles prior to installation.

- C. Use small diameter steel probe to verify area is free of underground obstructions prior to installation of anchors.

3.2 ERECTION/INSTALLATION/APPLICATION

- A. Install products in accordance with manufacturer's instructions.

- B. Plug unused holes in poles using treated wood dowel pins. Treat field-cut gains and field-bored holes with preservative.

- C. Shorten poles when required by cutting from top end. Apply hot preservative to shortened end of pole.

- D. Set poles in straight line. Place curved poles with curvature in line with lead pole. Maintain an even grade.

- E. Dig setting holes large enough to permit use of power tampers to full depth. Place earth in maximum 6-inch layers and power tamp.

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- F. Rake poles located at corners, angles, and dead ends so that poles are vertical after line installation.
- G. Do not install poles along the edge of cuts and embankments or where soil may be washed out.
- H. Identify each pole using aluminum marker stamped with characters 2-1/2 inches high, minimum. Locate to provide maximum visibility from roadway and fasten with aluminum nails. Obtain identifying numbers from the Construction Manager.
- I. Minimum depths in normal firm ground, measured from lower side of pole:

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OVERALL LENGTH	DEPTH FOR STRAIGHT LINES	DEPTH AT CURVES, CORNERS, AND POINTS OF EXTRA STRAIN
30'	5'-6"	5'-6"
35'	6'-0"	6'-0"
40'	6'-6"	6'-6"
45'	7'-0"	7'-6"
50'	7'-6"	8'-0"
55'	7'-6"	8'-0"

- J. Install conductors to ANSI C2. Maintain clearances required by ANSI C2, except as follows: above roads, 480 V conductors - 23 feet, over buildings, all conductors, 8 feet, 40 inches between communication lines and power lines.
- K. Make aluminum connections to copper or other material using only splices, connectors, lugs, or fittings designed for that specific purpose.
- L. Install guys and anchors according to ANSI C2 requirements.

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- M. Bond metal enclosures on poles to pole ground wire in accordance with NFPA 70, ANSI C2 and manufacturer's instructions.

END OF SECTION

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SECTION 16462
DRY TYPE TRANSFORMER/PANELBOARDS

PART 1 GENERAL

1.1 SCOPE

This section includes, but is not limited to:

- A. Dry type, two-winding transformers integrated with primary and secondary main breakers and feeder breakers.

1.2 RELATED SECTIONS

- A. Section 16050 - Basic Electrical Materials and Methods.
- B. Section 16170 - Grounding and Bonding.
- C. Part 6 - Statement of Work.
- D. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

- A. InterNational Electrical Testing Association (NETA):
 - 1. NETA ATS-95 Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- B. National Electrical Manufacturers Association (NEMA):
 - 1. NEMA AB 1-93 Molded Case Circuit Breakers and Molded Case Switches.
 - 2. NEMA PB 1-90 Panelboards.

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3. NEMA PB 1.1-91 General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.
 4. NEMA ST 20-92 Dry Type Transformers for General Applications.
 5. NEMA 250-91 Enclosures for Electrical Equipment (1000 Volts Maximum).
- C. National Fire Protection Association (NFPA):
1. NFPA 70 National Electrical Code, 1996 Edition.
- D. Underwriters Laboratories, Inc. (UL):
1. Electrical Construction Materials Directory-97.

1.4 SUBMITTALS

- A. Provide submittals as required by Part 6. Unless otherwise specified, submittals shall be made to the Construction Manager for review and approval.
- B. Submit the following after Notice to Proceed:
1. Catalog sheets and shop drawings for all equipment and materials.
 2. Product data to include outline and support point dimensions of enclosures and accessories; unit weight; voltage; kVA, number of phases, impedance ratings, and characteristics; X/R ratio; tap configurations; insulation system type; rated temperature rise; and main bus ampacity, integrated short circuit ampere rating, circuit breaker, arrangement, and sizes.
 3. Factory test reports: NEMA ST 20. Indicate loss data; efficiency at 25, 50, 75, and 100 percent rated loads; and sound level.
 4. All procedures and record forms for required testing.

