

# WASTE EXCLUSION PLAN

Altus Municipal Landfill

Permit No. 3533005



March 2024

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## 1.0 Purpose

The purpose of this document is to specify what types of solid waste are not accepted at the Altus Municipal Landfill and set forth standard procedures for inspecting waste loads to comply with Oklahoma Department of Environmental Quality Regulations described in 252:515-29-3.

## 2.0 Training of Personnel

All gate attendants and disposal facility operators shall receive an initial eight (8) hours of basic training in waste exclusion and radioactivity. The training curriculum at a minimum shall include review of regulatory definitions and requirements for handling of waste as well as the facility's WEP implementation procedures. Training shall include a minimum of four (4) hours per year annual refresher training. Trained personnel shall be on-site during all hours the facility is open to accept wastes. Training documentation for all personnel shall be kept on site. Every effort will be made to take in-person training provided by ODEQ or SWANA but online courses can be accepted if in-person training is not feasible.

On-the-job training will also be conducted. All new employees will read this Waste Exclusion Plan and become familiar with the types of wastes to be rejected as well as procedures for screening waste loads and rejecting wastes.

## 3.0 Prohibited Waste

The following wastes are prohibited for disposal at the Altus Municipal Landfill (Permit No. 3533005).

### 3.1 Polychlorinated Biphenols (PCBs)

PCBs, which are regulated under the Toxic Substances Control Act (TSCA) are listed in 40 CFR 258.20 as being specifically prohibited from disposal at municipal solid waste landfills. Any waste material with greater than 50 ppm of PCBs shall not be accepted for disposal.

### 3.2 Liquid Wastes

Under 40 CFR 258.28, bulk or non-containerized liquid waste may not be disposed of in a municipal solid waste landfill. EPA defines a waste as liquid if it fails the Paint Filter Liquids Test. This test is performed by placing 100 milliliters of waste in a conical 400-micron paint filter. If any liquid passes through the filter in 5.0 minutes, the waste is defined as liquid and cannot be accepted.

### 3.3 Refrigerants

Refrigerant-containing items such as air conditioners, refrigerators, freezers, chillers, vending machines, water coolers and dehumidifiers are not accepted for disposal with municipal solid waste. White goods like refrigerators may be held for recycling but must be placed in the recycle area by the customer.

These items likely contain liquid refrigerants such as ammonia, sulfur dioxide or chlorofluorocarbons (CFCs). The disposal of these items is governed by 40 CFR 82 which says that these refrigerants may not be released into the atmosphere.

### 3.4 Radioactive Waste

Radioactive waste is regulated by the Nuclear Regulatory Commission and is currently banned from disposal at municipal solid waste landfills.

### 3.5 Medical Waste

Medical waste and biohazard materials potentially contain bloodborne pathogens and other disease-causing organisms that present a health hazard to employees and visitors at the landfill.

### 3.6 Hazardous Waste

Any waste that meets the definition of RCRA Hazardous Waste as set forth in 40 CFR 261 is prohibited. RCRA describes two ways that a waste can be categorized as hazardous waste.

#### 3.6.1 Listed Hazardous Waste

Listed hazardous wastes are those materials listed in RCRA List F, List K, List U or List P provided in 40 CFR 261.31-33. These lists are included in Appendix A of this document.

#### 3.6.2 Characteristic Hazardous Waste

Any waste that shows characteristics of hazardous waste is also a regulated hazardous waste. RCRA describes four characteristics as follows:

##### 3.6.2.1 Ignitable

A waste is ignitable if it has a flashpoint of less than 140°F or is an oxidizer or can cause a fire by friction

##### 3.6.2.2 Corrosive

A waste is corrosive if it has pH less than 2.0 or higher than 12.5.

##### 3.6.2.3 Reactive

A waste is reactive if it is normally unstable, reacts violently with water, forms an explosive mixture with water, or contains cyanide or sulfate that could be released into the air or cause detonation.

##### 3.6.2.4 Toxic

A waste is toxic if it shows toxic substances will leach into water by laboratory testing under EPA Method 6010 in amounts that exceed numerical values of EPA's D-List. This tests for heavy metals, pesticides and certain organic compounds.

## 4.0 Waste Screening

Incoming waste loads shall be screened for prohibited wastes by the following methods.

### 4.1 Video Surveillance

Video screening of waste loads shall be provided. The scale house attendant shall view video feed for each load as it stops on the scale. The attendant shall look for evidence of prohibited waste such as:

- 55-gallon drums
- Tanks, totes or other liquid containers that might hold more than 5 gallons
- DOT placards for flammable, corrosive or reactive wastes
- Red biohazard bags or containers
- Radioactive warning labels
- Air conditioners
- Electric Transformers

Many loads arrive in trash compactor trucks that cannot be inspected until the load is emptied on the working face. Generally, these loads are from residential and commercial dumpsters which are least likely to contain prohibited wastes.

## 4.2 Random Inspections

Each week, an employee will randomly select at least one load to do a more thorough inspection than done at the scale house. The inspection checklist included in Appendix B will be used to document the inspection. Completed checklists shall be kept on file on site. The inspector will use a frisker to measure radioactivity along both sides of each load inspected.

## 4.3 Targeted Inspections

Certain loads will always be inspected by a qualified employee such as waste sludge from Bar-S Foods and solids from the City's wastewater treatment plant. Every load will be tested using the Paint Filter Test. Test results will be recorded on the form provided in Appendix C.

Unusual loads from industrial or military customers will also be inspected. The inspection checklist in Appendix B will be used to document load inspections. The inspector will use a frisker to measure radioactivity along both sides of each load inspected.

## 4.4 Work Face Observations

Workers on the work face who are spreading, compacting or covering municipal solid waste shall continually be on the lookout for indicators of prohibited wastes. If there is any indication of prohibited wastes, the worker shall immediately inform the landfill supervisor.

# 5.0 Waste Rejection Procedures

When prohibited wastes are found during screening, the following actions shall be taken.

## 5.1 Unloaded Waste

If the scale attendant sees something during video surveillance or the customer otherwise declares that the waste load includes prohibited wastes, the attendant will inform the customer that the waste load is rejected. The attendant will immediately notify the landfill supervisor who will assist with documentation. Where feasible, a description of the customer, the vehicle and the load will be recorded with as many details as feasible such as name of driver, company logo on truck, license plate info, etc.

If the scale attendant or other landfill staff refuses prohibited wastes, they will inform customers of the proper disposal alternatives, such as directing them to local facilities that would accept those wastes. Verification of proper disposal of prohibited wastes should be recorded.

This information will be reported to ODEQ by the end of the next working day.

If the prohibited item can be collected for recycle (i.e. a refrigerator), the customer will be informed to offload the item in the recycling area before dumping the load on the working face.

Some items flagged during video surveillance might be accepted after further inspection. For example, a drum or tote might be accepted once an inspector has determined that the item is dry and has no liquids.

## 5.2 Off-Loaded Waste

In some cases, the prohibited waste won't be discovered until the load is dumped on the working face. In such cases, the workers will immediately inform the customer that the prohibited item must be reloaded on the vehicle and removed from the property. The workers will immediately notify the landfill supervisor.

If the customer has left and the customer identity is known, attempts will be made to contact the customer and have them return to the landfill to remove the prohibited item.

If the customer is not known, the worker who observes the prohibited waste will immediately notify the landfill supervisor.

After an inspection of the items or materials, a decision will be made regarding where to store the materials and how to store the material until it can be picked up for proper disposal.

### 5.3 Storage of Prohibited Waste

Generally, safe storage of a prohibited waste will meet the following criteria.

#### 5.3.1 PCBs

Items that contain PCBs should be stored indoors away from traffic. If they cannot feasibly be placed indoors, they can be placed outside and covered with a tarp. If items are leaking fluids, they can be placed in a shallow hole lined with plastic to minimize the spread of contamination. A waste contractor shall be called to remove the items as soon as feasible. If a customer provides credible documentation that an item does not contain PCBs or liquids, the item may be accepted for disposal.

#### 5.3.2 Liquid Wastes

Containers with more than 5 gallons of liquid shall be stored for removal or placed in the City's Car Wash Disposal Pit (OPDES Permit No. OKG75T048). The carwash pit can take uncontaminated water or muddy water. Water thought to contain toxic or hazardous substances will be stored for pick-up. If the container is labeled, the safety data sheet for the product will be used to determine safe storage and proper disposal.

#### 5.3.3 Refrigerants

Items that contain refrigerants will be stored indoors and away from traffic. If they cannot feasibly be placed indoors, they can be placed outside and covered with a tarp. If items are leaking fluids, they can be placed in a shallow hole lined with plastic to minimize the spread of contamination. A waste contractor shall be called to remove the items as soon as feasible. If a customer provides credible documentation that refrigerants have been removed, the item may be accepted for disposal.

#### 5.3.4 Radioactive Waste

Items or materials that are radioactive shall be stored outdoors away from traffic and people and covered with tarps. A licensed qualified contractor shall be called to transport and dispose of radioactive waste such as:

Curie Environmental Services, LLC  
4020 Vassar Drive NE, Suite D  
Albuquerque, NM 87107 505-  
888-9392

#### 5.3.5 Medical Waste

Bags or containers labeled biohazard or medical waster will be stored indoors away from traffic. Plastic bags shall be placed in a rigid container like a trash can or barrel to reduce exposure to sharps.

Shipping containers for medical west can be obtained by contacting:

Stericycle  
866-783-7422  
[accessibility@stericycle.com](mailto:accessibility@stericycle.com)

MedPro Disposal  
888-641-6131  
[sales@medprodisposal.com](mailto:sales@medprodisposal.com)

#### 5.3.6 Hazardous Waste

Hazardous waste will f they cannot feasibly be placed indoors, they can be placed outside and covered with a tarp. If items are leaking fluids, they can be placed in a shallow hole lined with plastic to minimize the spread of contamination. A licensed waste contractor shall be called to remove the items such as:

- Clean Earth of Alabama 800-739-9156
- Triumvirate Environmental 866-780-7208
- HWH Environmental 866-348-3114

## 5.4 Documentation

The following documentation regarding wastes and pick-up shall be kept on file at the landfill and shall be included in reports to DEQ .

- Date waste discovered at landfill
- Type of waste
- Quantity of waste
- Location of Storage
- Contractor who picks up waste
- Date waste picked up
- Photographs

## 6.0 Reporting

A report will be sent to ODEQ for every instance of rejecting a prohibited waste.

A report will also be submitted to ODEQ for every instance of storing a prohibited waste for pick-up and proper disposal.

These reports will be submitted by the end of the next business day.

Other documentation including inspection checklists and paint filter test results are not submitted to ODEQ but are kept on file at the landfill.

## 7.0 WEP Updates

This plan will be reviewed annually by the landfill supervisor and sanitation superintendent. The plan will be updated as needed.

## 8.0 Related Programs

The following programs are intended to reduce the likelihood that prohibited wastes will be taken to the landfill.

### 8.1 Household Hazardous Waste

The City holds an annual event to collect household hazardous waste. A licensed hazardous waste contractor is engaged to collect a variety of materials such as motor oil, fuel, pesticides, propane cylinders, paint, sharps, electronic waste, batteries, etc. Residents of Altus and Jackson County can drop off items for free. Materials are properly containerized, shipped and disposed of.

### 8.2 Pharmaceutical Collection

The Jackson County Sheriff's office has a secure collection bin where residents of Jackson County can bring unused medications. This is located at the Jackson County Sheriff's Office and can be used all year.

### 8.2 Public Education

Educational materials are being developed to help promote these collection programs as well as proper disposal for common hazardous items such as rechargeable batteries (flammable) and smoke detectors (radioactive). These materials will educate people that they should not discard such items in residential trash dumpsters.



APPENDIX A – EPA Listed Hazardous Waste  
(Lists F, K, P and U)

# F LIST HAZARDOUS WASTE

## Reason for listing

Each group of wastes on the F List (list) was included for one or more of the following reasons, identified in the list by the capitalized letters in parentheses following the definition:

- Ignitable (I)
- Reactive (R)
- Toxic (T)
- Acutely Hazardous (H)

## Acutely hazardous F-listed wastes

The wastes listed for being acutely hazardous (H) are F020, F021, F022, F023, F026, and F027. These wastes are subject to more restrictive requirements than other hazardous wastes, including generator size calculation, accumulation limits, and empty container determinations.

## Listing-specific information

Many wastes on the F List have additional listing-specific information associated with them, including definitions and possible exemptions. This information is referenced in this fact sheet by the numbers in superscript following the reason for listing. Explanation of the numbers is given after the complete list in this document.

Although the MPCA has included the most common particulars in this guidance document, the EPA may have issued additional interpretation.

## Waste codes

A four-character hazardous waste code is assigned to each group of wastes on the list. Use this code for annual reporting and manifesting. The list below is grouped according to the type of waste. In alphabetical order:

- Contaminated soil treatment residues (F028)
- Discarded unused products (F027)
- Landfill leachate (F039)
- Manufacturing and processing (F020-F026)
- Metal treating (F006-F012 and F019)
- Petroleum refinery (F037-F038)
- Spent solvents (F001-F005)
- Wood preserving (F032-F035)

\*Reserved (No listings currently use codes F013-F018, F029-F031, F033 or F036) The following list is grouped in numerical order of the waste codes.

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## Spent solvents (F001 – F005)

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- F001** These spent halogenated solvents used in degreasing; spent solvent mixtures used in degreasing containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F002, F004, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures used in degreasing. (T)<sup>1</sup>
- carbon tetrachloride
  - chlorinated fluorocarbons
  - methylene chloride
  - tetrachloroethylene, also called perchloroethylene
  - 1,1,1-trichloroethane
  - trichloroethylene, also called 'TCE'
- F002** These spent halogenated solvents; spent solvent mixtures containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F001, F004, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (T)<sup>1</sup>
- chlorobenzene
  - methylene chloride
  - ortho-dichlorobenzene
  - tetrachloroethylene, also called 'perchloroethylene'
  - 1,1,1-trichloroethane
  - 1,1,2-trichloroethane
  - trichloroethylene, also called 'TCE'
  - trichlorofluoromethane
  - 1,1,2-trichloro-1,2,2-trifluoroethane
- F003** These spent non-halogenated solvents; spent solvent mixtures containing, before use, either only these non-halogenated solvents, or one or more of these non-halogenated solvents and a total of 10 percent or more by volume of the solvents listed in F001, F002, F004, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (I)<sup>1,2</sup>
- acetone
  - cyclohexane
  - ethyl acetate
  - ethyl benzene
  - ethyl ether
  - methanol
  - methyl isobutyl ketone
  - n-butyl alcohol
  - xylene
- F004** These spent non-halogenated solvents; spent solvent mixtures containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F001, F002, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (T)<sup>1</sup>
- cresols and cresylic acid
  - nitrobenzene
-

**F005** These spent non-halogenated solvents; spent solvent mixtures containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F001, F002, or F004, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (I,T)<sup>1</sup>

- benzene
- carbon disulfide
- 2-ethoxyethanol
- isobutanol
- methyl ethyl ketone, also called 'MEK'
- 2-nitropropane
- Pyridine
- toluene

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### **Metal treating (F006-F012 and F019)**

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**F006** All wastewater treatment sludges from electroplating operations except those from these processes. However, these sludges may still be hazardous for a hazardous waste characteristic. (T)

- sulfuric acid anodizing of aluminum
- tin plating of carbon steel
- zinc plating (segregated basis) on carbon steel
- aluminum or zinc aluminum plating on carbon steel
- cleaning/stripping associated with tin, zinc, and aluminum plating on carbon steel
- chemical etching and milling of aluminum

**F007** Spent cyanide plating bath solutions from electroplating operations. (R,T)

**F008** Plating bath sludges from the bottom of plating baths from electroplating operations where cyanides are used in the process. (R,T)<sup>3</sup>

**F009** Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process. Sludges formed in electroplating stripping and cleaning bath solution tanks where cyanides are used in the process are also included. (R,T)<sup>3</sup>

**F010** Quenching bath residues from oil baths from metal heat-treating operations where cyanides are used in the process. (R,T)<sup>3</sup>

**F011** Spent cyanide solutions from salt bath pot cleaning from metal heat-treating operations. (R,T)

**F012** Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process. (R,T)<sup>3</sup>

**F019** Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process. (T)<sup>4</sup>

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### **Manufacturing and processing (F020-F026)**

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**F020** Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (H)<sup>5,6</sup>

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- F021** Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives. (H)<sup>5</sup>
- F022** Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions. (H)<sup>5</sup>
- F023** Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (H)<sup>5,7</sup>
- F024** Process wastes from the production of chlorinated aliphatic hydrocarbons with carbon chain lengths from one through five by free radical catalyzed processes, with any amount and position of chlorine substitution. Process wastes include but are not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, but do not include F025 wastes. (T)<sup>8</sup>
- F025** Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of chlorinated aliphatic hydrocarbons with carbon chain lengths from one through five by free radical catalyzed processes, with any amount and position of chlorine substitution. (T)
- F026** Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions. (H)<sup>5</sup>

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**Discarded unused products (F027)**

- F027** Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (H)<sup>5,9</sup>

**F027 includes, but is not limited to:**

|   | <b>CAS Registry #</b> |
|---|-----------------------|
| • Acetic acid, (2,4,5-trichlorophenoxy)-                                  | 93-76-5               |
| • Pentachlorophenol <i>or</i> Phenol, pentachloro-                        | 87-86-5               |
| • Phenol, 2,3,4,6-tetrachloro-  | 58-90-2               |
| • Phenol, 2,4,5-trichloro-  | 95-95-4               |
| • Phenol, 2,4,6-trichloro-  | 88-06-2               |
| • Silvex (2,4,5-TP) <i>or</i> Propanoic acid, 2-(2,4,5-trichlorophenoxy)- | 93-72-1               |
| • 2,4,5-T   | 93-76-5               |
| • 2,3,4,6-Tetrachlorophenol   | 58-90-2               |
| • 2,4,5-Trichlorophenol   | 95-95-4               |
| • 2,4,6-Trichlorophenol   | 88-06-2               |

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**Contaminated soil treatment residues (F028)**

- F028** Residues resulting from the incineration or thermal treatment of soil contaminated with hazardous waste codes F020, F021, F022, F023, F026, and F027. (T)
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**Wood preserving****(F032-035)**

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Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations. (T)<sup>10,11</sup>

Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. (T)<sup>11</sup>

Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. (T)<sup>11</sup>

**Petroleum refinery****(F037-038)**

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Petroleum refinery primary oil/water/solids separation sludge—Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. This listing includes residuals generated from processing or recycling oil-bearing hazardous secondary materials excluded in another state under 40 CFR 261.4(a)(12)(i) imported for processing into Minnesota, if those residuals are to be disposed of. (T)<sup>12,13</sup>

Petroleum refinery secondary (emulsified) oil/water/solids separation sludge—Any sludge and/or float generated from the physical and/or chemical separation of oil/ water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. (T)<sup>12,14</sup>

**Landfill leachate****(F039)**

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Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste listed as a F-, K-, P- or U-listed hazardous waste. Leachate resulting from the disposal of one or more hazardous wastes bearing the following waste codes which is not mixed with any other hazardous wastes retains its original codes and is not F039: F020, F021, F022, F026, F027, and F028. (T)

# K List of Hazardous Wastes

## Listing-specific information

Many wastes on the K List have additional listing-specific information associated with them, including definitions and possible exemptions. This information is referenced in this document by the numbers in superscript following the reason for listing. Explanation of the numbers is given after the complete list in this document.

## Waste codes

A four-character hazardous waste code is assigned to each waste on the list. Use this code for annual reporting and manifesting. The list is grouped according to the process generating the waste. With the exception of K051 and K062, wastes on this list may be generated at any site performing these processes, and are not restricted to those sites with any specific Standard Industrial Classification (SIC) codes. In alphabetical order:

- Coking (K060, K087, K141-K145, and K147-K148)
- Explosives (K044-K047)
- Ink formulation (K086)
- Inorganic chemicals (K071, K073, K106, and K176-K178)
- Inorganic pigments (K002-K008)
- Iron and steel (K061-K062)
- Organic chemicals (K009-K011, K013-K030, K083, K085, K093-K096, K103-K105, K107-K118, K136, K149- K151, K156-K159, K161, K174-K175, and K181)
- Pesticides (K031-K043, K097-K099, K123-K126, and K131-K132)
- Petroleum refining (K048-K052 and K169-K172)
- Non-ferrous metals (K069, K088, and K100)
- Veterinary pharmaceuticals (K084 and K101-K102)
- Wood preservation (K001)

\*Reserved (No listings currently use codes K012, K053-K059, K063-K068, K070, K072, K074-K082, K089-K092, K119-K122, K127-K130, K133-K135, K137-K140, K146, K152-K155, K160, K162-K168, K173, and K179-K180)

The listings below are grouped by process and then listed in numerical order by waste code.