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- C. Submit the following after completing of tests:
 - 1. All field test reports: Indicate primary and secondary voltages as measured, according to NETA ATS.

1.5 QUALITY ASSURANCE PROGRAM

- A. Conform to requirements of NFPA 70.
- B. Furnish products listed in the UL Electrical Construction Materials Directory for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver transformers/panelboards individually wrapped for protection and mounted on shipping skids.
- B. Accept transformers/panelboards on site. Inspect for damage.
- C. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- D. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to transformer/panelboards' internal components, enclosure, and finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Siemens.
- B. Westinghouse.
- C. Square D.

2.2 EQUIPMENT

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A. Two-winding transformers

1. Description: NEMA ST 20, factory-assembled, air-cooled, dry type transformers; ratings as indicated on Construction Drawings.
2. Insulation system and average winding temperature rise for rated kVA as follows:
 - a. 1-30 kVA: Class 185 with 115 degrees C rise.
 - b. 16-500 kVA: Class 220 with 115 degrees C rise.
3. Case Temperature: Do not exceed 40 degrees C rise above ambient at warmest point.
4. Winding Taps:
 - a. Transformers: NEMA ST 20. Transformers shall have four full current taps, two at 2-1/2 percent each above and two at 2-1/2 percent each below normal voltage.
5. Sound Levels: NEMA ST 20, not to exceed 85 dBA at 3 feet.
6. Basic Impulse Level: 10 kV.
7. Ground core and coil assembly to enclosure by means of a visible, flexible copper grounding strap.
8. Mounting: Suitable for wall mounting, except where indicated otherwise on Construction Drawings.
9. Coil Conductors: Continuous windings with terminations brazed or welded.
10. Enclosure: NEMA ST 20. Provide lifting eyes or brackets.
11. Isolate core and coil from enclosure, using vibration-absorbing mounts.
12. Nameplate: Include connection data and overload capacity based on rated allowable temperature rise.

B. Branch Circuit Panelboards

1. Lighting and Appliance Branch Circuit Panelboards: NEMA PB 1; circuit breaker type.
2. Enclosure: NEMA PB 1; Type 3R conforming to NEMA 250.
3. Cabinet Size: As shown on manufacturer's drawings.

4. Cabinet Front: Hinged cover with paddle lock hinge.
5. Provide an integrated unit with transformer. Finish in manufacturer's standard gray enamel.
6. Provide panelboards with copper bus, ratings as scheduled on drawings. Provide copper ground bus in each panelboard.
7. Minimum Integrated Short Circuit Rating: 10,000 amperes rms symmetrical.
8. Molded Case Circuit Breakers: NEMA AB 1; plug-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, rated for 75 degrees C copper conductors. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A and Class B ground fault interrupter (GFCI) circuit breakers where required. Provide 20 percent spare breakers installed in the panelboard, including at least one 30 mA GFCI breaker, unless otherwise indicated on Construction Drawings.

PART 3 EXECUTION

3.1 ERECTION/INSTALLATION/APPLICATION

- A. Install transformer/panelboards in accordance with NEMA PB 1.1.
- B. Install plumb, and in accordance with manufacturer's instructions, and as indicated on Construction Drawings.
- C. Height (transformer/ panelboard combination only): 6 feet, 6 inches to top of transformer section.
- D. Provide grounding connections in accordance with Section 16170.
- E. Provide filler plates for unused spaces in panelboards.
- F. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

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- G. Provide engraved plastic nameplates identifying transformer/panelboard equipment number.
- H. After initial energizing of transformers, measure the secondary voltage and adjust to nominal voltage by changing taps.

3.2 QUALITY CONTROL

- A. Test according to general requirements of Section 16050 and to the relevant requirements of NETA ATS.
- B. Visual and mechanical inspection: Inspect for physical damage, proper alignment, anchorage, grounding, and conformance of installation to contract documents and manufacturer's instructions. Check tightness of wiring and mounting connections for circuit breakers and transformer prior to energizing.
- C. Record primary and secondary voltages; submit to the Construction Manager.
- D. Measure steady state load currents at each panelboard feeder. Rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

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