## Wood preservation

### K001

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**K001** Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol. (T)

**Inorganic pigments****K002-K008**

**K002** Wastewater treatment sludge from the production of chrome yellow and orange pigments. (T)

**K003** Wastewater treatment sludge from the production of molybdate orange pigments. (T)

**K004** Wastewater treatment sludge from the production of zinc yellow pigments. (T)

**K005** Wastewater treatment sludge from the production of chrome green pigments. (T)

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**K006** Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated). (T)

**K007** Wastewater treatment sludge from the production of iron blue pigments. (T)

**K008** Oven residue from the production of chrome oxide green pigments. (T)

**Organic chemicals****K009-K011, K013-K030, K083, K085, K093-K096, K103-K105, K107-K118, K136, K149-K151, K156-K159, K161, K174-K175, and K181**

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**K009** Distillation bottoms from the production of acetaldehyde from ethylene. (T)

**K010** Distillation side cuts from the production of acetaldehyde from ethylene. (T)

**K011** Bottom stream from the wastewater stripper in the production of acrylonitrile. (R,T)

**K013** Bottom stream from the acetonitrile column in the production of acrylonitrile. (R,T)

**K014** Bottoms from the acetonitrile purification column in the production of acrylonitrile. (T)

**K015** Still bottoms from the distillation of benzyl chloride. (T)

**K016** Heavy ends or distillation residues from the production of carbon tetrachloride. (T)

**K017** Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin. (T)

**K018** Heavy ends from the fractionation column in ethyl chloride production. (T)

**K019** Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production. (T)

**K020** Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production. (T)

**K021** Aqueous spent antimony catalyst waste from fluoromethanes production. (T)

**K022** Distillation bottom tars from the production of phenol/acetone from cumene. (T)

**K023** Distillation light ends from the production of phthalic anhydride from naphthalene. (T)

**K024** Distillation bottoms from the production of phthalic anhydride from naphthalene. (T)

**K025** Distillation bottoms from the production of nitrobenzene by the nitration of benzene. (T)

**K026** Stripping still tails from the production of methy ethyl pyridines. (T)

**K027** Centrifuge and distillation residues from toluene diisocyanate production. (R,T)



- K028** Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane. (T)
- K029** Waste from the product steam stripper in the production of 1,1,1-trichloroethane. (T)
- K030** Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene. (T)
- K083** Distillation bottoms from aniline production. (T)
- K085** Distillation or fractionation column bottoms from the production of chlorobenzenes. (T)
- K093** Distillation light ends from the production of phthalic anhydride from ortho-xylene. (T)
- K094** Distillation bottoms from the production of phthalic anhydride from ortho-xylene. (T)
- K095** Distillation bottoms from the production of 1,1,1-trichloroethane. (T)
- K096** Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane. (T)
- K103** Process residues from aniline extraction from the production of aniline. (T)
- K104** Combined wastewater streams generated from nitrobenzene/aniline production. (T)
- K105** Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes. (T)
- K107** Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazines. (C,T)
- K108** Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides. (I,T)
- K109** Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides. (T)
- K110** Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides. (T)
- K111** Product washwaters from the production of dinitrotoluene via nitration of toluene. (C,T)
- K112** Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene. (T)
- K113** Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene. (T)
- K114** Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene. (T)
- K115** Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene. (T)
- K116** Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine. (T)

- K117** Wastewater from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethene. (T)
- K118** Spent adsorbent solids from purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene. (T)
- K136** Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene. (T)
- K149** Distillation bottoms from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups. (T)<sup>1</sup>
- K150** Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha-(or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups. (T)
- K151** Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups. (T)
- K156** Organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) from the production of carbamates and carbamoyl oximes. (T)<sup>2</sup>
- K157** Wastewaters (including scrubber waters, condenser waters, washwaters, and separation waters) from the production of carbamates and carbamoyl oximes. (T)<sup>2</sup>
- K158** Bag house dusts and filter/separation solids from the production of carbamates and carbamoyl oximes. (T)<sup>2</sup>
- K159** Organics from the treatment of thiocarbamate wastes. (T)
- K161** Purification solids (including filtration, evaporation, and centrifugation solids), bag house dust and floor sweepings from the production of dithiocarbamate acids and their salts. (R,T)<sup>3</sup>
- K174** Wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer (including sludges that result from commingled ethylene dichloride or vinyl chloride monomer wastewater and other wastewater). (T)<sup>4</sup>
- K175** Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process. (T)
- K181** Nonwastewaters from the production of dyes and/or pigments (including nonwastewaters commingled at the point of generation with nonwastewaters from other processes) that, at the point of generation, contain mass loadings of any of the constituents identified in 40 CFR 261.32(c) at or above the specified levels after any annual mass loading limit has been reached. (T)<sup>5</sup>
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## Inorganic chemicals

### K071, K073, K106, and K176-K178

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- K071** Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used. (T)
- K073** Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production. (T)
- K106** Wastewater treatment sludge from the mercury cell process in chlorine production. (T)
- K176** Baghouse filters from the production of antimony oxide, including filters from the production of intermediates (e.g., antimony metal or crude antimony oxide). (E)
- K177** Slag from the production of antimony oxide that is speculatively accumulated or disposed, including slag from the production of intermediates (e.g., antimony metal or crude antimony oxide). (T)
- K178** Residues from manufacturing and manufacturing-site storage of ferric chloride from acids formed during the production of titanium dioxide using the chloride-ilmenite process. (T)

**Pesticides****K031-K043, K097-K099, K123-K126, and K131-K1**

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- K031** By-product salts generated in the production of MSMA and cacodylic acid. (T)
- K032** Wastewater treatment sludge from the production of chlordane. (T)
- K033** Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane. (T)
- K034** Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane. (T)
- K035** Wastewater treatment sludges generated in the production of creosote. (T)
- K036** Still bottoms from toluene reclamation distillation in the production of disulfoton. (T)
- K037** Wastewater treatment sludges from the production of disulfoton. (T)
- K038** Wastewater from the washing and stripping of phorate production. (T)
- K039** Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate. (T)
- K040** Wastewater treatment sludge from the production of phorate. (T)
- K041** Wastewater treatment sludge from the production of toxaphene. (T)
- K042** Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T. (T)
- K043** 2,6-Dichlorophenol waste from the production of 2,4-D. (T)
- K097** Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane. (T)
- K098** Untreated process wastewater from the production of toxaphene. (T)
- K099** Untreated wastewater from the production of 2,4-D. (T)
- K123** Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salt. (T)
- K124** Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts. (C,T)
- K125** Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts. (T)
- K126** Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylenebisdithiocarbamic acid and its salts. (T)
- K131** Wastewater from the reactor and spent sulfuric acid from the acid dryer from the production of methyl bromide. (C,T)
- K132** Spent absorbent and wastewater separator solids from the production of methyl bromide. (T)

**Explosives****K044-K047**

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- K044** Wastewater treatment sludges from the manufacturing and processing of explosives. (R)<sup>6</sup>
- K045** Spent carbon from the treatment of wastewater containing explosives. (R)<sup>6</sup>

**K046** Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds. (T)

**K047** Pink/red water from TNT operations. (R)<sup>6</sup>

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**Petroleum refining                    K048-K052 and K169-K172**

**K048** Dissolved air flotation (DAF) float from the petroleum refining industry. (T)

**K049** Slop oil emulsion solids from the petroleum refining industry. (T)

**K050** Heat exchanger bundle cleaning sludge from the petroleum refining industry. (T)

**K051** API separator sludge from the petroleum refining industry. (R)<sup>7</sup>

**K052** Tank bottoms (leaded) from the petroleum refining industry. (T)

**K169** Crude oil storage tank sediment from petroleum refining operations. (T)

**K170** Clarified slurry oil tank sediment and/or in-line filter/separation solids from petroleum refining operations. (T)

**K171** Spent Hydrotreating catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors. (I,T)<sup>8</sup>

**K172** Spent Hydrotreating catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors. (I,T)<sup>8</sup>

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**Iron and steel                    K061-K062**

**K061** Emission control dust/sludge from the primary production of steel in electric furnaces. (T)

**K062** Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332). (C,T)

**Non-ferrous metals:**

**primary aluminum and secondary lead                    K088, K069, and K100**

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**K088** Spent potliners from primary aluminum reduction. (T)

**K069** Emission control dust/sludge from secondary lead smelting. (T)<sup>9</sup>

**K100** Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting. (T)

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**Veterinary pharmaceuticals                    K084 and K101-K102**

**K084** Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds. (T)

**K101** Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds. (T)

**K102** Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds. (T)

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**Ink formulation and steel                    K086**

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**K086** Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, dyes, driers, soaps, and stabilizers containing chromium and lead. (T)

**Coking    K060, K087, K141-K145, and K147-K148**

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**K060** Ammonia still lime sludge from coking operations. (T)

**K087** Decanter tank tar sludge from coking operations. (T)

**K141** Process residues from the recovery of coal tar, including, but not limited to, collecting sump residues from the production of coke from coal or the recovery of coke byproducts produced from coal. This listing does not include K087. (T)

**K142** Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal. (T)

**K143** Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal. (T)

**K144** Wastewater sump residues from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal. (T)

**K145** Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal. (T)

**K147** Tar storage tank residues from coal tar refining. (T)

**K148** Residues from coal tar distillation, including but not limited to, still bottoms. (T)

# P LIST HAZARDOUS WASTE

## **Waste code**

Every Listed waste is assigned a unique four-character waste code.

## **CAS Registry number**

The CAS Registry assigns a unique number to individual chemical compounds to differentiate them from similar compounds that may have different physical structures or confusingly close generic or common names.

However, though a single CAS Registry number is shown for each waste in the P-list, the CAS Registry number is included only as an aid to identification and does not restrict the listing to the individual chemical compound assigned that CAS Registry number. ***All wastes having the generic name in the P-list are regulated, regardless of their specific CAS numbers, unless otherwise noted.***

## **Generic listed name**

The P-list is organized alphabetically by the chemical compounds' generic names. However, chemical compounds may often be known by many different names, and only one of those names may be in the P-list. ***Any waste having the generic name in the P-list is regulated, regardless of whether your site might know it by another name that is not listed.*** The generic names on the F-list describe the source of the regulated waste.

## **Listing reason**

Acute hazardous wastes may be listed for any of three reasons, indicated by a capital letter; they are acutely toxic (H), reactive (R), or toxic (T).

Note: The toxic (T) listing reason is different and has a separate definition from the Toxicity Characteristic. Wastes may be listed for being toxic (T) without displaying the Toxicity Characteristic and vice versa.

| Waste code | CAS registry # | Generic listed name                                       | Listing reason | Notes |
|------------|----------------|---|----------------|-------|
| P002       | 591-08-2       | 1-Acetyl-2-thiourea                                       | H              |       |
| P003       | 107-02-8       | Acrolein  | H              |       |
| P070       | 116-06-3       | Aldicarb  | H              |       |
| P203       | 1646-88-4      | Aldicarb sulfone  | H              |       |
| P004       | 309-00-2       | Aldrin  | H              |       |
| P005       | 107-18-6       | Allyl alcohol   | H              |       |
| P006       | 20859-73-8     | Aluminum phosphide  | R, T           |       |
| P007       | 2763-96-4      | 5-(Aminomethyl)-3-isoxazolol                              | H              |       |
| P008       | 504-24-5       | 4-Aminopyridine   | H              |       |
| P009       | 131-74-8       | Ammonium picrate  | R              | 1     |
| P119       | 7803-55-6      | Ammonium vanadate   | H              |       |
| P010       | 7778-39-4      | Arsenic acid H <sub>3</sub> AsO <sub>4</sub>              | H              |       |
| P011       | 1303-28-2      | Arsenic pentoxide   | H              |       |
| P012       | 1327-53-3      | Arsenic trioxide  | H              |       |
| P054       | 151-56-4       | Aziridine   | H              |       |
| P067       | 75-55-8        | Aziridine, 2-methyl-                                      | H              |       |
| P013       | 542-62-1       | Barium cyanide  | H              |       |
| P028       | 100-44-7       | Benzyl chloride   | H              |       |
| P015       | 7440-41-7      | Beryllium powder  | H              | 2     |
| P017       | 598-31-2       | Bromoacetone  | H              |       |
| P018       | 357-57-3       | Brucine   | H              |       |
| P021       | 592-01-8       | Calcium cyanide   | H              |       |
| P127       | 1563-66-2      | Carbofuran  | H              |       |
| P022       | 75-15-0        | Carbon disulfide  | H              |       |
| P189       | 55285-14-8     | Carbosulfan   | H              |       |
| P023       | 107-20-0       | Chloroacetaldehyde  | H              |       |
| P024       | 106-47-8       | p-Chloroaniline   | H              |       |
| P029       | 544-92-3       | Copper cyanide  | H              |       |
| P030       | -----          | Cyanides (soluble cyanide salts), not otherwise specified | H              |       |
| P031       | 460-19-5       | Cyanogen  | H              |       |
| P033       | 506-77-4       | Cyanogen chloride   | H              |       |
| P016       | 542-88-1       | Dichloromethyl ether                                      | H              |       |
| P036       | 696-28-6       | Dichlorophenylarsine                                      | H              |       |
| P037       | 60-57-1        | Dieldrin  | H              |       |
| P038       | 692-42-2       | Diethylarsine   | H              |       |
| P043       | 55-91-4        | Diisopropylfluorophosphate (DFP)                          | H              |       |
| P044       | 60-51-5        | Dimethoate  | H              |       |
| P191       | 644-64-4       | Dimetilan   | H              |       |
| P020       | 88-85-7        | Dinoseb   | H              |       |
| P039       | 298-04-4       | Disulfoton  | H              |       |
| P049       | 541-53-7       | Dithiobiuret  | H              |       |
| P050       | 115-29-7       | Endosulfan  | H              |       |
| P088       | 145-73-3       | Endothall   | H              |       |
| P051       | 72-20-8        | Endrin & metabolites                                      | H              | 3, 4  |
| P042       | 51-43-4        | Epinephrine   | H              | 5     |



| <b>Waste code</b> | <b>CAS registry #</b> | <b>Generic listed name</b>                   | <b>Listing reason</b> | <b>Notes</b> |
|-------------------|-----------------------|--|-----------------------|--------------|
| P097              | 52-85-7               | Famphur                                      | H                     |              |
| P056              | 7782-41-4             | Fluorine                                     | H                     |              |
| P057              | 640-19-7              | Fluoroacetamide                              | H                     |              |
| P058              | 62-74-8               | Fluoroacetic acid, sodium salt               | H                     |              |
| P198              | 23422-53-9            | Formetanate hydrochloride                    | H                     |              |
| P197              | 17702-57-7            | Formparanate                                 | H                     |              |
| P059              | 76-44-8               | Heptachlor                                   | H                     | 6            |
| P062              | 757-58-4              | Hexaethyl tetraphosphate                     | H                     |              |
| P116              | 79-19-6               | Hydrazinecarbothioamide                      | H                     |              |
| P063              | 74-90-8               | Hydrogen cyanide                             | H                     |              |
| P060              | 465-73-6              | Isodrin                                      | H                     |              |
| P192              | 119-38-0              | Isolan                                       | H                     |              |
| P196              | 15339-36-3            | Manganese dimethyldithiocarbamate            | H                     |              |
| P065              | 628-86-4              | Mercury fulminate                            | R, T                  |              |
| P199              | 2032-65-7             | Methiocarb.                                  | H                     |              |
| P066              | 16752-77-5            | Methomyl                                     | H                     |              |
| P068              | 60-34-4               | Methyl hydrazine                             | H                     |              |
| P064              | 624-83-9              | Methyl isocyanate                            | H                     |              |
| P071              | 298-00-0              | Methyl parathion                             | H                     |              |
| P190              | 1129-41-5             | Metolcarb                                    | H                     |              |
| P128              | 315-8-4               | Mexacarbate                                  | H                     |              |
| P073              | 13463-39-3            | Nickel carbonyl                              | H                     |              |
| P074              | 557-19-7              | Nickel cyanide                               | H                     |              |
| P075              | 54-11-5               | Nicotine & salts                             | H                     | 3, 7         |
| P076              | 10102-43-9            | Nitric oxide                                 | H                     |              |
| P077              | 100-01-6              | p-Nitroaniline                               | H                     |              |
| P078              | 10102-44-0            | Nitrogen dioxide                             | H                     |              |
| P081              | 55-63-0               | Nitroglycerine                               | R                     | 1            |
| P082              | 62-75-9               | N-Nitrosodimethylamine                       | H                     |              |
| P084              | 4549-40-0             | N-Nitrosomethylvinylamine                    | H                     |              |
| P085              | 152-16-9              | Octamethylpyrophosphoramidate                | H                     |              |
| P087              | 20816-12-0            | Osmium tetroxide                             | H                     |              |
| P194              | 23135-22-0            | Oxamyl                                       | H                     |              |
| P089              | 56-38-2               | Parathion                                    | H                     |              |
| P034              | 131-89-5              | Phenol, 2-cyclohexyl-4,6-dinitro-            | H                     |              |
| P048              | 51-28-5               | Phenol, 2,4-dinitro-                         | H                     |              |
| P047              | 534-52-1              | Phenol, 2-methyl-4,6-dinitro- & salts        | H                     | 3            |
| P202              | 64-00-6               | Phenol, 3-(1-methylethyl)-, methyl carbamate | H                     |              |
| P046              | 122-09-8              | Phentermine                                  | H                     | 8            |
| P092              | 62-38-4               | Phenylmercury acetate                        | H                     |              |
| P093              | 103-85-5              | Phenylthiourea                               | H                     |              |
| P094              | 298-02-2              | Phorate                                      | H                     |              |
| P095              | 75-44-5               | Phosgene                                     | H                     |              |
| P096              | 7803-51-2             | Phosphine                                    | H                     |              |
| P041              | 311-45-5              | Phosphoric acid, diethyl 4-nitrophenyl ester | H                     |              |

|      |          |   |   |  |
|------|----------|---|---|--|
| P040 | 297-97-2 | Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester | H |  |
|------|----------|---|---|--|

| Waste code | CAS registry # | Generic listed name  | Listing reason | Notes |
|------------|----------------|--|----------------|-------|
| P204       | 57-47-6        | Physostigmine  | H              |       |
| P188       | 57-64-7        | Physostigmine salicylate   | H              |       |
| P098       | 151-50-8       | Potassium cyanide  | H              |       |
| P099       | 506-61-6       | Potassium silver cyanide   | H              |       |
| P201       | 2631-37-0      | Promecarb  | H              |       |
| P101       | 107-12-0       | Propanenitrile   | H              |       |
| P027       | 542-76-7       | Propanenitrile, 3-chloro-  | H              |       |
| P069       | 75-86-5        | Propanenitrile, 2-hydroxy-2-methyl-  | H              |       |
| P102       | 107-19-7       | Propargyl alcohol  | H              |       |
| P103       | 630-10-4       | Selenourea   | H              |       |
| P104       | 506-64-9       | Silver cyanide   | H              |       |
| P105       | 26628-22-8     | Sodium azide   | H              |       |
| P106       | 143-33-9       | Sodium cyanide   | H              |       |
| P108       | 57-24-9        | Strychnine & salts   | H              | 3     |
| P109       | 3689-24-5      | Tetraethyldithiopyrophosphate  | H              |       |
| P110       | 78-00-2        | Tetraethyl lead  | H              |       |
| P111       | 107-49-3       | Tetraethyl pyrophosphate   | H              |       |
| P112       | 509-14-8       | Tetranitromethane  | R              | 1     |
| P113       | 1314-32-5      | Thallic oxide  | H              |       |
| P114       | 12039-52-0     | Thallium(I) selenite   | H              |       |
| P115       | 7446-18-6      | Thallium(I) sulfate  | H              |       |
| P045       | 39196-18-4     | Thiofanox  | H              |       |
| P014       | 108-98-5       | Thiophenol   | H              |       |
| P026       | 5344-82-1      | Thiourea, (2-chlorophenyl)-  | H              |       |
| P072       | 86-88-4        | Thiourea, 1-naphthalenyl-  | H              |       |
| P185       | 26419-73-8     | Tirpate  | H              |       |
| P123       | 8001-35-2      | Toxaphene  | H              | 9     |
| P118       | 75-70-7        | Trichloromethanethiol  | H              |       |
| P120       | 1314-62-1      | Vanadium pentoxide   | H              |       |
| P001       | 81-81-2        | Warfarin & salts, when present at concentrations > 0.3%                              | H              | 3, 10 |
| P121       | 557-21-1       | Zinc cyanide   | H              |       |
| P122       | 1314-84-7      | Zinc phosphide Zn <sub>3</sub> P <sub>2</sub> , when present at concentrations > 10% | R, T           | 11    |
| P205       | 137-30-4       | Ziram  | H              |       |

# U List of Hazardous Wastes

The U List regulates discarded commercial chemical products, manufacturing chemical intermediates, and off-specification commercial chemical products that contain certain ingredients, and any soil or debris contaminated by spills of those products or intermediates.

## **Sole active ingredient**

A waste is regulated under the U List only if the ingredient contained in the list is the sole active ingredient of the product that became waste. *Active ingredients* are those that perform the function of the product, regardless of the concentration of those ingredients. Ingredients used in a product as preservatives, solvents, stabilizers, and adjuncts are not active ingredients unless that is the function of the product.

## **Examples**

- Hydrofluoric acid is the sole active ingredient in some glass etching compounds. These compounds would be U listed as U134 hazardous wastes if disposed of without being used.
- Some rust-remover compounds, however, contain phosphoric and oxalic acids in addition to hydrofluoric acid as active ingredients. These compounds would not be U-listed wastes when disposed of, because the hydrofluoric acid was not the sole active ingredient.
- Finally, some cyanoacrylate adhesive compounds contain hydrofluoric acid as a stabilizer. These compounds would not be U-listed wastes when disposed of because the hydrofluoric acid was not an active ingredient.

## **All wastes having the generic name contained in the U List are regulated**

Although a single Chemical Abstract Service (CAS) Registry Number accompanies each waste contained in the U List, the CAS Number is included only as an aid to identification and does not restrict the list to the unique chemical identified by that CAS Number. All wastes having the generic name contained in the U List are regulated, regardless of their specific CAS Numbers.

## **Reason for listing**

Each waste on the U List is included for one or more of the following reasons identified by the capitalized letters in parentheses following the generic name:

- Corrosive (C)
  - Ignitable (I)
  - Reactive (R)
  - Toxic (T)
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## Waste codes

A four-character hazardous waste code is assigned to each waste on the list. Use this code for annual reporting and manifesting of hazardous wastes.

The list is organized alphabetically by the listed generic name. Remember that many chemical compounds are known by many chemical names, and only one or a few of those names may be printed in the list.

| Waste code | CAS Registry # | Generic name  | Reason           |
|------------|----------------|---|------------------|
| U394       | 30558-43-1     | A2213   | (T)              |
| U001       | 75-07-0        | Acetaldehyde  | (I) <sup>1</sup> |
| U034       | 75-87-6        | Acetaldehyde, trichloro-                            | (T)              |
| U187       | 62-44-2        | Acetamide, N-(4-ethoxyphenyl)-                      | (T)              |
| U005       | 53-96-3        | Acetamide, N-9H-fluoren-2-yl-                       | (T)              |
| U240       | 94-75-7        | Acetic acid, (2,4-dichlorophenoxy)-, salts & esters | (T) <sup>2</sup> |
| U112       | 141-78-6       | Acetic acid ethyl ester                             | (I) <sup>1</sup> |
| U144       | 301-04-2       | Acetic acid, lead(2+) salt                          | (T)              |
| U214       | 563-68-8       | Acetic acid, thallium(1+) salt                      | (T)              |
| U002       | 67-64-1        | Acetone   | (I) <sup>1</sup> |
| U003       | 75-05-8        | Acetonitrile  | (I,T)            |
| U004       | 98-86-2        | Acetophenone  | (T)              |
| U005       | 53-96-3        | 2-Acetylaminofluorene                               | (T)              |
| U006       | 75-36-5        | Acetyl chloride                                     | (C,R,T)          |
| U007       | 79-06-1        | Acrylamide  | (T)              |
| U008       | 79-10-7        | Acrylic acid  | (I) <sup>1</sup> |
| U009       | 107-13-1       | Acrylonitrile                                       | (T)              |
| U011       | 61-82-5        | Amitrole  | (T)              |
| U012       | 62-53-3        | Aniline   | (I,T)            |
| U136       | 75-60-5        | Arsinic acid, dimethyl-                             | (T)              |
| U014       | 492-80-8       | Auramine  | (T)              |
| U015       | 115-02-6       | Azaserine   | (T)              |

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|------------|----------------|---|--------------------|
| U010       | 50-07-7        | Azirino[2',3':3,4]pyrrolo[1,2-a]indole-4,7-dione, 6-amino-8-[[aminocarbonyloxy]methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-, [1aS-(1aalpha, 8beta,8aalpha,8balpha)]- | (T)                |
| U280       | 101-27-9       | Barban  | (T)                |
| U278       | 22781-23-3     | Bendiocarb  | (T)                |
| U364       | 22961-82-6     | Bendiocarb phenol   | (T)                |
| U271       | 17804-35-2     | Benomyl   | (T)                |
| U157       | 56-49-5        | Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-   | (T)                |
| U016       | 225-51-4       | Benz[c]acridine   | (T)                |
| U017       | 98-87-3        | Benzal chloride   | (T)                |
| U192       | 23950-58-5     | Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-  | (T)                |
| U018       | 56-55-3        | Benz[a]anthracene   | (T)                |
| U094       | 57-97-6        | Benz[a]anthracene, 7,12-dimethyl-   | (T)                |
| U012       | 62-53-3        | Benzenamine   | (I,T)              |
| U014       | 492-80-8       | Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl-  | (T)                |
| U049       | 3165-93-3      | Benzenamine, 4-chloro-2-methyl-, hydrochloride  | (T)                |
| U093       | 60-11-7        | Benzenamine, N,N-dimethyl-4-(phenylazo)-  | (T)                |
| U328       | 95-53-4        | Benzenamine, 2-methyl-  | (T)                |
| U353       | 106-49-0       | Benzenamine, 4-methyl-  | (T)                |
| U158       | 101-14-4       | Benzenamine, 4,4'-methylenebis[2-chloro-  | (T)                |
| U222       | 636-21-5       | Benzenamine, 2-methyl-, hydrochloride   | (T)                |
| U181       | 99-55-8        | Benzenamine, 2-methyl-5-nitro-  | (T)                |
| U019       | 71-43-2        | Benzene   | (I,T) <sup>3</sup> |
| U038       | 510-15-6       | Benzenoacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester   | (T)                |
| U030       | 101-55-3       | Benzene, 1-bromo-4-phenoxy-   | (T)                |
| U035       | 305-03-3       | Benzenobutanoic acid, 4-[bis(2-chloroethyl)amino]-  | (T)                |
| U037       | 108-90-7       | Benzene, chloro-  | (T)                |
| U221       | 25376-45-8     | Benzenediamine, ar-methyl-  | (T)                |
| U028       | 117-81-7       | 1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester   | (T)                |
| U069       | 84-74-2        | 1,2-Benzenedicarboxylic acid, dibutyl ester   | (T)                |
| U088       | 84-66-2        | 1,2-Benzenedicarboxylic acid, diethyl ester   | (T)                |
| U102       | 131-11-3       | 1,2-Benzenedicarboxylic acid, dimethyl ester  | (T)                |
| U107       | 117-84-0       | 1,2-Benzenedicarboxylic acid, dioctyl ester   | (T)                |
| U070       | 95-50-1        | Benzene, 1,2-dichloro-  | (T)                |
| U071       | 541-73-1       | Benzene, 1,3-dichloro-  | (T)                |
| U072       | 106-46-7       | Benzene, 1,4-dichloro-  | (T)                |

| Waste code | CAS Registry # | Generic name  | Reason             |
|------------|----------------|---|--------------------|
| U060       | 72-54-8        | Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-   | (T)                |
| U017       | 98-87-3        | Benzene, (dichloromethyl)-  | (T)                |
| U223       | 26471-62-5     | Benzene, 1,3-diisocyanatomethyl-  | (R,T)              |
| U239       | 1330-20-7      | Benzene, dimethyl-  | (I) <sup>1</sup>   |
| U201       | 108-46-3       | 1,3-Benzenediol   | (T)                |
| U127       | 118-74-1       | Benzene, hexachloro-  | (T)                |
| U056       | 110-82-7       | Benzene, hexahydro-   | (I) <sup>1</sup>   |
| U220       | 108-88-3       | Benzene, methyl-  | (T)                |
| U105       | 121-14-2       | Benzene, 1-methyl-2,4-dinitro-  | (T)                |
| U106       | 606-20-2       | Benzene, 2-methyl-1,3-dinitro-  | (T)                |
| U055       | 98-82-8        | Benzene, (1-methylethyl)-   | (I) <sup>1</sup>   |
| U169       | 98-95-3        | Benzene, nitro-   | (T)                |
| U183       | 608-93-5       | Benzene, pentachloro-   | (T)                |
| U185       | 82-68-8        | Benzene, pentachloronitro-  | (T)                |
| U020       | 98-09-9        | Benzenesulfonic acid chloride   | (C,R) <sup>1</sup> |
| U020       | 98-09-9        | Benzenesulfonyl chloride  | (C,R) <sup>1</sup> |
| U207       | 95-94-3        | Benzene, 1,2,4,5-tetrachloro-   | (T)                |
| U061       | 50-29-3        | Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-  | (T)                |
| U247       | 72-43-5        | Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4- methoxy-  | (T)                |
| U023       | 98-07-7        | Benzene, (trichloromethyl)-   | (T)                |
| U234       | 99-35-4        | Benzene, 1,3,5-trinitro-  | (T)                |
| U021       | 92-87-5        | Benzidine   | (T)                |
| U202       | 81-07-2        | 1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts  | (T) <sup>2</sup>   |
| U278       | 22781-23-3     | 1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate   | (T)                |
| U364       | 22961-82-6     | 1,3-Benzodioxol-4-ol, 2,2-dimethyl-,  | (T)                |
| U203       | 94-59-7        | 1,3-Benzodioxole, 5-(2-propenyl)-   | (T)                |
| U141       | 120-58-1       | 1,3-Benzodioxole, 5-(1-propenyl)-   | (T)                |
| U367       | 1563-38-8      | 7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-   | (T)                |
| U090       | 94-58-6        | 1,3-Benzodioxole, 5-propyl-   | (T)                |
| U064       | 189-55-9       | Benzo[rs]pentaphene   | (T)                |
| U248       | 81-81-2        | 2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations of 0.3% or less | (T) <sup>2,5</sup> |
| U022       | 50-32-8        | Benzo[a]pyrene  | (T)                |
| U197       | 106-51-4       | p-Benzoquinone  | (T)                |
| U023       | 98-07-7        | Benzotrichloride  | (C,R,T)            |
| U085       | 1464-53-5      | 2,2'-Bioxirane  | (T)                |

| Waste code | CAS Registry # | Generic name  | Reason           |
|------------|----------------|---|------------------|
| U021       | 92-87-5        | [1,1'-Biphenyl]-4,4'-diamine  | (T)              |
| U073       | 91-94-1        | [1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-  | (T)              |
| U091       | 119-90-4       | [1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-   | (T)              |
| U095       | 119-93-7       | [1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-  | (T)              |
| U225       | 75-25-2        | Bromoform   | (T)              |
| U030       | 101-55-3       | 4-Bromophenyl phenyl ether  | (T)              |
| U128       | 87-68-3        | 1,3-Butadiene, 1,1,2,3,4,4-hexachloro-  | (T)              |
| U172       | 924-16-3       | 1-Butanamine, N-butyl-N-nitroso-  | (T)              |
| U031       | 71-36-3        | 1-Butanol   | (I) <sup>1</sup> |
| U159       | 78-93-3        | 2-Butanone  | (I,T)            |
| U160       | 1338-23-4      | 2-Butanone, peroxide  | (R,T)            |
| U053       | 4170-30-3      | 2-Butenal   | (T)              |
| U074       | 764-41-0       | 2-Butene, 1,4-dichloro-   | (I,T)            |
| U143       | 303-34-4       | 2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy] methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z),7(2S*,3R*),7aalpha]]- | (T)              |
| U031       | 71-36-3        | n-Butyl alcohol   | (I) <sup>1</sup> |
| U136       | 75-60-5        | Cacodylic acid  | (T)              |
| U032       | 13765-19-0     | Calcium chromate  | (T)              |
| U372       | 10605-21-7     | Carbamic acid, 1H-benzimidazol-2-yl, methyl ester   | (T)              |
| U271       | 17804-35-2     | Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-, methyl ester   | (T)              |
| U280       | 101-27-9       | Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester  | (T)              |
| U238       | 51-79-6        | Carbamic acid, ethyl ester  | (T)              |
| U178       | 615-53-2       | Carbamic acid, methylnitroso-, ethyl ester  | (T)              |
| U373       | 122-42-9       | Carbamic acid, phenyl-, 1-methylethyl ester   | (T)              |
| U409       | 23564-05-8     | Carbamic acid, [1,2-phenylenebis(iminocarbonothioyl)]bis-, dimethyl ester   | (T)              |
| U097       | 79-44-7        | Carbamic chloride, dimethyl-  | (T)              |
| U389       | 2303-17-5      | Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2-propenyl) ester   | (T)              |
| U387       | 52888-80-9     | Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester   | (T)              |
| U114       | 1 111-54-6     | Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters  | (T)              |
| U062       | 2303-16-4      | Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester  | (T)              |
| U279       | 63-25-2        | Carbaryl  | (T)              |
| U372       | 10605-21-7     | Carbendazim   | (T)              |
| U367       | 1563-38-8      | Carbofuran phenol   | (T)              |

| Waste code | CAS Registry # | Generic name   | Reason             |
|------------|----------------|--|--------------------|
| U215       | 6533-73-9      | Carbonic acid, dithallium(1+) salt   | (T)                |
| U033       | 353-50-4       | Carbonic difluoride  | (T)                |
| U156       | 79-22-1        | Carbonochloridic acid, methyl ester  | (I,T)              |
| U033       | 353-50-4       | Carbon oxyfluoride   | (R,T)              |
| U211       | 56-23-5        | Carbon tetrachloride   | (T) <sup>3</sup>   |
| U034       | 75-87-6        | Chloral  | (T)                |
| U035       | 305-03-3       | Chlorambucil   | (T)                |
| U036       | 57-74-9        | Chlordane, alpha & gamma isomers   | (T) <sup>3</sup>   |
| U026       | 494-03-1       | Chlornaphazin  | (T)                |
| U037       | 108-90-7       | Chlorobenzene  | (T) <sup>3</sup>   |
| U038       | 510-15-6       | Chlorobenzilate  | (T)                |
| U039       | 59-50-7        | p-Chloro-m-cresol  | (T)                |
| U042       | 110-75-8       | 2-Chloroethyl vinyl ether  | (T)                |
| U044       | 67-66-3        | Chloroform   | (T) <sup>3</sup>   |
| U046       | 107-30-2       | Chloromethyl methyl ether  | (T)                |
| U047       | 91-58-7        | beta-Chloronaphthalene   | (T)                |
| U048       | 95-57-8        | o-Chlorophenol   | (T)                |
| U049       | 3165-93-3      | 4-Chloro-o-toluidine, hydrochloride  | (T)                |
| U032       | 13765-19-0     | Chromic acid H2 CrO4, calcium salt   | (T)                |
| U050       | 218-01-9       | Chrysene   | (T)                |
| U051       | -----          | Creosote   | (T)                |
| U052       | 1319-77-3      | Cresol (Cresylic acid)   | (T) <sup>3</sup>   |
| U053       | 4170-30-3      | Crotonaldehyde   | (T)                |
| U055       | 98-82-8        | Cumene   | (I) <sup>1</sup>   |
| U246       | 506-68-3       | Cyanogen bromide (CN)Br  | (T)                |
| U197       | 106-51-4       | 2,5-Cyclohexadiene-1,4-dione   | (T)                |
| U056       | 110-82-7       | Cyclohexane  | (I) <sup>1</sup>   |
| U129       | 58-89-9        | Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alpha,6beta)- | (T)                |
| U057       | 108-94-1       | Cyclohexanone  | (I) <sup>1</sup>   |
| U130       | 77-47-4        | 1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-                                     | (T)                |
| U058       | 50-18-0        | Cyclophosphamide   | (T)                |
| U240       | 94-75-7        | 2,4-D, salts & esters  | (T) <sup>2,3</sup> |
| U059       | 20830-81-3     | Daunomycin   | (T)                |
| U060       | 72-54-8        | DDD  | (T)                |
| U061       | 50-29-3        | DDT  | (T)                |



| Waste code | CAS Registry # | Generic name                            | Reason           |
|------------|----------------|---|------------------|
| U062       | 2303-16-4      | Diallate                                | (T)              |
| U063       | 53-70-3        | Dibenz[a,h]anthracene                   | (T)              |
| U064       | 189-55-9       | Dibenzo[a,i]pyrene                      | (T)              |
| U066       | 96-12-8        | 1,2-Dibromo-3-chloropropane             | (T)              |
| U069       | 84-74-2        | Dibutyl phthalate                       | (T)              |
| U070       | 95-50-1        | o-Dichlorobenzene                       | (T)              |
| U071       | 541-73-1       | m-Dichlorobenzene                       | (T)              |
| U072       | 106-46-7       | p-Dichlorobenzene                       | (T)              |
| U073       | 91-94-1        | 3,3'-Dichlorobenzidine                  | (T)              |
| U074       | 764-41-0       | 1,4-Dichloro-2-butene                   | (I,T)            |
| U075       | 75-71-8        | Dichlorodifluoromethane                 | (T)              |
| U078       | 75-35-4        | 1,1-Dichloroethylene                    | (T) <sup>3</sup> |
| U079       | 156-60-5       | 1,2-Dichloroethylene                    | (T)              |
| U025       | 111-44-4       | Dichloroethyl ether                     | (T)              |
| U027       | 108-60-1       | Dichloroisopropyl ether                 | (T)              |
| U024       | 111-91-1       | Dichloromethoxy ethane                  | (T)              |
| U081       | 120-83-2       | 2,4-Dichlorophenol                      | (T)              |
| U082       | 87-65-0        | 2,6-Dichlorophenol                      | (T)              |
| U084       | 542-75-6       | 1,3-Dichloropropene                     | (T)              |
| U085       | 1464-53-5      | 1,2:3,4-Diepoxybutane                   | (I,T)            |
| U108       | 123-91-1       | 1,4-Diethyleneoxide                     | (T)              |
| U028       | 117-81-7       | Diethylhexyl phthalate                  | (T)              |
| U395       | 5952-26-1      | Diethylene glycol, dicarbamate          | (T)              |
| U086       | 1615-80-1      | N,N'-Diethylhydrazine                   | (T)              |
| U087       | 3288-58-2      | O,O-Diethyl S-methyl dithiophosphate    | (T)              |
| U088       | 84-66-2        | Diethyl phthalate                       | (T)              |
| U089       | 56-53-1        | Diethylstilbesterol                     | (T)              |
| U090       | 94-58-6        | Dihydrosafrole                          | (T)              |
| U091       | 119-90-4       | 3,3'-Dimethoxybenzidine                 | (T)              |
| U092       | 124-40-3       | Dimethylamine                           | (I) <sup>1</sup> |
| U093       | 60-11-7        | p-Dimethylaminoazobenzene               | (T)              |
| U094       | 57-97-6        | 7,12-Dimethylbenz[a]anthracene          | (T)              |
| U095       | 119-93-7       | 3,3'-Dimethylbenzidine                  | (T)              |
| U096       | 80-15-9        | alpha,alpha-Dimethylbenzylhydroperoxide | (R) <sup>1</sup> |
| U097       | 79-44-7        | Dimethylcarbamoyl chloride              | (T)              |
| U098       | 57-14-7        | 1,1-Dimethylhydrazine                   | (T)              |

| Waste code | CAS Registry # | Generic name   | Reason           |
|------------|----------------|--|------------------|
| U099       | 540-73-8       | 1,2-Dimethylhydrazine  | (T)              |
| U101       | 105-67-9       | 2,4-Dimethylphenol   | (T)              |
| U102       | 131-11-3       | Dimethyl phthalate   | (T)              |
| U103       | 77-78-1        | Dimethyl sulfate   | (T)              |
| U105       | 121-14-2       | 2,4-Dinitrotoluene   | (T) <sup>3</sup> |
| U106       | 606-20-2       | 2,6-Dinitrotoluene   | (T)              |
| U107       | 117-84-0       | Di-n-octyl phthalate   | (T)              |
| U108       | 123-91-1       | 1,4-Dioxane  | (T)              |
| U109       | 122-66-7       | 1,2-Diphenylhydrazine  | (T)              |
| U110       | 142-84-7       | Dipropylamine  | (D) <sup>1</sup> |
| U111       | 621-64-7       | Di-n-propylnitrosamine   | (T)              |
| U041       | 106-89-8       | Epichlorohydrin  | (T)              |
| U001       | 75-07-0        | Ethanal  | (D) <sup>1</sup> |
| U404       | 121-44-8       | Ethanamine, N,N-diethyl-   | (T)              |
| U174       | 55-18-5        | Ethanamine, N-ethyl-N-nitroso-   | (T)              |
| U155       | 91-80-5        | 1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-                 | (T)              |
| U067       | 106-93-4       | Ethane, 1,2-dibromo-   | (T)              |
| U076       | 75-34-3        | Ethane, 1,1-dichloro-  | (T)              |
| U077       | 107-06-2       | Ethane, 1,2-dichloro-  | (T)              |
| U131       | 67-72-1        | Ethane, hexachloro-  | (T)              |
| U024       | 111-91-1       | Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-  | (T)              |
| U117       | 60-29-7        | Ethane, 1,1'-oxybis-   | (D) <sup>1</sup> |
| U025       | 111-44-4       | Ethane, 1,1'-oxybis[2-chloro-  | (T)              |
| U184       | 76-01-7        | Ethane, pentachloro-   | (T)              |
| U208       | 630-20-6       | Ethane, 1,1,1,2-tetrachloro-   | (T)              |
| U209       | 79-34-5        | Ethane, 1,1,2,2-tetrachloro-   | (T)              |
| U218       | 62-55-5        | Ethanethioamide  | (T)              |
| U226       | 71-55-6        | Ethane, 1,1,1-trichloro-   | (T)              |
| U227       | 79-00-5        | Ethane, 1,1,2-trichloro-   | (T)              |
| U410       | 59669-26-0     | Ethanimidothioic acid, N,N'- [thiobis[(methylimino)carbonyloxy]]bis-, dimethyl ester | (T)              |
| U394       | 30558-43-1     | Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester              | (T)              |
| U359       | 110-80-5       | Ethanol, 2-ethoxy-   | (T)              |
| U173       | 1116-54-7      | Ethanol, 2,2'-(nitrosoimino)bis-   | (T)              |
| U395       | 5952-26-1      | Ethanol, 2,2'-oxybis-, dicarbamate   | (T)              |
| U004       | 98-86-2        | Ethanone, 1-phenyl-  | (T)              |

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|------------|----------------|---|------------------|
| U043       | 75-01-4        | Ethene, chloro-   | (T)              |
| U042       | 110-75-8       | Ethene, (2-chloroethoxy)-                                     | (T)              |
| U078       | 75-35-4        | Ethene, 1,1-dichloro-   | (T)              |
| U079       | 156-60-5       | Ethene, 1,2-dichloro-, (E)-                                   | (T)              |
| U210       | 127-18-4       | Ethene, tetrachloro-  | (T)              |
| U228       | 79-01-6        | Ethene, trichloro-  | (T)              |
| U112       | 141-78-6       | Ethyl acetate   | (I) <sup>1</sup> |
| U113       | 140-88-5       | Ethyl acrylate  | (I)1             |
| U238       | 51-79-6        | Ethyl carbamate (urethane)                                    | (T)              |
| U117       | 60-29-7        | Ethyl ether   | (I)1             |
| U114       | 111-54-6       | Ethylenebisdithiocarbamic acid, salts & esters                | (T)2             |
| U067       | 106-93-4       | Ethylene dibromide  | (T)              |
| U077       | 107-06-2       | Ethylene dichloride   | (T)              |
| U359       | 110-80-5       | Ethylene glycol monoethyl ether                               | (T)              |
| U115       | 75-21-8        | Ethylene oxide  | (I,T)            |
| U116       | 96-45-7        | Ethylenethiourea  | (T)              |
| U076       | 75-34-3        | Ethylidene dichloride   | (T)              |
| U118       | 97-63-2        | Ethyl methacrylate  | (T)              |
| U119       | 62-50-0        | Ethyl methanesulfonate  | (T)              |
| U120       | 206-44-0       | Fluoranthene  | (T)              |
| U122       | 50-00-0        | Formaldehyde  | (T)4             |
| U123       | 64-18-6        | Formic acid   | (C,T)            |
| U124       | 110-00-9       | Furan   | (I) <sup>1</sup> |
| U125       | 98-01-1        | 2-Furancarboxaldehyde   | (I) <sup>1</sup> |
| U147       | 108-31-6       | 2,5-Furandione  | (T)              |
| U213       | 109-99-9       | Furan, tetrahydro-  | (I) <sup>1</sup> |
| U125       | 98-01-1        | Furfural  | (I) <sup>1</sup> |
| U124       | 110-00-9       | Furfuran  | (I) <sup>1</sup> |
| U206       | 18883-66-4     | Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-, D-      | (T)              |
| U206       | 18883-66-4     | D-Glucose, 2-deoxy-2-[[[(methylnitrosoamino)-carbonyl]amino]- | (T)              |
| U126       | 765-34-4       | Glycidylaldehyde  | (T)              |
| U163       | 70-25-7        | Guanidine, N-methyl-N'-nitro-N-nitroso-                       | (T)              |
| U127       | 118-74-1       | Hexachlorobenzene   | (T) <sup>3</sup> |
| U128       | 87-68-3        | Hexachlorobutadiene   | (T) <sup>3</sup> |
| U130       | 77-47-4        | Hexachlorocyclopentadiene                                     | (T)              |
| U131       | 67-72-1        | Hexachloroethane  | (T) <sup>3</sup> |

| Waste code | CAS Registry # | Generic name                           | Reason           |
|------------|----------------|--|------------------|
| U132       | 70-30-4        | Hexachlorophene                        | (T)              |
| U243       | 1888-71-7      | Hexachloropropene                      | (T)              |
| U133       | 302-01-2       | Hydrazine (R,T)                        | (T)              |
| U086       | 1615-80-1      | Hydrazine, 1,2-diethyl-                | (T)              |
| U098       | 57-14-7        | Hydrazine, 1,1-dimethyl-               | (T)              |
| U099       | 540-73-8       | Hydrazine, 1,2-dimethyl-               | (T)              |
| U109       | 122-66-7       | Hydrazine, 1,2-diphenyl-               | (T)              |
| U134       | 7664-39-3      | Hydrofluoric acid                      | (C,T)            |
| U134       | 7664-39-3      | Hydrogen fluoride                      | (C,T)            |
| U135       | 7783-06-4      | Hydrogen sulfide                       | (T)              |
| U135       | 7783-06-4      | Hydrogen sulfide H <sub>2</sub> S      | (T)              |
| U096       | 80-15-9        | Hydroperoxide, 1-methyl-1-phenylethyl- | (R) <sup>1</sup> |
| U116       | 96-45-7        | 2-Imidazolidinethione                  | (T)              |
| U137       | 193-39-5       | Indeno[1,2,3-cd]pyrene                 | (T)              |
| U190       | 85-44-9        | 1,3-Isobenzofurandione                 | (T)              |
| U140       | 78-83-1        | Isobutyl alcohol                       | (I,T)            |
| U141       | 120-58-1       | Isosafrole                             | (T)              |
| U142       | 143-50-0       | Kepone                                 | (T)              |
| U143       | 303-34-4       | Lasiocarpine                           | (T)              |
| U144       | 301-04-2       | Lead acetate                           | (T)              |
| U146       | 1335-32-6      | Lead, bis(acetato-O)tetrahydroxytri-   | (T)              |
| U145       | 7446-27-7      | Lead phosphate                         | (T)              |
| U146       | 1335-32-6      | Lead subacetate                        | (T)              |
| U129       | 58-89-9        | Lindane                                | (T) <sup>3</sup> |
| U163       | 70-25-7        | MNNG                                   | (T)              |
| U147       | 108-31-6       | Maleic anhydride                       | (T)              |
| U148       | 123-33-1       | Maleic hydrazide                       | (T)              |
| U149       | 109-77-3       | Malononitrile                          | (T)              |
| U150       | 148-82-3       | Melphalan                              | (T)              |
| U151       | 7439-97-6      | Mercury                                | (T) <sup>3</sup> |
| U152       | 126-98-7       | Methacrylonitrile                      | (I, T)           |
| U092       | 124-40-3       | Methanamine, N-methyl-                 | (I) <sup>1</sup> |
| U029       | 74-83-9        | Methane, bromo-                        | (T)              |
| U045       | 74-87-3        | Methane, chloro-                       | (I, T)           |
| U046       | 107-30-2       | Methane, chloromethoxy-                | (T)              |
| U068       | 74-95-3        | Methane, dibromo-                      | (T)              |

| Waste code | CAS Registry # | Generic name   | Reason             |
|------------|----------------|--|--------------------|
| U080       | 75-09-2        | Methane, dichloro-   | (T)                |
| U075       | 75-71-8        | Methane, dichlorodifluoro-   | (T)                |
| U138       | 74-88-4        | Methane, iodo-   | (T)                |
| U119       | 62-50-0        | Methanesulfonic acid, ethyl ester  | (T)                |
| U211       | 56-23-5        | Methane, tetrachloro-  | (T)                |
| U153       | 74-93-1        | Methanethiol   | (I, T)             |
| U225       | 75-25-2        | Methane, tribromo-   | (T)                |
| U044       | 67-66-3        | Methane, trichloro-  | (T)                |
| U121       | 75-69-4        | Methane, trichlorofluoro-  | (T)                |
| U036       | 57-74-9        | 4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a- hexahydro-  | (T)                |
| U154       | 67-56-1        | Methanol   | (I) <sup>1</sup>   |
| U155       | 91-80-5        | Methapyrilene  | (T)                |
| U142       | 143-50-0       | 1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6- decachlorooctahydro-  | (T)                |
| U247       | 72-43-5        | Methoxychlor   | (T) <sup>3</sup>   |
| U154       | 67-56-1        | Methyl alcohol   | (I) <sup>1</sup>   |
| U029       | 74-83-9        | Methyl bromide   | (T)                |
| U186       | 504-60-9       | 1-Methylbutadiene  | (I) <sup>1</sup>   |
| U045       | 74-87-3        | Methyl chloride  | (I,T)              |
| U156       | 79-22-1        | Methyl chlorocarbonate   | (I,T)              |
| U226       | 71-55-6        | Methyl chloroform  | (T)                |
| U157       | 56-49-5        | 3-Methylcholanthrene   | (T)                |
| U158       | 101-14-4       | 4,4'-Methylenebis(2-chloroaniline)   | (T)                |
| U068       | 74-95-3        | Methylene bromide  | (T)                |
| U080       | 75-09-2        | Methylene chloride   | (T)                |
| U159       | 78-93-3        | Methyl ethyl ketone (MEK)  | (I,T) <sup>3</sup> |
| U160       | 1338-23-4      | Methyl ethyl ketone peroxide   | (R,T)              |
| U138       | 74-88-4        | Methyl iodide  | (T)                |
| U161       | 108-10-1       | Methyl isobutyl ketone   | (I) <sup>1</sup>   |
| U162       | 80-62-6        | Methyl methacrylate  | (I,T)              |
| U161       | 108-10-1       | 4-Methyl-2-pentanone   | (I) <sup>1</sup>   |
| U164       | 56-04-2        | Methylthiouracil   | (T)                |
| U010       | 50-07-7        | Mitomycin C  | (T)                |
| U059       | 20830-81-3     | 5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy)-alpha-L- lyxo-hexopyranosyl)oxy]- 7,8,9,10-tetrahydro-6,8,11-trihydroxy-1- methoxy-, (8S-cis) | (T)                |

| Waste code | CAS Registry # | Generic name  | Reason           |
|------------|----------------|---|------------------|
| U167       | 134-32-7       | 1-Naphthalenamine   | (T)              |
| U168       | 91-59-8        | 2-Naphthalenamine   | (T)              |
| U026       | 494-03-1       | Naphthalenamine, N,N'-bis(2-chloroethyl)-   | (T)              |
| U165       | 91-20-3        | Naphthalene   | (T)              |
| U047       | 91-58-7        | Naphthalene, 2-chloro-  | (T)              |
| U166       | 130-15-4       | 1,4-Naphthalenedione  | (T)              |
| U236       | 72-57-1        | 2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl[1,1'-biphenyl]-4,4'-diyl)bis(azo)bis[5-amino-4-hydroxy]-, tetrasodium salt | (T)              |
| U279       | 63-25-2        | 1-Naphthalenol, methylcarbamate   | (T)              |
| U166       | 130-15-4       | 1,4-Naphthoquinone  | (T)              |
| U167       | 134-32-7       | alpha-Naphthylamine   | (T)              |
| U168       | 91-59-8        | beta-Naphthylamine  | (T)              |
| U217       | 10102-45-1     | Nitric acid, thallium(1+) salt  | (T)              |
| U169       | 98-95-3        | Nitrobenzene (I,T)  | (T) <sup>3</sup> |
| U170       | 100-02-7       | p-Nitrophenol   | (T)              |
| U171       | 79-46-9        | 2-Nitropropane  | (I,T)            |
| U172       | 924-16-3       | N-Nitrosodi-n-butylamine  | (T)              |
| U173       | 1116-54-7      | N-Nitrosodiethanolamine   | (T)              |
| U174       | 55-18-5        | N-Nitrosodiethylamine   | (T)              |
| U176       | 759-73-9       | N-Nitroso-N-ethylurea   | (T)              |
| U177       | 684-93-5       | N-Nitroso-N-methylurea  | (T)              |
| U178       | 615-53-2       | N-Nitroso-N-methylurethane  | (T)              |
| U179       | 100-75-4       | N-Nitrosopiperidine   | (T)              |
| U180       | 930-55-2       | N-Nitrosopyrrolidine  | (T)              |
| U181       | 99-55-8        | 5-Nitro-o-toluidine   | (T)              |
| U193       | 1120-71-4      | 1,2-Oxathiolane, 2,2-dioxide  | (T)              |
| U058       | 50-18-0        | 2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2- oxide   | (T)              |
| U115       | 75-21-8        | Oxirane   | (I,T)            |
| U126       | 765-34-4       | Oxiranecarboxyaldehyde  | (T)              |
| U041       | 106-89-8       | Oxirane, (chloromethyl)-  | (T)              |
| U182       | 123-63-7       | Paraldehyde   | (T)              |
| U183       | 608-93-5       | Pentachlorobenzene  | (T)              |
| U184       | 76-01-7        | Pentachloroethane   | (T)              |
| U185       | 82-68-8        | Pentachloronitrobenzene (PCNB)  | (T)              |
| U161       | 108-10-1       | Pentanol, 4-methyl-   | (I) <sup>1</sup> |

| Waste code | CAS Registry # | Generic name  | Reason           |
|------------|----------------|---|------------------|
| U186       | 504-60-9       | 1,3-Pentadiene                                      | (I) <sup>1</sup> |
| U187       | 62-44-2        | Phenacetin  | (T)              |
| U188       | 108-95-2       | Phenol  | (T)              |
| U048       | 95-57-8        | Phenol, 2-chloro-                                   | (T)              |
| U039       | 59-50-7        | Phenol, 4-chloro-3-methyl-                          | (T)              |
| U081       | 120-83-2       | Phenol, 2,4-dichloro-                               | (T)              |
| U082       | 87-65-0        | Phenol, 2,6-dichloro-                               | (T)              |
| U089       | 56-53-1        | Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)- | (T)              |
| U101       | 105-67-9       | Phenol, 2,4-dimethyl-                               | (T)              |
| U052       | 1319-77-3      | Phenol, methyl-                                     | (T)              |
| U132       | 70-30-4        | Phenol, 2,2'-methylenebis[3,4,6-trichloro-          | (T)              |
| U411       | 114-26-1       | Phenol, 2-(1-methylethoxy)-, methylcarbamate.       | (T)              |
| U170       | 100-02-7       | Phenol, 4-nitro-                                    | (T)              |
| U150       | 148-82-3       | L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-       | (T)              |
| U145       | 7446-27-7      | Phosphoric acid, lead(2+) salt (2:3)                | (T)              |
| U087       | 3288-58-2      | Phosphorodithioic acid, O,O-diethyl S-methyl ester  | (T)              |
| U189       | 1314-80-3      | Phosphorus sulfide                                  | (R) <sup>1</sup> |
| U190       | 85-44-9        | Phthalic anhydride                                  | (T)              |
| U191       | 109-06-8       | 2-Picoline  | (T)              |
| U179       | 100-75-4       | Piperidine, 1-nitroso-                              | (T)              |
| U192       | 23950-58-5     | Pronamide   | (T)              |
| U194       | 107-10-8       | 1-Propanamine                                       | (I,T)            |
| U111       | 621-64-7       | 1-Propanamine, N-nitroso-N-propyl-                  | (T)              |
| U110       | 142-84-7       | 1-Propanamine, N-propyl-                            | (I) <sup>1</sup> |
| U066       | 96-12-8        | Propane, 1,2-dibromo-3-chloro-                      | (T)              |
| U083       | 78-87-5        | Propane, 1,2-dichloro-                              | (T)              |
| U149       | 109-77-3       | Propanedinitrile                                    | (T)              |
| U171       | 79-46-9        | Propane, 2-nitro-                                   | (I,T)            |
| U027       | 108-60-1       | Propane, 2,2'-oxybis[2-chloro-                      | (T)              |
| U193       | 1120-71-4      | 1,3-Propane sultone                                 | (T)              |
| U235       | 126-72-7       | 1-Propanol, 2,3-dibromo-, phosphate (3:1)           | (T)              |
| U140       | 78-83-1        | 1-Propanol, 2-methyl-                               | (I,T)            |
| U002       | 67-64-1        | 2-Propanone   | (I) <sup>1</sup> |
| U007       | 79-06-1        | 2-Propenamide                                       | (T)              |
| U084       | 542-75-6       | 1-Propene, 1,3-dichloro-                            | (T)              |
| U243       | 1888-71-7      | 1-Propene, 1,1,2,3,3,3-hexachloro-                  | (T)              |

| Waste code | CAS Registry # | Generic name  | Reason           |
|------------|----------------|---|------------------|
| U009       | 107-13-1       | 2-Propenenitrile  | (T)              |
| U152       | 126-98-7       | 2-Propenenitrile, 2-methyl-                               | (I,T)            |
| U008       | 79-10-7        | 2-Propenoic acid  | (I) <sup>1</sup> |
| U113       | 140-88-5       | 2-Propenoic acid, ethyl ester                             | (I) <sup>1</sup> |
| U118       | 97-63-2        | 2-Propenoic acid, 2-methyl-, ethyl ester                  | (T)              |
| U162       | 80-62-6        | 2-Propenoic acid, 2-methyl-, methyl ester                 | (I,T)            |
| U373       | 122-42-9       | Propham   | (T)              |
| U411       | 114-26-1       | Propoxur  | (T)              |
| U387       | 52888-80-9     | Prosulfocarb  | (T)              |
| U194       | 107-10-8       | n-Propylamine   | (I,T)            |
| U083       | 78-87-5        | Propylene dichloride                                      | (T)              |
| U148       | 123-33-1       | 3,6-Pyridazinedione, 1,2-dihydro-                         | (T)              |
| U196       | 110-86-1       | Pyridine  | (T) <sup>3</sup> |
| U191       | 109-06-8       | Pyridine, 2-methyl-                                       | (T)              |
| U237       | 66-75-1        | 2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]- | (T)              |
| U164       | 56-04-2        | 4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-        | (T)              |
| U180       | 930-55-2       | Pyrrolidine, 1-nitroso-                                   | (T)              |
| U200       | 50-55-5        | Reserpine   | (T)              |
| U201       | 108-46-3       | Resorcinol  | (T)              |
| U203       | 94-59-7        | Safrole   | (T)              |
| U204       | 7783-00-8      | Selenious acid  | (T)              |
| U204       | 7783-00-8      | Selenium dioxide  | (T)              |
| U205       | 7488-56-4      | Selenium sulfide  | (T)              |
| U205       | 7488-56-4      | Selenium sulfide SeS <sub>2</sub>                         | (R,T)            |
| U015       | 115-02-6       | L-Serine, diazoacetate (ester)                            | (T)              |
| U206       | 18883-66-4     | Streptozotocin  | (T)              |
| U103       | 77-78-1        | Sulfuric acid, dimethyl ester                             | (T)              |
| U189       | 1314-80-3      | Sulfur phosphide  | (R) <sup>1</sup> |
| U207       | 95-94-3        | 1,2,4,5-Tetrachlorobenzene                                | (T)              |
| U208       | 630-20-6       | 1,1,1,2-Tetrachloroethane                                 | (T)              |
| U209       | 79-34-5        | 1,1,2,2-Tetrachloroethane                                 | (T)              |
| U210       | 127-18-4       | Tetrachloroethylene                                       | (T) <sup>3</sup> |
| U213       | 109-99-9       | Tetrahydrofuran   | (I) <sup>1</sup> |
| U214       | 563-68-8       | Thallium(I) acetate                                       | (T)              |
| U215       | 6533-73-9      | Thallium(I) carbonate                                     | (T)              |
| U216       | 7791-12-0      | Thallium(I) chloride                                      | (T)              |



| Waste code | CAS Registry # | Generic name  | Reason             |
|------------|----------------|---|--------------------|
| U216       | 7791-12-0      | Thallium chloride TlCl  | (T)                |
| U217       | 10102-45-1     | Thallium(I) nitrate   | (T)                |
| U218       | 62-55-5        | Thioacetamide   | (T)                |
| U410       | 59669-26-0     | Thiodicarb  | (T)                |
| U153       | 74-93-1        | Thiomethanol  | (I,T)              |
| U244       | 137-26-8       | Thioperoxydicarbonic diamide [(H2 N)C(S)]2 S2, tetramethyl-       | (T)                |
| U409       | 23564-05-8     | Thiophanate-methyl  | (T)                |
| U219       | 62-56-6        | Thiourea  | (T)                |
| U244       | 137-26-8       | Thiram  | (T)                |
| U220       | 108-88-3       | Toluene   | (T)                |
| U221       | 25376-45-8     | Toluenediamine  | (T)                |
| U223       | 26471-62-5     | Toluene diisocyanate  | (R,T)              |
| U328       | 95-53-4        | o-Toluidine   | (T)                |
| U353       | 106-49-0       | p-Toluidine   | (T)                |
| U222       | 636-21-5       | o-Toluidine hydrochloride   | (T)                |
| U389       | 2303-17-5      | Triallate   | (T)                |
| U011       | 61-82-5        | 1H-1,2,4-Triazol-3-amine  | (T)                |
| U226       | 71-55-6        | 1,1,1-Trichloroethane   | (T)                |
| U227       | 79-00-5        | 1,1,2-Trichloroethane   | (T)                |
| U228       | 79-01-6        | Trichloroethylene   | (T) <sup>3</sup>   |
| U121       | 75-69-4        | Trichloromonofluoromethane  | (T)                |
| U404       | 121-44-8       | Triethylamine   | (T)                |
| U234       | 99-35-4        | 1,3,5-Trinitrobenzene   | (R,T)              |
| U182       | 123-63-7       | 1,3,5-Trioxane, 2,4,6-trimethyl-                                  | (T)                |
| U235       | 126-72-7       | Tris(2,3-dibromopropyl) phosphate                                 | (T)                |
| U236       | 72-57-1        | Trypan blue   | (T)                |
| U237       | 66-75-1        | Uracil mustard  | (T)                |
| U176       | 759-73-9       | Urea, N-ethyl-N-nitroso-  | (T)                |
| U177       | 684-93-5       | Urea, N-methyl-N-nitroso-   | (T)                |
| U043       | 75-01-4        | Vinyl chloride  | (T) <sup>3</sup>   |
| U248       | 81-81-2        | Warfarin, & salts, when present at concentrations of 0.3% or less | (T) <sup>2,5</sup> |
| U239       | 1330-20-7      | Xylene  | (I) <sup>1</sup>   |

|      |           |   |                  |
|------|-----------|---|------------------|
| U200 | 50-55-5   | Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester, (3beta,16beta,17alpha,18beta,20alpha)- | (T)              |
| U249 | 1314-84-7 | Zinc phosphide Zn <sub>3</sub> P <sub>2</sub> , when present at concentrations of 10% or less   | (T) <sup>6</sup> |

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## APPENDIX B – Load Inspection Checklist



# Load Inspection Checklist

Inspected by: \_\_\_\_\_

Date: \_\_\_\_\_

Customer: \_\_\_\_\_

Vehicle Description: \_\_\_\_\_

Time of Inspection: \_\_\_\_\_

Description of Load:  Sludge from Bar-S  Sludge from WWTP  Other (describe below)

\_\_\_\_\_  
\_\_\_\_\_

Paint Filter Test Performed:  Yes  No      Passed?  Yes  No

| <u>Indicators of Prohibited Waste:</u> | <u>Yes</u> | <u>No</u> |
|--|------------|-----------|
|--|------------|-----------|

|   |                          |                          |
|---|--------------------------|--------------------------|
| Electric transformers, light ballasts, capacitors<br>Or Other indicators of PCBs > 50 ppm | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|

|   |                          |                          |
|---|--------------------------|--------------------------|
| Drums, totes, liquid containers<br>Or other indicators of liquids > 5 gallons | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|

|  |                          |                          |
|--|--------------------------|--------------------------|
| Biohazard containers, bags, labels<br>Or other indicators of sharps or medical waste | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|

|  |                          |                          |
|--|--------------------------|--------------------------|
| Refrigerators, AC compressors, freezers<br>Or other indicators of refrigerants | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|

|  |                          |                          |
|--|--------------------------|--------------------------|
| Radioactive labels, containers<br>Or other indicators of radiation | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|

|   |                          |                          |
|---|--------------------------|--------------------------|
| Chemical containers, warning labels<br>Or other indicators of hazardous waste | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|

|                |                          |                          |
|----------------|--------------------------|--------------------------|
| Load Rejected? | <input type="checkbox"/> | <input type="checkbox"/> |
|----------------|--------------------------|--------------------------|

Date Rejection Reported to DEQ \_\_\_\_\_ Reported By \_\_\_\_\_

## APPENDIX C – Paint Filter Test Data



**SECTION 31 35 26.13 - RECONSTRUCTED CLAY LINER (LANDFILLS)**

**PART 1 - GENERAL**

**1.1 SCOPE**

- A. The CONTRACTOR shall furnish all labor, materials, supervision and equipment to complete the excavation, embankment and a reconstructed clay liner with a minimum thickness of three (3) feet with a hydraulic conductivity no greater than  $1.0 \times 10^{-5}$  cm/sec, as shown on the Plans and as included in these Specifications.

**1.2 DEFINITIONS**

The following list of definitions is provided for reference:

- A. **"Authorized Representation"** shall mean a duly named individual who has the authority to execute a change order on behalf of the City.
- B. **"City"** shall mean the City of Altus, Oklahoma.
- C. **"Classification System"** shall mean the soil classification system shall be in accordance with the standard test method for classification of soils for engineering purposes (ASTM D2487- 83).
- D. **"Compaction"** shall mean the process of increasing the density of soil by rolling, tamping, vibrating, or other mechanical means.
- E. **"Contractor"** shall mean the party entering into this general contract.
- F. **"Atterberg Limits"** includes the liquid limit, plastic limit, and shrinkage limit for soils (ASTM D4318-84 and D427-83, respectively). The water content when the soil behavior changes from the liquid to the plastic state is the liquid limit; from the plastic to the semi- solid state is the plastic limit; and from the semi-solid to the solid state is the shrinkage limit.
- G. **"Density"** shall mean the mass density of a soil is its weight per unit volume; usually reported in pounds per cubic foot.
- H. **"Department"** shall mean the Oklahoma Department of Environmental Quality, Land Protection Service (ODEQ/LPS).
- I. **"Engineer"** shall mean the consulting engineering firm providing design and general supervision, monitoring of earthwork and liner construction, construction surveillance, and surveying services and who is responsible interpreting for and enforcing the Specifications outlined herein.
- J. **"EPA Document"** shall mean the EPA (U.S. Environmental Protection Agency) Technical Guidance Document "Quality Control and Quality Assurance for Waste Containment Facilities", EPA/600/R-93/182, dated September 1993.
- K. **"Gas Well"** shall mean a vertically installed slotted, perforated, or porous pipe with a solid riser pipe surrounded by a gravel-packed zone over the perforated pipe section to allow removal of landfill gas and any intercepted leachate.

- L. **"Geomembrane"** shall mean an impermeable membrane liner or barrier used in civil engineering for geotechnical products. It can also be reinforced with a fabric scrim for added strength.
- M. **"Geotextile"** shall mean a relatively porous construction or reinforcement fabric used in civil engineering for geotechnical projects. The fabric structure may be knit, woven, or nonwoven. Filter geotextile is a material, which provides separation of materials with different pore size openings to prevent clogging. Drainage geotextiles are materials with adequate transmissivity to provide planar flow of fluid. Reinforcing geotextile is a material with sufficient in-plane strength to support some or all of the load applied to a composite system (such as soil-geotextile).
- N. **"In Situ"** shall mean ", "as is", or as it exists in-place naturally.
- O. **"Moisture Content"** shall mean the ratio of quantity of water in the soil (by weight) to the weight of the soil solids (dry soil), expressed in percentage; also referred to as water content.
- P. **"Optimum Moisture Content (OMC)"** shall mean the moisture content corresponding to maximum dry density as determined in the Standard Proctor (ASTM D-698) or Modified Proctor (ASTM D-1557) Test.
- Q. **"OAC"** shall mean the Oklahoma Administrative Code.
- R. **"Permeability"** shall mean the ability of pore fluid to travel through a soil mass via interconnected void. "High" permeability indicates relatively rapid flow of pore fluid and vice versa. Coefficients of permeability are generally reported in centimeters per second.
- S. **"Plasticity"** shall mean the ability of soil mass to be remolded without raveling or breaking apart. The plasticity index, numerically equal to the difference between the liquid and plastic limit, is a comparative number, which describes the range of moisture contents over which a soil behavior is plastic.
- T. **"QCA Engineer"** shall mean an independent consulting engineer and/or testing firm, working directly for the City, providing subsurface soil investigations, soil testing laboratory, oversight of earthwork and liner construction, and assisting in the construction surveillance, who is responsible for final approval of cell liner construction according to the Plans and Specifications outlined herein.

## **PART 2 - PRODUCTS**

### **2.1 RECONSTRUCTED CLAY LINER**

- A. Preliminary Liner Soil Testing (Furnished by QAQC Firm)
  - 1. Suitability determination. The OWNER shall collect samples and test soil proposed to be used as liner material.
  - 2. Sample collection. At least one sample shall be collected for each type of material proposed for use as liner material. One composite sample shall be taken for every



10,000 cubic yards of soil or more frequently if visual observations indicate a change in material characteristics. At least five natural or in-place moisture and density tests per acre shall be taken.

3. Testing. The soil samples shall be tested by a soil’s laboratory under the direction of an independent professional ENGINEER registered in the State of Oklahoma. The test samples and report shall be sealed by a Registered Professional ENGINEER.
4. Tests. The following tests shall be conducted on each type of soil samples:
 

|                                      |                            |
|--------------------------------------|----------------------------|
| a. Soil Classification               | ASTM D-2487                |
| b. Particle-Size Analysis of Soil    | ASTM D-422                 |
| c. Sieve Analysis for the Following: | #4, #10, #40, #200         |
| d. Percent Fines (- #200 sieve)      | ASTM 1140                  |
| e. Atterberg Limits                  | ASTM D-4318                |
| f. Moisture Content                  | ASTM D-2216 or ASTM D-4643 |
| g. Moisture-Density Relationship     | ASTM D698 or ASTM D1557    |
| h. Hydraulic Conductivity            | ASTM D-5084                |
5. Test Pad. A test pad for the liner can be constructed and used to verify that the construction methods to produce the hydraulic conductivity of  $1.0 \times 10^{-7}$  cm./sec. or less throughout the reconstructed area. However, hydraulic conductivity tests shall be performed in the top 12 inches of the finished liner per Part 3.6 below.
6. Soils Report. A laboratory report of soil and rock characteristics shall be submitted as part of the application. All test results shall indicate the type of test used the method of testing and the condition, preparation, and orientation of each sample.

## **2.2. PERFORMANCE STANDARDS OF LINER MATERIAL**

- A. The soil tests required for preconstruction shall meet or exceed OAC 252:515-11-32. These tests shall be conducted at a minimum rate of one sample per 4,000 cubic yards and for each soil type or visual change in soil appearance.
- B. The minimum performance standards required of recompacted liner material include:
  1. Plasticity Index must be no less than 10 percent and should be less than 30 percent
  2. Liquid Limit must be no less than 24 percent.
  3. Percent Fines Passing #200 Mesh Sieve shall be at least 50 percent.
  4. The amount of gravel (dry-weight percentage retained on the No. 4 sieve) must be less than or equal to 20 percent.
  5. The largest particle size allowed must be less than one (1) inches in diameter.
  6. The water content of the soil must be wet of optimum at the time the soil is compacted. The recommended range is 1 to 3 percent wet of optimum moisture or as determine by field geotechnical testing.

7. After the soil is compacted, it must have a hydraulic conductivity that is no greater than  $1.0 \times 10^{-7}$  cm./sec.

### **PART 3 - EXECUTION**

#### **3.1 SEQUENCE OF CONSTRUCTION**

- A. The two (2) foot reconstructed clay liner shall be constructed to the lines and elevations shown on the Contract Drawings and in accordance with these Specifications.
- B. The recompacted liner shall be constructed in the following sequence:
  1. Removal of Overburden
  2. Subgrade Preparation
  3. Three (3) Foot Reconstructed Clay Liner
- C. During all phases of the project, construction will be tested, inspected, and evaluated prior to approval.

#### **3.2 REMOVAL OF OVERBURDEN**

- A. CONTRACTOR shall remove and stockpile overburden on-site in a location coordinated with the OWNER.

#### **3.3 SUBGRADE PREPARATION FOR RECOMPACTED LINER**

- A. The upper six (6) inches of the surface on which the clay liner is to be placed must be scarified and recompacted to a minimum density of 95 percent of the standard proctor density.

#### **3.4. RECOMPACTED LINER PLACEMENT AND COMPACTION**

- A. The steps shall be followed in constructing each lift of a recompacted liner.
  1. Internal side slopes of disposal areas where liner shall be constructed shall be no steeper than 3:1 (run: rise).
  2. Liner material shall be placed at 1 to 3 percent wet of optimum moisture, or as indicated by soil tests. If the soil must be moistened to achieve the proper level of water content, then the water must be distributed equally throughout, and a full hydration of the soil must take place. This may require that the soil be moistened in a separate area and allowed to hydrate for some time before it is placed in the liner. Moisture content must be verified by either a 95% Standard Proctor Test or a 90% Modified Proctor test.
  3. Scarify the surface on which the lift shall be placed to a nominal depth of approximately one (1) inch.
  4. Place a lift of soil at a loose depth of nine (9) inches or less. On the final lift, no more than 5 percent of the final lift thickness determinations can exceed this requirement and no lift thickness can exceed the maximum allowable lift thickness by more than 1 inch.

5. Compact the lift to a depth of six (6) inches or less by the use of a heavy-footed roller with feet that fully penetrate the loose lift of soil and at least 1" into the underlying layer. The minimum weight of roller shall be 3,000 pounds per liner foot along the axis of the drum(s). The soil test results, and the type of compaction equipment used shall determine the minimum number of passes. A pass shall be constituted as one pass for a self-propelled roller or one pass of the drums(s) for a towed roller. The minimum compaction coverage (C) anticipated to meet compaction is 150 to 200 percent, where the Number of passes (N) can be estimated from the following:

$$N = C \cdot A_d / A_f / 100$$

Where:

|                |   |  |
|----------------|---|--|
| C              | = | Percent of coverage                      |
| A <sub>d</sub> | = | Surface area drum                        |
| A <sub>f</sub> | = | Sum of the area of the feet on the drums |

6. At least 5 to 15 passes may be necessary to remold and compact the clay liner sufficiently to achieve the required permeability. The minimum density of the lift shall be greater than or equal to 95 percent of the standard proctor density or 90% of modified proctor density. Heavy compaction equipment may require the minimum density to be 95 percent of the modified proctor density, at the discretion of the ENGINEER. The required number of passes shall be observed/determine at least one time, per acre, per lift.
7. Inspect for and remove all rocks, cobbles, roots, and other foreign objects over one inch in diameter, as well as all surface rocks, regardless of size.
8. Inspect for flaws, cracks, and other defects; and,
9. Corrective action will be required in all areas that do not conform with specifications. The defective area must be repaired out to the limits defined by passing soils tests unless the limits are determined by additional field tests.

\*The required inspections and removals must be continual as part of the placement of liner material.

### 3.5. RECOMPACTED LINER CONSTRUCTION TESTS

- A. The following moisture and density tests shall be performed on each compacted lift at a rate of at least three per acre for each approximately six-inch compacted lift. A minimum of two tests shall be performed on the bottom and one on side-slope areas.

1. Determination of moisture values of each lift by one of the following methods:

|                                    |             |
|------------------------------------|-------------|
| a. Nuclear density method          | ASTM D-2922 |
| b. Drive-cylinder method           | ASTM D-2937 |
| c. Rubber balloon method           | ASTM D-2167 |
| d. Sand-cone method                | ASTM D-1556 |
| e. Microwave drying method         | ASTM D-4643 |
| f. Conventional oven drying method | ASTM D-2216 |

- B. As part of the QC/QA procedures, every tenth sample tested with the above methods; must be tested by the conventional oven drying method (ASTM D2216). The results of these tests must be compared with field tests to identify any significant or systematic calibration errors.
  - 1. Determination of density values of each lift by one of the following methods:
    - a. Nuclear density method                      ASTM D-2922
    - b. Drive-cylinder method                         ASTM D-2937
    - c. Standard Proctor Test or                     ASTM D-698  
Modified Proctor Test                         ASTM D-1557
- C. As part of the QC/QA procedures, every twentieth sample tested with ASTM D-2922 must be tested with the sand cone method (ASTM D-155, rubber balloon method (ASTM D-2167) or undisturbed sample method (ASTM D-1587). The results of these tests must be compared with field tests to identify any significant or systematic calibration errors.
- D. Sampling patterns will be based on a grid system establish by the ENGINEER. Tests will be randomly staggered in successive lifts so that sampling points vary in successive lifts. Areas missed by randomly sampling will require additional tests for liner verification.

**3.6. RECOMPACTED LINER CONSTRUCTION VERIFICATION TESTS**

- A. After completion of recompacted liner construction, the following quality control measures shall be performed and documented.
  - 1. A control survey shall be performed on a 100-foot grid which verifies the thickness of the constructed liner.
  - 2. A visual inspection shall be performed to ensure liner integrity.
  - 3. Hydraulic conductivity shall be tested with at least one test per acre performed on the side-slopes and two per acre on the bottom, at DEQ approved locations, in the top 12" of the liner using one of the following methods:
    - a. Laboratory testing of undisturbed soil sample can be done according to ASTM Test Method D-5084 with a maximum confining stress of 35 kPa (5 psi). ASTM Method D-1587 shall be used to retrieve the undisturbed soil sample for an in-situ laboratory test.
    - b. A field test for hydraulic conductivity shall be according to the sealed double ring infiltrometer test (ASTM D-5093).
    - c. Any other method approved in advance by the ENGINEER and/or the OWNER in accordance with OAC 252:515-11-37(c)(2)(c).
      - i. The use of other verification test methods must be approved in advance by ODEQ.
  - 4. Liner Test Holes
    - a. All test holes deeper than three feet shall be plugged in accordance with OAC 252 :515-7-3 and OAC 785:35-11-2 (b).

ALTUS MUNICIPAL LANDFILL – C&D DEBRIS CELL

- (1) If no contaminated soil and groundwater is encountered in the boring, uncontaminated drill cuttings, uncontaminated surface clay, cement, and/or high solids (a minimum of twenty percent (20%) solids by dry weight) bentonite grout, pellets, or granules shall be placed from the bottom of the boring to an elevation fourteen (14) feet below land surface and a minimum of ten (10) feet shall be filled with cement grout to an elevation four (4) feet below land surface. The remaining four (4) feet to land surface shall be backfilled with compacted uncontaminated soil.
- (2) If contaminated soil or contaminated groundwater is encountered in the boring, or if the boring is located at an underground storage tank site or within 300 feet of the outside perimeter of an existing wastewater lagoon or is located on a tract of land where a wastewater lagoon is proposed, cement grout shall be placed from the bottom of the borehole to an elevation four (4) feet below land surface. Cement grout shall be placed in the borehole through a tremie pipe and filled r pumped from the bottom upward. The remaining four (4) feet to land surface shall be backfilled with compacted uncontaminated soil.
- (3) If the boring is twenty (20) feet or less in total depth and groundwater has not been encountered, the boring shall, at a minimum, be filled with compacted uncontaminated cuttings from the bottom of the boring to land surface.
- (4) Direct push geotechnical borings. Direct push geotechnical borings shall be plugged to prevent pollution of groundwater within thirty (30) days after completion of drilling or immediately if drilled by an unlicensed or uncertified person or if the Board determines that the well does not meet the minimum construction standards set forth in this Chapter as follows:
  - (a) Bentonite chips shall be placed and effectively compressed within the annulus space from the bottom of the borehole to within ten (10) feet of the land surface.
  - (b) Cement grout shall be installed through a tremie pipe in the remaining annulus space from ten (10) feet to land surface, provide that no cement grout shall be required if the boring is less than ten feet (10') in total depth and no groundwater and no contaminated soil was encountered.
- b. All holes, three feet or less in depth shall be plugged in accordance with OAC 252:515-11-74. All boreholes must be plugged with pelletized or chipped bentonite and rehydrated after the core sampling is completed.
- c. Maximum allowable percentages of failing materials tests shall be as follows:

| <b>Test</b>   | <b>Maximum Percentage of Outliers</b> |
|---|---------------------------------------|
| Atterberg Limits                                    | 5%                                    |
| Percent fines                                       | 5%                                    |
| Percent Gravel                                      | 10%                                   |
| Clod Size   | 10%                                   |
| Hydraulic Conductivity of Laboratory Compacted Soil | 5%                                    |

|                           |                  |
|---------------------------|------------------|
| Water Content             | 3% <sup>*1</sup> |
| Dry Density               | 3% <sup>*2</sup> |
| Number of Passes Required | 5%               |

---

- \*1 No water content less than 2% nor more than 3% of the allowable value
- \*2 No dry density values less than 5 lbs. per cubic foot below the allowable Value

Failing tests concentrated in one lift or one area will not be acceptable even if the above percentages are met.

- f. A report, prepared by QCA ENGINEER, of the above quality control measures shall be submitted to the ENGINEER for approval of the Recompected Clay Liner. All soil property values as required by OAC regulation or this specification shall also be included as well as a summary of all construction testing.

**3.7. REPAIR AND/OR REPLACEMENT OF FLAWED RECOMPACTED CLAY LINER**

- A. If the liner fails any construction verification tests, the liner shall be repaired or replaced until it meets the requirement. The defective area must be repaired out to the limits defined by passing soils tests unless the limits are determined by additional field tests.
- B. The CONTRACTOR may proceed, at his own risk, to place additional lifts before all test results are available; however, if the QCA ENGINEER rejects the lift based on completed test reports, the defective soil and all overlying materials that have been replaced will be removed and replaced.
- C. All repairs will be certified by the QCA ENGINEER and will be documented in the liner installation and testing report in accordance with QAC 252:515-11-38.

**3.8. PROTECTION OF RECOMPACTED CLAY LINER**

- A. The recompacked clay liner must be protected from desiccation, freezing, and excess surface water after construction. The Quality Assurance ENGINEER shall certify that the moisture content of OAC 252:515-11-33(6) was maintained in the liner until placement of the protective cover.
  - 1. The CONTRACTOR shall prevent the desiccation of the recompacked clay by any of the following methods or any other method approved by the ENGINEER and QCA ENGINEER:
    - a. Water the soil periodically (preferred).
    - b. Rolling the surface of the recompacked clay liner smooth with a drummed roller to produce a thin, dense layer of soil on the surface to minimize water transfer in and out of the liner.

ALTUS MUNICIPAL LANDFILL – C&D DEBRIS CELL

- c. Cover the recompacted clay liner, temporarily with a geomembrane, moist geotextile, or with moist soil.
  2. Damage from freezing is not anticipated, however, should freezing temperatures occur, the recompacted clay liner shall be inspected as outlined in Section 2.9.2.3 of the EPA Document.
  3. The CONTRACTOR shall provide adequate equipment to prevent ponding of water on the recompacted liner. Soils softened by excess rain, shall be removed, or allowed to dry by natural processes until the proper water content has been restored. The soil shall be disked and/or recompacted as necessary to restore the soils to meet the requirements of this section.
  4. No additional payment shall be made for protecting and reworking the recompacted clay liner as outlined above. Costs to be included in the unit price bid for recompacted clay liner.
- B. After construction, the liner shall be protected by a 12-inch soil protective layer.

**END OF SECTION 31 35 26.13**

**CONTRACT DOCUMENTS  
AND  
TECHNICAL SPECIFICATIONS  
Altus Municipal Landfill – C&D Debris Cell  
Project No. 22-117**



**City of Altus      509 S. Main Street      Altus, OK 73521**

**April 2024**

Prepared By:

Cowan Group Engineering, LLC  
7100 N. Classen Blvd., Suite 500  
Oklahoma City, OK 73116  
Phone: 405-463-3369  
CA # 6414   Expires 6/30/24



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**Responsible Registrant**

Cowan Group Engineering, LLC  
CA No. 6414 (Expires 6/30/24)



Michael Taylor, PE  
Project Manager  
OK PE #27655

## **ADVERTISEMENT FOR BIDS**

Notice is hereby given that the City of Altus will receive and open sealed Bids for the construction of:

### **Altus Municipal Landfill – C&D Debris Cell**

Sealed bids will be received until **9:30 AM, \_\_\_\_\_, 2022**, in the Altus City Clerk's Office on the 2nd Floor of City Hall at 509 S. Main Street, Altus, Oklahoma, 73521-3135. A public bid-opening will be held at **10:00 AM** on the same date in the same location. Bids shall be opened at the above stated time for receipt of Bids or as soon thereafter as practicable. This project consists of furnishing all required materials, supplies, equipment, tools, and personnel to perform all necessary labor for the construction of the **Altus Municipal Landfill – C&D Debris Cell**. This project is eligible for sales tax exemption.

Questions regarding this solicitation must be submitted by **3:00 PM, \_\_\_\_\_, 2022**. Questions should be submitted to the City Engineer who can be reached as follows:

Johnny Barron  
City Engineer  
580-481-3518  
[jbarron@altusok.gov](mailto:jbarron@altusok.gov)

Questions submitted after this deadline might not be answered. Written responses to questions will be sent to potential bidders who have requested a bid package. Interested persons may be added to the list of potential bidders by emailing a request to the City Engineer.

#### **Pre-Bid Meeting**

Bidders are invited to attend a non-mandatory pre-bid meeting to be held at:

**10:00 AM, \_\_\_\_\_, 2022**

#### **Altus Municipal Landfill**

16250 N1960 Road, Duke, Oklahoma 73532  
1.5 miles north of the intersection of US Hwy 62 & N1960 Road

Attendance is not mandatory. Bids will be accepted from bidders who are not able to attend the pre-bid meeting.

The work shall be done in accordance with plans and specifications on file in the City Engineer's Office. Plans, specifications and other bidding documents are available for public inspection, and copies may be obtained by visiting the City Engineer's Office or the Consulting Engineer's Office, Cowan Group Engineering, LLC, 7100 N. Classen Blvd., Suite 500, Oklahoma City, OK 73116; phone: 405.463.3369.

Complete digital project bidding documents are available for a non-refundable fee of **\$50.00** by going to QuestCDN – [www.questcdn.com](http://www.questcdn.com) and by entering Quest Project # \_\_\_\_\_ on the website's project search page. Please contact QuestCDN.com at 952-233-1632 or [info@questcdn.com](mailto:info@questcdn.com) for assistance in free membership registration, downloading and working with this digital project information.

Hardcopy plans and specifications are available for a non-refundable fee of **\$150.00** payable to Cowan Group Engineering. No documents will be mailed until payment is received in full.

Each bid must be submitted in a sealed envelope bearing on the outside: the name of the bidder, his/her address and the name of the project for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as specified in the bid form. All blank spaces for bid prices must be completed in ink, or typewritten and in both words and figures.

Bids received more than ninety-six (96) hours, excluding Saturdays, Sundays and holidays, before the time set for opening of bids, as well as bids received after the time set for receipt of bids, WILL NOT be considered and will be RETURNED UNOPENED.

A cashier's check, a certified check or a surety bond in the amount of five percent (5%) of the bid shall accompany the sealed proposal of each bidder. Deposits will be returned to unsuccessful bidders. Each bid submitted is a legal offer and when accepted by the City, constitutes a FIRM AND BINDING CONTRACT. The City reserves the right to REJECT ANY or ALL BIDS. The City of Altus Municipal Trust Authority reserves the unconditional right to cancel all or any portion of this project within thirty (30) days from the date of the opening of the bids, for any reason and at its sole discretion.

### ***INSTRUCTION TO BIDDERS***

The City of Altus, herein after called the "City," is seeking bids to construct one (1) approximately 10 acre construction and demolition debris cell with an access road at the Altus Municipal Landfill located on the west side of N1960 Rd. approximately 1.5 miles north of the intersection of US Hwy. 62 and N1960 Rd.

Sealed bids will be received until **9:30 AM, \_\_\_\_\_, 2022**, in the Altus City Clerk's Office on the 2<sup>nd</sup> Floor of City Hall at 509 S. Main Street, Altus, Oklahoma, 73521-3135. A public bid-opening will be held **10:00 AM** on the same date in the same location.

Questions regarding this solicitation must be submitted by **3:00 PM, \_\_\_\_\_, 2022**. Questions should be submitted to the City Engineer who can be reached as follows:

Johnny Barron  
City Engineer  
580-481-3518  
[jbarron@altusok.gov](mailto:jbarron@altusok.gov)

Questions submitted after this deadline might not be answered. Written responses to questions will be sent to potential bidders who have requested a bid package. Interested persons may be added to the list of potential bidders by emailing a request to the City Engineer.

### ***PRE-BID MEETING***

Bidders are invited to attend a non-mandatory pre-bid meeting to be held at:

**10:00 AM, \_\_\_\_\_, 2022**  
**Altus Municipal Landfill**  
16250 N1960 Road, Duke, Oklahoma 73532  
1.5 miles north of the intersection of US Hwy 62 & N1960 Road

Attendance is not mandatory. Bids will be accepted from bidders who are not able to attend the pre-bid meeting.

## ***BID SUBMITTAL***

Bids must be sealed and must include "Project No. 22-117" on the bottom left hand corner of the bid envelope and be mailed or delivered to the Clerk's Office on the second floor of the Altus City Hall City at 509 S. Main Street, Altus, OK 73521-3135. Bidders must include a return address on the top left hand corner of the envelope.

Bids shall consist of returning the following completed forms, all of which are found in this solicitation package:

- Bid Form
- Bid Bond
- Business Relationship Affidavit
- Non-Collusion Affidavit

The City reserves the right to reject any or all bids and to study all bids for thirty (30) days prior to bid award.

Bids received more than ninety six (96) hours before the time set for opening of bids, or any bid received after the time set for the opening of bids, shall not be considered and shall be returned unopened.

The City does not discriminate on the basis of race, color, national origin, sex, religion, age or handicap status, in; employment decisions, the procurement of services, the selection of suppliers or awarding of bids and/or contracts.

Awards shall be based on a determination of the lowest qualified bid. "Qualified" is a determination by the City regarding the capability of the bidder to perform the work in good faith, with integrity and reliability as well as the materiality of the bidder's errors, omissions, or exceptions (if any).

## ***SCOPE OF WORK***

The Contractor shall provide labor, equipment, materials and incidentals needed to perform the following work:

- Construct one (1) approximately 10 acre construction and demolition debris cell with an access road:
  - Unclassified Soil Excavation and On-Site Stockpile
  - Clay Liner Excavation / Re-compaction
  - Grading for Access Road
  - Protective Sand Layer Construction – 1' thickness
  - In-situ liner borings
  - In-site liner post excavation/pre-disposal tests

## ***BONDS***

The following bonds will be required for this project. Bond forms are included in this solicitation.

1. Bid Bond – a bond to protect the City against unqualified bidders. Each bidder shall include a bid bond along with the bid. Bonds shall be in the amount of 5% of the total bid. A cashier check or certified letter of credit may be submitted in lieu of a bid bond. Failure to submit this along with

the bid may result in the bid being rejected as not complete. Within 10-days of the project being awarded by the City Council, bid bonds will be returned to unsuccessful bidders.

In the event that the successful bidder fails to execute a contract or to submit required bonds and insurance, the Bid Bond will be cashed and retained by the City as compensation and the project will be offered to the next lowest qualified bidder.

2. Performance Bond - a bond to protect the City against failure to complete the project. This bond shall be for the total bid amount and shall be in force until the project is accepted by the City. To be submitted by the winning contractor after the bid is awarded.
3. Statutory Bond (Payment Bond) – a bond to protect the City against Contractors failure to pay suppliers, vendors, or subcontractors. This bond shall be for the total amount of the project. To be submitted by the winning contractor after the bid is awarded.
4. Maintenance Bond – a bond to protect the City from faulty work. This bond shall be for the total bid price and shall be in force until 24 months after the date of acceptance. To be submitted by the winning contractor after the bid is awarded.

### ***INSURANCE***

The Contractor shall purchase and maintain such insurance as will protect himself and the Owner from claims which may arise out of or result from the Contractor's execution of the work, whether such execution be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them.

The required insurance shall cover the following claims which may arise thru execution of the Contract:

1. Claims under Workman's Compensation, disability benefit and other similar employee benefit acts;
2. Claims for damages because of bodily injury, occupational sickness or disease, or death of the employees;
3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than the employees;
4. Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

The Contractor shall purchase and maintain, during the contract time, General Public Liability and Property Damage insurance including vehicle coverage. The insurance shall be in an amount of not less than \$200,000.00 for injuries, including accidental death, to any one person, and subject to the same limit for each person in an amount of not less than \$200,000.00 for injuries, including accidental death, to any one person, and subject to the same limit for each person in an amount of not less than \$200,000.00 for injuries, including accidental death, to any one person, and subject to the same limit for each person in an amount of not less than \$1,000,000.00 on account of one accident and Property Damage Insurance in an amount of not less than \$200,000.00.

The Contractor shall furnish to the Owner Certificates of Insurance prior to execution of the Agreement. These certificates shall contain a provision that coverage's afforded under the policies will not be

cancelled unless at least fifteen (15) days prior written notice has been given to the Owner. Only companies that have been approved by the Oklahoma Insurance Commission will be accepted.

***HOLD HARMLESS***

The Contractor shall save harmless the Owner from all suits, actions or claims brought on account of any injuries or damages sustained by any person or property in consequence of any neglect or misconduct by the Contractor including any and all employees, agents or subcontractors.

***WARRANTIES***

Bidders shall declare manufacturer warranty information on the bid form. The Contractor will be expected to obtain and follow manufacturer specifications as needed to qualify for this warranty. If there is a discrepancy between this document and the manufacturer specifications, the manufacturer specifications shall govern.

**BID FORM**

TO: City of Altus  
509 S. Main Street  
Altus, OK 73521-3135

DATE: \_\_\_\_\_

In compliance with your Invitation to Bid, we, the undersigned hereby propose to furnish all labor, materials, equipment and incidentals necessary to perform and complete all work for:

**Altus Municipal Landfill – C&D Debris Cell – Project No. 22-117**

The Bidder hereby agrees that if a contract is awarded, he will enter into an Agreement with the City of Altus and will commence work on the date specified in the Notice to Proceed and fully complete the work within one hundred twenty (120) consecutive calendar days thereafter.

Bidder acknowledges receipt of the following Addenda (if any):

Addendum No. \_\_\_\_\_ Date Issued: \_\_\_\_\_

Addendum No. \_\_\_\_\_ Date Issued: \_\_\_\_\_

The Bidder agrees to perform all the work herein described in the Contract Documents for the fees entered into the following Bid Schedule.

By submitting this Bid, the Bidder acknowledges that he has had sufficient opportunity to review the Contract Documents and visit each property to familiarize himself with all requirements, limitations and site conditions. The Bidder agrees that this Bid shall be good and may not be withdrawn for a period of 30 (thirty) calendar days after the date of the bid opening.



**Bid Schedule**

| ITEM | DESCRIPTION                                      | QTY    | UNIT | UNIT PRICE | TOTAL COST |
|------|--|--------|------|------------|------------|
| 1    | MOBILIZATION                                     | 1      | LSUM |            |            |
| 2    | UNCLASSIFIED EXCAVATION AND ON-SITE STOCKPILE    | 88,700 | CY   |            |            |
| 3    | PROTECTIVE SAND LAYER (1' THICKNESS)             | 15,600 | CY   |            |            |
| 4    | GRADING, ACCESS ROAD                             | 1,400  | CY   |            |            |
| 5    | EXCAVATION AND RECOMPACTION OF 3' CLAY LINER     | 50     | CY   |            |            |
| 6    | IN-SITU LINER BORINGS                            | 50     | EA   |            |            |
| 7    | IN-SITU LINER POST EXCAVATION/PRE-DISPOSAL TESTS | 1      | LSUM |            |            |

TOTAL BASE BID \$ \_\_\_\_\_

TOTAL BASE BID \_\_\_\_\_

\_\_\_\_\_ DOLLARS

Upon written receipt of the Notice of Award, the Bidder agrees that within 5 (five) days they will furnish to the City a Certificate of Insurance and a W-9 Form as required in Contract Documents.

The Bidder understands that the City reserves the right to reject any or all bids, to waive any informalities in the bidding, and to accept what is determined to be the lowest qualified Bid.

Submitted By:

SEAL - if bid

by Corporation

Name of Firm: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

**BID BOND**

Know all men by these presents, that we \_\_\_\_\_, hereinafter called the "Principal", and \_\_\_\_\_, hereinafter called the "Surety", are held and firmly bound unto the City of Altus, Oklahoma, hereinafter called the "Obligee", in the sum of \$ \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), for payment of which sum well and truly to be made, the said Principal and Surety jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns, by these presents.

The condition of the above obligation is such that, whereas the Principal has submitted a bid for the Full Altus Municipal Landfill – C&D Debris Cell (Project No. 22-117) which is attached hereto and hereby made a part hereof.

NOW, THEREFORE, if said bid shall be accepted and the Principal shall execute and deliver a contract and shall furnish bonds and insurance as specified in the contract documents, then this obligation shall be void. Otherwise, the same shall remain in force and effect, it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall be limited to the penal amount of the obligation as stated herein.

The Surety, for value received, hereby stipulates that the obligations of said Surety and its bond shall in no way be impaired or affected by any extension of the time within which the Obligee may accept such bid and said Surety does hereby waive notice of any such extension.

IN WITNESS THEREOF, the Principal and the Surety have hereunto set their hands and seals and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers.

SIGNED AND SEALED THIS \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

(SEAL)

\_\_\_\_\_  
Signature for Principal

\_\_\_\_\_

Attest (if by Corporation)

\_\_\_\_\_  
Printed Name and Title

(SEAL)

\_\_\_\_\_  
Signature for Surety

\_\_\_\_\_

Attest (if by Corporation)

\_\_\_\_\_  
Printed Name and Title

**BUSINESS RELATIONSHIP AFFIDAVIT**

STATE OF OKLAHOMA)

)SS

COUNTY OF JACKSON)

\_\_\_\_\_, of lawful age, being first duly sworn, on oath says that he/she is the agent authorized by the bidder to submit the attached bid, affiant further states that the nature of any partnership, joint venture or other business relationship presently in effect or existed within 1 (one) year prior to the date of this statement with the architect, engineer, or other party to the project is as follows:

\_\_\_\_\_  
\_\_\_\_\_

Affiant further states that any such business relationship presently in effect or which existed within 1 (one) year prior to the date of this statement between any officer or director of the bidding company and any officer or director of the architectural or engineering firm or other party to the project is as follows:

\_\_\_\_\_  
\_\_\_\_\_

Affiant further states that the names of all persons having any such business relationships and the positions they hold with their respective companies or firms are as follows:

\_\_\_\_\_  
\_\_\_\_\_

(If none of the business relationships hereinabove mentioned exist, affiant should so state.)

\_\_\_\_\_  
Affiant's Name & Signature

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public

My Commission Expires \_\_\_\_\_

Seal

**NON-COLLUSION AFFIDAVIT**

STATE OF OKLAHOMA)  
  )SS  
COUNTY OF JACKSON)

\_\_\_\_\_, of lawful age, being first duly sworn, on oath says that he/she is the agent authorized by the bidder to submit the attached bid. Affiant further states that the bidder has not been a party to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding; or with any state or city official or employee as to quantity, quality, or price in the prospective contract; or in any discussions between bidders and any state or city official concerning exchange of money or any other thing of value for special consideration in the letting of a contract.

\_\_\_\_\_  
Affiant's Name & Signature

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Notary Public

My Commission Expires: \_\_\_\_\_

SEAL

**AGREEMENT**

This Agreement, made this \_\_\_\_\_ day of \_\_\_\_\_, 2022, by and between the City of Altus (“City”) a municipal corporation public trust, and \_\_\_\_\_ (“Contractor”).

WITNESSETH:

That for and in consideration of the payments and agreements hereinafter mentioned:

1. The Project. The Contractor shall commence and complete the construction of Altus Municipal Landfill – C&D Debris Cell (Project No. 22-117).
2. Materials. The Contractor shall furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the project described herein.
3. Commencement and Completion. The Contractor shall commence the work required by the Contract Documents within ten (10) calendar days after the date of the Notice to Proceed and shall complete the same within **one hundred and twenty (120)** calendar days unless the period for completion is otherwise extended by the Contract Documents.
4. Work and Total Payment. The Contractor agrees to perform, and shall perform, the entirety of the work described in the Contract Documents and shall comply with the terms therein for the total sum of \_\_\_\_\_, as shown on the Contractor’s Bid Form.
5. Liquidated Damages. The Contractor shall pay liquidated damages at the rate of **\$1,000.00** per each and every **calendar** day required by him to complete the contract in excess of the contract time.
6. Agreement Terms and Documents. The term “Contract Documents” means the Project No. 22-117, which includes the following:

- |  |  |
|--|--|
| 6.01. Instructions to Bidders          | 6.14. Non-Collusion Affidavit                      |
| 6.02. Bid Submittal                    | 6.15. Agreement                                    |
| 6.03. Scope of Work                    | 6.16. Performance Bond                             |
| 6.04. Conditions                       | 6.17. Statutory Bond                               |
| 6.05. Bonds                            | 6.18. Maintenance Bond                             |
| 6.06. Insurance                        | 6.19. Location Maps & Photographs                  |
| 6.07. Hold Harmless                    |  |
| 6.08. Technical Specifications         |  |
| 6.09. Bid Review & Award               | The Contract Documents also include the following: |
| 6.10. Warranties                       | 6.20. Contractor’s Bid                             |
| 6.11. Bid Form                         | 6.21. Notice of Award                              |
| 6.12. Bid Bond                         | 6.22. Notice to Proceed                            |
| 6.13. Business Relationships Affidavit | 6.23. Change Orders (if Any)                       |

7. Payment. The City will pay the contract amount in full to the Contractor after the work is completed in such amount as required by the Contract Documents and after approval of the work by the City of Altus ("City"). Partial payments may also be approved on a monthly basis for work completed or materials purchased during that month. Retainage shall apply to partial payments to the Contractor.
8. Retainage. Five percent (5%) of all partial payments made shall be held by the City as retainage, or, in the alternative, the maximum amount allowed by Oklahoma law. See Title 61 O.S. §113.1. Retainage shall be paid upon project completion and approval of the work by qualified City
9. Execution. This Agreement shall be executed by both parties no later than sixty (60) days from the date of the Notice of Award. See Title 61 O.S. §113(A).
10. Bonds. The Contractor shall obtain all bonds required by Oklahoma law, including without limitation the bonds set forth in Title 61 O.S. §§ 107 and 113. The Contractor shall provide documentary proof of the bonds, at the time of the execution of this Agreement, and to Johnny Barron, the Engineer for the City of Altus.
11. Remedies upon Default:
  - 10.01. Upon default, and in addition to any other remedies available to it on account of such event or default, either party may terminate this Agreement, in writing, without further notice.
  - 10.02. No right or remedy herein conferred upon or reserved to either of the parties is intended to be exclusive of any other right or remedy, and each and every right and remedy shall be cumulative to any other right or remedy given hereunder or now or hereafter legally existing upon default.
  - 10.03. The failure of either party to insist upon the strict observance or performance of any of the provisions of this Agreement or to exercise any right or remedy provided in this Agreement shall not impair any such right or remedy nor be construed as a waiver or relinquishment thereof with respect to subsequent defaults. Every right and remedy given by this Agreement to the parties may be exercised from time to time and as often as may be deemed expedient by the parties.
  - 10.04. Contractor acknowledges that it is contracting with a political subdivision of the State of Oklahoma. If the City and/or AMA brings any action because of any event of default, and if the City and/or AMA is successful in any such action, Contractor agrees to pay the costs and fees, including reasonable attorney's fees, incurred by the City and/or AMA. If the City and/or AMA is unsuccessful in any such action, or if the action is brought by Contractor as a result of City and/or AMA's default, both parties agree to pay its own costs and fees.
12. Severability. If a court of competent jurisdiction determines that any term of this Agreement is invalid or unenforceable to any extent under applicable law, the remainder of this Agreement (and the application of this Agreement to other circumstances) shall not

be affected thereby, and each remaining term shall be valid and enforceable to the fullest extent permitted by law.

13. Integration, Amendments and Interpretation. This Agreement constitutes the entire agreement between the parties and may not be amended, altered, modified or changed in any way except in writing signed by all parties to this Agreement and which specifically references this Agreement. There are no other agreements, representations or warranties, whether oral or written, regarding the subject matter of this Agreement. No course of dealings involving the parties hereto and no usage of trade shall be relevant or admissible to interpret, supplement, explain or in any way vary any of the terms of this Agreement. Any amendment to this Agreement shall be attached to this Agreement and all of the terms in this Agreement not addressed in the amendment shall remain in full force and effect.
14. Compliance with Laws. Contractor shall comply with all applicable federal, state and local laws, codes, ordinances, rules and regulations in performing its duties, responsibilities and obligations pursuant to this Agreement.
15. Governing Law. This Agreement shall be deemed to have been made in the State of Oklahoma and shall be construed and interpreted in accordance with the laws of the State of Oklahoma.
16. Venue. Any action or proceeding seeking to enforce any provision of, or based on any right arising out of, this Agreement may be brought against any of the parties in the courts of the State of Oklahoma, County of Jackson or, if it has or can acquire jurisdiction, in the United States District Court for the Western District of Oklahoma. The parties consent to the jurisdiction of such courts, and of the appropriate appellate courts, in any such action or proceeding and waives any objection to venue laid therein.
17. Relationship of Parties. Contractor and the City and/or the AMA acknowledge and agree that they are not joint venturers, partners, or joint owners with respect to the Leased Premises, and nothing contained in this Agreement shall be construed as creating a partnership, joint venture or similar relationship between the City and/or the AMA and the Contractor. All persons working for Contractor under this Agreement shall be employees of Contractor and shall not be considered employees of the City and/or the AMA for any reason. The hiring, discharge, supervision, and management of the employees of Contractor who provide services under this Agreement and the establishment, revision, and administration of wage scales, rates of compensation, conditions of employment, and job position descriptions with respect to Contractor shall be within the sole discretion and responsibility of the Contractor.
18. Counterparts. This Agreement may be executed in any number of counterparts, and when each party has signed and delivered to the other at least one (1) such counterpart, each counterpart shall be deemed an original and, when taken together with other signed counterparts, shall constitute one Agreement; provided, however, this Agreement shall not be binding upon either party hereto until executed by both parties.

19. Third-Party Beneficiaries. Nothing in this Agreement, expressed or implied, is intended to confer upon any person, other than the parties hereto and their respective assigns, any rights or remedies under or by reason of this Agreement.
20. Binding Effect. This Agreement binds the parties hereto and any successors and assigns of the parties.
21. Governmental Tort Claims Act. As may be applicable, by entering into this Agreement, City and/or the AMA and its “employees,” as defined by the Governmental Tort Claims Act, 51 O.S. § 151 et seq., do not waive sovereign immunity, any defenses or any limitations of liability as may be provided for by law. No provision of this Agreement modifies and/or waives any provision of the Governmental Tort Claims Act.
22. Construction and Interpretation. Captions and other headings contained in this Agreement are for reference and identification purposes only and do not alter, modify, amend, limit or restrict the contractual obligations of the parties.
23. Notices. Whenever notice is required to be given in writing, such notice shall be hand delivered or mailed by certified mail, return receipt requested, and directed to the respective parties at the following addresses:

As to the City/AMA:                      City of Altus/Altus Municipal Authority  
     Attn: City Clerk/Treasurer  
     509 S. Main St.  
     Altus, Oklahoma 73521

AND

City of Altus/Altus Municipal Authority  
 Attn: Johnny Barron  
 509 S. Main St.  
 Altus, Oklahoma 73521

As to the Contractor: \_\_\_\_\_  
 Attn: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City, ST Zip: \_\_\_\_\_

or at such other addresses as a party shall specify by like notice to the other party hereto. Notices shall be effective on the date of delivery.

**IN WITNESS WHEREOF**, the parties hereto have caused this Agreement to be executed on the day and year last written below.

**\*\* SEPARATE SIGNATURE PAGES FOLLOW \*\***



**SIGNATURE PAGE OF THE CITY OF ALTUS**

Date Signed: \_\_\_\_\_

“City of Altus”  
an Oklahoma Municipal Corporation

\_\_\_\_\_  
Jack Smiley, Mayor

(SEAL)

ATTEST:

\_\_\_\_\_  
Debbie Davis, City Clerk

Approved as to Form and Legality:

\_\_\_\_\_  
Michael T. Beason, City Attorney

**SIGNATURE PAGE OF CONTRACTOR**

Date Signed: \_\_\_\_\_

“Contractor”

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name and Title

**ACKNOWLEDGMENT**

State of Oklahoma    )  
                                  ) ss.  
County of Jackson    )

On this \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, before me, a Notary Public in and for said county and state, personally appeared \_\_\_\_\_, to me known or proved on the basis of satisfactory evidence to be the person whose name is subscribed to the foregoing instrument on behalf of \_\_\_\_\_ and acknowledged that he/she executed the same as the voluntary act and deed of said corporation.

In Witness Whereof, I have hereunto subscribed my name and affixed my official seal on the day and year last above written.

\_\_\_\_\_  
Notary Public

My Commission Expires: \_\_\_\_\_

My Commission Number: \_\_\_\_\_

**PERFORMANCE BOND**

That \_\_\_\_\_ as Principal, and \_\_\_\_\_ corporation organized under the laws of the State of \_\_\_\_\_ and authorized to transact business in the State of Oklahoma, as surety, are held and firmly bound unto the City of Altus in the sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) in lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves and each of us, our heirs, executors, administrators, trustees, successors, and assigns, jointly and severally, firmly by these presents.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

The conditions of this obligation is such that:

Whereas, said principal entered into a written contract with the City of Altus, dated \_\_\_\_\_, 20\_\_\_\_\_, for Altus Municipal Landfill – C&D Debris Cell (Project No. 22-117).

All in compliance with the plans and specifications therefore, made a part of said contract and on file in the office of the City of Altus, 509 S. Main Street, Altus, OK 73521-3135.

Now, Therefore, if said principal shall, in all particulars, well, truly, and faithfully perform and abide by said contract and each and every covenant, condition, and part thereof and shall fulfill all obligations resting upon said principal by the terms of said contract and said specifications; and said principal shall promptly pay, or cause to be paid, all labor, materials and/or repairs and all bills for labor performed on said work, whether by subcontractor or otherwise; and if said principal shall protect and save harmless said City of Altus from all loss, damage, and expense to life or property suffered or sustained by any person, firm or corporation caused by said principal or his/her agents, servants, or employees in the construction of said work, or by or in consequence of any negligence, carelessness or misconduct in guarding and protecting the same, or from any act or omission of said principal or his / her or its agents, servants, or employees, and if said principal shall protect and save City of Altus harmless from all suits and claims of infringement or patent rights or processes, then this obligation shall be null and void, otherwise to be and remain in full force and effect.

It is further expressly agreed and understood by the parties hereto that no changes or alterations in said contract and no deviations from the plan or mode of procedure herein fixed shall have the effect of releasing the sureties, or any of them, from the obligations of this bond.

In witness whereof, the said principal has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its duly authorized officers, and the said surety has caused these

presents to be executed in its name and its corporate seal to be hereunto affixed by its attorney-in-fact, duly authorized so to do, the day and year first above written.

Principal:

---

By:

---

Title

Attest:

---

Surety:

---

By:

---

Attorney-in-Fact

**STATUTORY BOND**

Project No. 22-117

KNOW ALL MEN THESE PRESENTS:

That we, \_\_\_\_\_ as Principal, and \_\_\_\_\_ a Corporation  
organize under laws of \_\_\_\_\_, as Surety, are held and firmly bound unto the City of Altus in  
the amount of \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_) for the payment of which we hereby bind ourselves, our heirs, executors,  
administrators, successors, and assigns, jointly and severally, firmly by these presents.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Whereas, the said \_\_\_\_\_ did on \_\_\_\_\_ enter into a certain  
contract with the City of Altus for construction of:

**Altus Municipal Landfill – C&D Debris Cell**

Whereas, this bond is given in compliance with Oklahoma Statutes Annotated, 1941, Title 61, Sections 1  
and 2, as amended.

NOW THEREFORE, the condition of the above obligation is such, that if the Principal shall pay all  
indebtedness incurred for labor or material or rental of machinery or equipment furnished in the  
construction of said public construction project and while making said public improvements, then this  
obligation shall be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals the day first above written.

Principal:

\_\_\_\_\_

By:

\_\_\_\_\_

Title

Surety:

\_\_\_\_\_

By:

\_\_\_\_\_

Attorney-in-Fact

Attest:

\_\_\_\_\_

**MAINTENANCE BOND**

Project No. 22-117

KNOW ALL MEN BY THESE PRESENTS:

That we, \_\_\_\_\_, as Principal, and \_\_\_\_\_, as Surety, are held and firmly bound unto the City of Altus, a Municipal Corporation, as Owner in full and just sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_) for the payment of which well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, devisees, trustees, successors or assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such, that whereas, said Principal has by a certain contract, between himself and the Owner dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, agreed to construct the improvements described in said contract and to maintain the said improvements in good condition for a period of one (1) year from the date of final acceptance of the job by the Owner. Principal and Surety further guarantee the repair of any and all damage and or loss resulting from faulty materials or workmanship provided or done by said Principal.

NOW, THEREFORE, if said Principal for the period of one (1) year from and after the completion and acceptance of said improvements, shall maintain in good condition the said improvements, then this obligation shall be void, otherwise to remain in full force and effect. It is further agreed that if the said Principal and Surety, herein shall fail to maintain said improvements in good condition for the said period of one (1) year, and at any time repairs shall be necessary the Owner will make the necessary repairs and the cost of making said repairs shall be determined by the Owner or someone or persons designated by them to ascertain the same, and, upon fifteen (15) days' notice, the said amount ascertained shall become due and payable to the Owner by the Principal or the Surety.

IN WITNESS WHEREOF, instrument is executed in \_\_\_\_\_ counterparts, each one shall be deemed original, this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_.

Attest: \_\_\_\_\_  
Principal

\_\_\_\_\_  
Secretary By: \_\_\_\_\_

Attest: \_\_\_\_\_  
Surety

\_\_\_\_\_  
By: \_\_\_\_\_

## **SPECIAL CONDITIONS**

### **1.1 SCOPE**

These Special Conditions are supplemental to and shall be considered as a part of the Specifications and Contract. In case of conflict between stipulations of the Special Conditions and the General Specifications or Plans, the Special Conditions shall take precedence and govern Interpretation of the Plans and Specifications shall be made by the Engineer.

The work herein consists of furnishing all tools, labor, equipment, materials and performing all work necessary for the construction, complete, for the following work in strict accordance with detailed Plans and Specifications

The Base Bid is as follows:

Construct one (1) approximately 10 acre construction and demolition debris cell with an access road.

It is the intent of these Plans and Specifications to prescribe a complete work and improvement. Where items of work are necessary for the satisfactory completion of the project for which specific contract prices are not provided in the Proposal and Contract, then such work shall be considered as incidental, and the costs involved shall be included in the Unit Price Bid for items which are classified for payment.

### **1.2 LAYOUT OF WORK AND SURVEYS**

The Engineer will establish base lines and benchmarks at the site of the work. From the base lines and benchmarks established by the Engineer, the Contractor shall complete the layout of the work and shall be responsible for all measurements that may be required for the execution of the work to the location and limit marks prescribed in the specifications or on the contract drawings, subject to such modifications as the Engineer may require to meet changed conditions or as a result of necessary modifications to the contract work.

The Contractor shall furnish at his own expense, such stakes, templates, platform equipment, tools, and materials, and all labor as may be required in laying out any part of the work from the base lines and benchmarks established by the Engineer. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other marks established by the Engineer until authorized to remove them and if such marks are destroyed by the Contractor through his negligence prior to their authorized removal, they may be replaced by the Engineer, at his discretion, and the expense of replacement will be charged to the Contractor. The Engineer may require that work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking of the work.

### **1.3 QUALITY CONTROL/QUALITY ASSURANCE**

Quality Control/Quality Assurance (QC/QA) procedures for earthwork is included in the Specifications and is hereby made a part of the Specifications. The contractor and subcontractors shall familiarize themselves with the requirements of these procedures, coordinate and cooperate with the QC/QA project representative, furnish samples for testing, repair test sections and/or locations as called for in the Specifications and the QC/QA Procedures. The contractor may submit five (5) copies of their QC/QA Procedures to the Engineer for approval, if changes are needed from the QC/QA Procedures bound in these Specifications.

The Contractor shall be responsible for disseminating info to the City, the Engineer, and the CQA Engineer of the scheduling and occurrence of all construction activities and for coordination and scheduling of all testing. The CQA Engineer will be directly responsible to the City and will have independent oversight of all testing necessary for liner certification.

It is the intent of these specifications to conform to the EPA (U.S. Environmental Protection Agency) Technical Guidance Document "Quality Control and Quality Assurance for Waste Containment Facilities", EPA/600/R-93/182, dated September 1993. In the event of conflicting requirements, the EPA Document will govern. The Engineer will resolve items not covered in the EPA document. Copies of the EPA Document will be available for review at the Office of the Engineer and at the Landfill office during construction.

The Oklahoma Department of Environmental Quality may sample and/or perform tests on the liner to assure its integrity.

Any reference to an ASTM method refers to the latest published revision.

### **1.4 PAYMENT FOR TESTING**

The Contractor(s) shall be responsible for any testing or samples required for project approval and as specifically called for in these specifications and the QC/QA procedures.

Contractors shall pay for all failed tests.

### **1.5 INCREASED OR DECREASED QUANTITIES OR WORK**

The Owner reserves the right to alter the quantities of the work to be performed or to extend or shorten the improvements at any time when it is found necessary, and the Contractor shall perform the work as altered, increased or decreased, at the contract unit prices. No allowance will be made for anticipated profits nor shall such changes be considered as waiving or invalidating any condition or provision of the contract.

This provision shall not be construed to permit the Contractor to perform additional work not included or contemplated in the original proposal.

### **1.6 TESTING REQUIREMENTS FOR NON-PERFORATED LEACHATE COLLECTION LINES**

The Contractor shall test the full length of the line for infiltration and exfiltration. The infiltration or exfiltration shall not exceed 10 GAL/24 HR/INCH of diameter of pipe/mile of sewer.

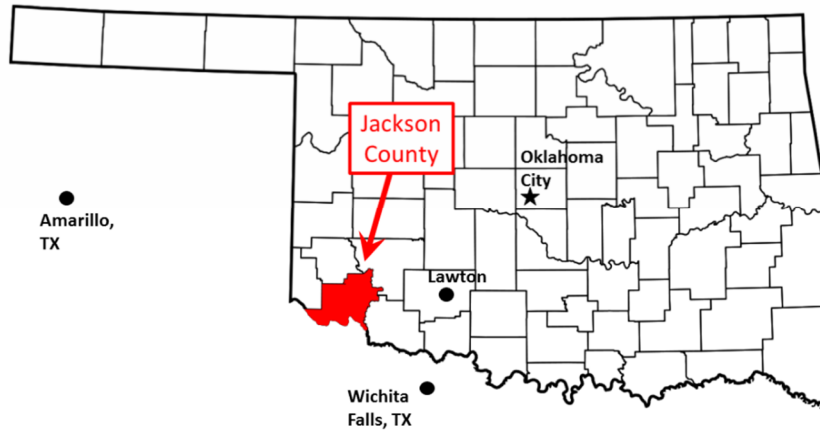
A deflection test using a rigid ball or mandrel with a diameter equal to 95 percent of the inside diameter of the pipe shall be performed without mechanical pulling devices. The deflection shall not exceed 5 percent of pipe diameter.



***TECHNICAL SPECIFICATIONS***

Work shall comply with the technical specifications provided by the manufacturer of materials to be installed. The Contractor shall coordinate the project with the Manufacturer's representative to obtain additional specifications as needed.

**ATTACHMENT 'A' – PROJECT LOCATION**



**DIVISION 01 – GENERAL REQUIREMENTS**

**SECTION 01 00 00 – GENERAL CONDITIONS**

**PART 1 – GENERAL**

**1.1 DESCRIPTION**

The General Conditions shall govern and control all work to which they apply; however, since these specifications are of a general nature, they may refer to work not found in this project, in which case such non-applicable stipulations will have no meaning in this Contract. In case of conflict between the General Conditions and the Special Conditions, the Special Conditions shall govern. In case of conflict with either the General or Special Conditions by Supplemental Conditions of a funding agency such as EPA, FMHA, EDA or HUD, the Supplemental Conditions will govern.

**PART 2 – DEFINITIONS**

**2.1 DEFINITIONS**

DEFINITIONS: Whenever the words defined below, or pronouns used in their stead occur hereinafter, they shall have the meanings given as follows:

- A. "OWNER" shall mean the City of Altus or Altus Municipal Trust Authority.
- B. "ENGINEER" shall mean Cowan Group Engineering, LLC, who has been employed by the OWNER for this work, or his duly authorized agent.
- C. "Inspector" shall mean the engineering or technical inspector or inspectors duly authorized by the ENGINEER, limited to the particular duties entrusted to him or them.
- D. "CONTRACTOR" shall mean the person, persons, partnership, company, firm or corporation entering into this contract for the performance of the work, or the agent appointed to act for such party.
- E. "Specification" shall mean, collectively, all of the terms and stipulations contained in the written portion of information furnished.
- F. "Drawings or Plan Sheets" shall mean, collectively, all of the drawings pertaining to the contract and made a part thereof, and also such supplementary drawings as the ENGINEER may issue from time to time in order to clarify the drawings, or for the purpose of showing authorized changes in the work, or for showing details which are not shown thereon.
- G. The term "Grade" used in these Specification is understood to refer to and indicate the established elevations of the paving, flow line of waterlines and other appurtenances as shown on the drawings.
- H. Whenever in these CONTRACT DOCUMENTS the words "as ordered", "as directed", "as permitted", "as allowed", or words or phrases of like import are used, it shall

be understood that the order, direction, requirements, permission, or allowance of the OWNER and ENGINEER is intended.

- I. Similarly, the words "approved", "reasonable", "suitable", "acceptable", "properly", "satisfactory", or words of like effect and import, unless otherwise particularly specified herein, shall mean approved, reasonable, suitable, acceptable, proper, or satisfactory in the judgment of the OWNER and ENGINEER.
- J. Whenever the term "or equal" is used in the drawings and/or Specification it shall refer to a material which will adequately perform the same function, in the opinion of the ENGINEER, as the material specified or shown on the drawings.

### **PART 3 - SCOPE OF WORK**

The work to be covered under these contracts in accordance with the drawings listed herein and, in these specifications, consists of the furnishing of all materials, equipment, tools, labor, transportation and services necessary to complete the construction as outlined herein and as shown on the drawings. The complete installation shall not lack any part which can be reasonably implied as necessary to its proper functioning nor any subsidiary which is customarily furnished.

### **PART 4 - EXAMINATION OF SITE OF WORK**

It is the obligation of the bidder to examine carefully the site of the proposed work; to ascertain for himself all the facts concerning conditions therein, including all physical characteristics above, on and below the surface of the ground; to investigate the subsurface conditions and to determine for his information the character and proportionate quantities of soils, rock and other subsurface material which may be encountered in the work; to inform himself by independent research of the difficulties to be encountered and judge for himself the accessibility of the work and all other circumstances affecting the cost of doing the work or the time required for its completion; and the bidder agrees to this obligation in signing the proposal. When provided, the soils boring and testing report is attached to these Specification for the CONTRACTOR'S information and is not a part of the contract. No guarantee is made as to their accuracy or completeness. The OWNER assumes no responsibility whatsoever with respect to ascertaining for the bidder such facts covering physical characteristics at the site of the work. The bidder agrees that, if awarded the contract, he will make no claim for, and will have no right to, additional payment or extension of time for completion of the work or any other concession because of any failure on his part to fully acquaint himself with all conditions relating to the work. The bidder shall rely exclusively upon his own estimate, investigation and evaluation of site conditions.

### **PART 5 - SITE CONDITIONS**

Where connections to existing utilities are shown on the drawings, the work may be required to be done at night or at a time which will least interfere with the operation of the existing facility.

The tie to existing utilities will be coordinated with personnel of the OWNER of the existing lines and will be done at a time to least inconvenience their operation. The work may be required to be done at night or weekends or both.

Where possible the existing utilities (water, gas, etc.) have been noted on the drawings. There may be additional buried lines that are not shown and if such is encountered, said lines will be left in service. CONTRACTOR shall take all precautions available prior to construction to locate, identify, and verify utilities. If said lines are broken by the CONTRACTOR, they shall be repaired as soon as possible.

The work along or across state highways shall be done in accordance with the permit from Division Engineer, Department of Transportation. The right-of-way shall be maintained in a satisfactory manner at all times. All roads, streets, drives, etc., cut during construction shall be properly protected by barricades, flashing lights, etc., and shall be made passable as soon as possible after laying of lines during the day and always at night. CONTRACTOR shall maintain the above cut roads in a passable condition until the wearing surface is replaced and then kept in a satisfactory condition for five (5) years after job is completed.

#### **PART 6 - EXPLOSIVES**

In handling explosives used during the construction of the project, the CONTRACTOR shall adhere to all Federal and State laws and City ordinances regulating the purchase, transportation, storage, handling, and use of such explosives. No blasting shall be done without 12-hour notification of the OWNER and ENGINEER, proof of insurance, and the presence of the Inspector. All equipment, tools, and materials used shall be of the correct type and in good condition for the operation. The CONTRACTOR shall take all necessary precautions to avoid damage to property resulting from the transportation, storage, handling and use of explosives. Before blasting, the CONTRACTOR shall take all necessary precautions to ensure that rock and debris will be confined to the excavation. Any blasting within 10 ft. of a water, sewer, gas or pipeline shall be done with very light charges, and utmost care shall be taken to avoid disturbance to these lines.

#### **PART 7 - SUBMITTALS**

Engineering data covering all equipment and fabricated materials to be furnished under this contract shall be submitted to the ENGINEER for review. This data shall include drawings and operation of component materials and devices; the external connections; anchorages and supports required; performance characteristics; and dimensions needed for installation and correlation with other materials and equipment. Data submitted shall include drawings showing essential details of any changes proposed by CONTRACTOR and all required structural layout and wiring diagrams.

**No work shall be performed in connection with the fabrication or manufacture of materials and equipment, nor shall any accessory or appurtenance be purchased until the drawings and data therefore have been reviewed, except at the CONTRACTOR'S own risk and responsibility.**

At least five (5) copies of each drawing and necessary data with statement of approval by the CONTRACTOR, shall be submitted to the ENGINEER. Each drawing or data sheet shall be clearly marked with the name of the project, the ENGINEER'S name, CONTRACTOR'S name and references to applicable specification paragraphs and drawing sheets. When catalog pages are submitted, the applicable items shall be identified.

The ENGINEER'S review of drawings and data submitted by the CONTRACTOR will cover only general conformity to the drawings and specifications, external connections and

dimensions which affect the layout. The ENGINEER'S review of drawings returned marked NO EXCEPTIONS NOTED or EXCEPTIONS NOTED does not indicate a thorough review of all dimensions, quantities and details of the material, equipment, device or items shown and does not relieve the CONTRACTOR from any responsibility for errors, omissions, or deviations from the contract requirements.

All drawings and data, after final processing by the ENGINEER, shall become a part of the contract documents, and the work shown or described thereby shall be performed in conformance therewith unless otherwise authorized by the OWNER or the ENGINEER.

After drawings and data have been accepted by OWNER or ENGINEER, the CONTRACTOR shall submit three (3) additional copies of all data and one (1) set of reproducible of all drawings to OWNER for file records. Also, CONTRACTOR shall keep accurate "record drawings" records of the work and turn these records over to the OWNER at the completion of the work.

## **PART 8 - SURVEYS**

The OWNER shall establish base lines or control points for the location of the principal component parts of the work together with benchmarks adjacent to the work as shown or indicated on the Drawings. The CONTRACTOR shall develop and make all detail surveys necessary for construction. The CONTRACTOR shall be responsible for the accuracy of all lines and grades for all parts of the work. He shall do all field work necessary to lay out and maintain the work and shall make available to the OWNER all facilities and information necessary for properly checking the accuracy of such field work. Such checking shall in no way relieve the CONTRACTOR of his responsibility of the correctness of all field work.

The OWNER will provide survey of property including reference points, property corners and benchmarks where necessary in the opinion of the ENGINEER. If necessary, the CONTRACTOR shall transfer these reference points and benchmarks to permanent locations where they will not be disturbed. If disturbed, the CONTRACTOR shall re-install them to OWNER'S satisfaction, at CONTRACTOR'S cost.

## **PART 9 - PERMITS AND REGULATIONS**

The CONTRACTOR shall secure and pay for all construction permits required to carry out the work unless otherwise specified and shall produce same upon demand of the OWNER. The CONTRACTOR shall give all notices and pay all fees and shall, before starting work, ascertain whether the drawings and specification are at variance with any codes or regulations applying at the site. The CONTRACTOR shall obtain completion survey, certificate of completion or occupancy if required by local regulations.

All features of design and construction shall comply with the local building regulations and/or other lawful or public regulations which apply at the site. If any features of construction as shown on the OWNER'S plan, do not conform to the regulations, the CONTRACTOR shall notify the OWNER of such discrepancy, and shall base his quotation and work on features of construction which do conform to the regulations.

If the CONTRACTOR performs any work contrary to such laws, ordinances, rules and regulations and without such notice to the OWNER, he shall bear all costs arising therefrom.

**PART 10 - INSPECTION**

The CONTRACTOR will provide access to the work site and facilities for representatives of the Environmental Protection Agency, Oklahoma Department of Environmental Quality and other agencies, as well as, OWNER and ENGINEER, as required whenever the work is in progress.

**PART 11 - SATURDAY, SUNDAY, HOLIDAY AND NIGHT WORK**

No work shall be done between the hours of 7:00 p.m. and 7:00 a.m., nor on Saturday, Sunday or legal holidays without the written approval or permission of the ENGINEER in each case, except such work as may be necessary for the proper care, maintenance and protection of work already done, or of equipment, or in the case of an emergency.

**PART 12 - PROTECTION OF PROPERTY**

- A. The protection of City, State and Government monuments, street signs and other OWNER's property is of prime importance, and if the same be damaged, destroyed or removed, they shall be repaired, replaced or paid for by the CONTRACTOR. Disturbance to this property must first be approved by the agency which controls it.
- B. No valves or other control on any utility main or building service line shall be operated for any purpose by the CONTRACTOR.
- C. At places where the CONTRACTOR'S operations are adjacent to the plant of railway, telegraph, telephone, electric and gas companies, or water, sanitary sewers and storm sewers, damage to which might result in expense, loss or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.
- D. The OWNER has attempted to locate all storm sewers, culverts, buried telephone or electrical conduits, sanitary sewers and water mains that might interfere with the construction of this project. The CONTRACTOR shall cooperate with the owners of any underground or overhead utility lines in their removal and rearrangement operations in order that these operations may progress in a reasonable manner and duplication or rearrangement work may be reduced to a minimum and that services rendered by those parties will not be unnecessarily interrupted. The revision and crossings of the various types of lines shall be made as follows:
  - 1. Storm sewers and culverts may be removed at the time of crossing or may be adequately braced and held in position while the pipe is placed beneath them. If the storm sewer or culvert is removed, it shall be replaced with pipe of the same type and size as that removed and it shall be re-joined to the undisturbed line with a joint satisfactory to the ENGINEER. Backfill over the main up to and around the storm sewer shall be thoroughly compacted in order that no settlement will occur. The revision and crossing of said lines shall be at the expense of the CONTRACTOR.
  - 2. All overhead and buried telephone and electrical conduits, to be revised or crossed by the construction of this project shall be protected in accordance with the directions of the utility company owning the conduits and/or mains. The CONTRACTOR shall notify the companies and obtain their permission before

making any crossing or revisions. The revision and crossing of said lines shall be at the expense of the CONTRACTOR. Any overhead cables or buried cables or conduits damaged by the CONTRACTOR shall be repaired at his expense to the satisfaction of the ENGINEER and of the OWNER.

3. The CONTRACTOR shall not remove any water or sanitary sewer lines except as directed by the ENGINEER or as required by the Drawings and specifications and shall adequately brace and protect them from any damage during construction. Any existing water main or sewer main or lateral damage caused by the CONTRACTOR'S operations will be repaired by the CONTRACTOR. The repairs will be made at the CONTRACTOR'S expense.
- E. The location of utility service lines serving individual properties may or may not be shown on the Drawings, but the CONTRACTOR shall assume that such service lines exist whether or not they are shown on the Drawings, and it shall be the responsibility of the CONTRACTOR to make any necessary changes in the line and/or grade of such services, or to secure the necessary changes therein to be made by the particular utility company involved or other OWNER thereof, or by an agent or individual CONTRACTOR approved by such utility company or other OWNER. CONTRACTOR shall pay the cost of all such revisions whether performed by CONTRACTOR, the utility company or other OWNER, or an approved CONTRACTOR. In the event of interruption of a utility service as a result of accidental breakage, CONTRACTOR shall promptly notify the ENGINEER and the OWNER of the utility and shall repair or cause the same to be repaired, in the same manner as necessary changes above are provided for, the CONTRACTOR shall do all things necessary to see that the restoration of services is done as promptly as may be reasonably done. All sanitary sewer service lines damaged shall be replaced with cast iron pipe regardless of type or kind damaged.
- F. In the event the CONTRACTOR in any way fails to comply with the requirements of protecting, repairing and restoring of any utility or utility service, the OWNER may, upon forty-eight (48) hours written notice proceed to protect, repair, rebuild or otherwise restore such utility or utility service as may be deemed necessary, and the cost thereof will be deducted from any money due, or which may become due the CONTRACTOR pursuant to the terms of his contract.

### **PART 13 - FIELD OFFICE**

Copies of the drawings, specification, and other contract documents shall be kept at the site of the work available for use at all times.

### **PART 14 - ALTERATION OF QUANTITIES**

The CONTRACTOR agrees that the quantities of work as stated in the Bid Schedule or indicated on the drawings are only approximate, and that the OWNER shall have the right to omit portions of the work and to increase or decrease the quantities of any item of work. Final payment will be based on the actual quantities used and installed in accordance with the drawings and Specification.



**PART 15 - QUALITY CONTROL**

When required in writing by the ENGINEER, the CONTRACTOR shall make such tests as may be necessary to show that the requirements of the Specification have been fulfilled.

All tests shall be made under the supervision and direction of the ENGINEER, and the CONTRACTOR will provide all required materials, labor and apparatus, etc., or so directed, engage an approved testing laboratory for making same. Any work found defective shall be removed, replaced and retested until satisfactory to the ENGINEER, all at the CONTRACTOR'S expense.

Should tests required by the ENGINEER, except those specifically called for elsewhere in these General Requirements or in the Specification show that the requirements of the Specification have been fulfilled, then the costs of such tests shall be paid for by the OWNER.

**PART 16 - MEASUREMENT AND FITTING OF PARTS**

The CONTRACTOR, without extra charge, shall make such slight alterations as may be necessary to make adjustable parts fit the fixed parts, leaving all complete and in proper shape when done. The CONTRACTOR shall verify all dimensions given in the drawings and shall report any error or inconsistency to the ENGINEER before commencing work.

**PART 17 - CONTRACTOR'S SUPERINTENDENT**

The CONTRACTOR shall keep a competent Superintendent and any necessary assistants at the site throughout the progress of the work. All directions given to said Superintendent shall be as binding as if given to the CONTRACTOR. Upon request, such directions will be confirmed, in writing, to the CONTRACTOR.

The CONTRACTOR'S Superintendent and/or any of his assistants shall be promptly replaced in the event he or they shall prove to be incompetent and/or unsatisfactory to the ENGINEER.

**PART 18 - ASSISTANCE BY ENGINEER**

It is distinctly understood and agreed that such assistance as the ENGINEER may render to the CONTRACTOR in connection with the interpretation of drawings and specification shall not relieve the CONTRACTOR from any responsibility for the work. Any work which proves faulty shall be made right by the CONTRACTOR without delay. The failure of the ENGINEER, or his Inspectors to call the CONTRACTOR'S attention to faulty work or work done which is not in accordance with drawings and specification shall not prevent the OWNER from insisting that the CONTRACTOR make all work right.

**PART 19 - INCIDENTAL WORK**

Work called for on the drawings and/or specifications and are not set forth in the Bid Schedule as pay items, shall be considered as incidental work and will not be paid for directly, but shall be included in the price bid for the various pay items.

**PART 20 - TERMINATION OF CONTRACT**

If the CONTRACTOR shall be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should persistently or repeatedly refuse, or should fail, except in cases for which

extension of time is provided, to supply enough properly skilled workmen, equipment or proper materials, or if he should fail to make prompt payment to SUBCONTRACTOR or for material or labor, or persistently disregard laws, ordinances or the instructions of the ENGINEER, or otherwise be guilty of a substantial violation of any provision of the Contract, then the OWNER upon the certificate of the ENGINEER that sufficient cause exists to justify such action, may without prejudice to any other right or remedy and after giving the CONTRACTOR seven days written notice, terminate the employment of the CONTRACTOR and take possession of the premises and of all materials, tools and appliances thereon and finish the work by whatever method the OWNER may deem expedient. In such case, the CONTRACTOR shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract Price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the CONTRACTOR. If such expense shall exceed such unpaid balance, the CONTRACTOR shall pay the difference to the OWNER as herein provided, and the damage incurred through the CONTRACTOR's default shall be certified by the ENGINEER.

In the event of termination of Contract before completion of the work, due to abandonment of the project or discontinuance thereof, the CONTRACTOR will be paid in proportion to the work completed and in progress as per scope of work described in the drawings and specification and in accordance with the unit price schedule.

#### **PART 21 – PROGRESS PAYMENTS, ACCEPTANCE AND FINAL PAYMENT**

*Basis for Progress Payments:* The Schedule of Quantities as shown in the Plans will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period. The amount of retainage with respect to progress payments will be 5% until 50 percent completion after which retainage shall be 2.5%.

Upon receipt of written notice from the CONTRACTOR that the work is ready for final inspection and acceptance, the ENGINEER shall promptly make such inspection and when he finds the work acceptable under the Contract and the Contract fully performed, he shall promptly issue a final certificate over his own signature, stating that the work provided for in this Contract has been completed and is accepted by him under the terms and conditions thereof, and the entire balance found to be due the CONTRACTOR, including the retained percentage, shall be paid to the CONTRACTOR, as approved by the OWNER, at the office of the OWNER within 30 days after the date of said final certificate.

If, after receipt of written notice from CONTRACTOR requesting final inspection and the performance of said final inspection by ENGINEER, additional inspections are necessary in order for ENGINEER to issue a final certificate; the OWNER shall withhold the cost associated with said additional inspections from the final payment due the CONTRACTOR.

Before issuance of final certificate, the CONTRACTOR shall submit evidence satisfactory to the ENGINEER that all payrolls, material bills, equipment rentals, and all other indebtedness connected with the work have been paid.

**PART 22 - PLACING WORK IN SERVICE**

If desired by the OWNER, portions of the work may be placed in service when completed and the CONTRACTOR shall give prior access to the work for this purpose, but such use and operation shall not constitute an acceptance of the work.

**PART 23 - SCHEDULES**

The CONTRACTOR shall furnish the ENGINEER with a tentative schedule, in a format approved by the ENGINEER, setting forth in detail the procedure he proposes to follow, and giving the dates on which he expects to start and to complete separate portions of the work. If at any time, in the opinion of the ENGINEER, proper progress is not being maintained, such changes shall be made in the schedule of operations which will satisfy the ENGINEER that the work will be completed within the period stated in the proposal, or extension thereof made as herein provided.

CONTRACTOR is to prepare list of proposed SUBCONTRACTORS including material suppliers; submit to ENGINEER for approval before subcontracts are awarded. No SUBCONTRACTOR is to be employed on work unless approved by OWNER and ENGINEER.

**PART 24 - PROJECT SIGN**

NOT REQUIRED FOR THIS PROJECT.

**PART 25 - INSURANCE**

The CONTRACTOR shall protect, indemnify, save and hold harmless the OWNER, their officers, agents, and employees from all suits, actions or claims of any kind or character brought because of bodily injuries, sickness, disease or personal injury, or damages received or sustained by any person, persons, or property on account of any operations of the CONTRACTOR, his agents, employees, his subcontractors or any others authorized by the CONTRACTOR to perform work on the project.

Third Party Beneficiary Clause. It is specifically agreed by and between the parties executing this Contract, that it is not intended by any of the provisions of any part of the Contract to create in the public or any member thereof any third-party beneficiary provisions or to authorize anyone not a party to this Contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of this Contract.

The CONTRACTOR shall carry insurance of the following kinds and amounts on all City Contracts:

- A. CONTRACTOR'S Public Liability, Auto Liability and Property Damage Liability Insurance.** The CONTRACTOR shall provide regular CONTRACTOR'S Public Liability Insurance for a combined amount of one million (\$1,000,000) dollars of coverage for all damages arising out of bodily injury, death, and property damage for each occurrence with an aggregate limit of two million (\$2,000,000) dollars.

The CONTRACTOR shall provide business auto liability coverage for an aggregate limit of one million (\$1,000,000) dollars of coverage for bodily injury and property

damage arising out of the operation or maintenance of any vehicle including owned, non-owned and hired vehicles, and employee non-ownership use.

- B. Insurance for SUBCONTRACTOR'S and CONTRACTOR'S Protective Public Liability and Property Damage Liability Insurance.** In the event that any of the work to be performed by the CONTRACTOR on the project is sublet or assigned or is otherwise to be performed by anyone other than the CONTRACTOR'S own employees, then the insurance specified above shall extend to cover such work.
- C. Workmen's Compensation Insurance and Employer's Liability Insurance.** The CONTRACTOR shall furnish satisfactory evidence to the City that, with respect to the work to be performed by him on the project, he carries regular Workmen's Compensation and Employers Liability Insurance covering his liability under the "Workmen's Compensation Law of the State of Oklahoma". The CONTRACTOR shall maintain the aforementioned insurance in full force and effect for the duration of the Contract. Should the CONTRACTOR fail or neglect to maintain the aforementioned insurance, the City specifically reserves the right to withhold all funds due and owing the CONTRACTOR until such time as the required insurance is in effect.

In addition to the aforementioned insurance coverage, on any project in which the CONTRACTOR shall perform any Railway-Highway work, the CONTRACTOR shall also secure the following: "Railroads' Protective Liability and Property Damage Insurance".

- D. Railroads' Protective Liability and Property Damage Insurance.** In addition to the above, the CONTRACTOR shall furnish satisfactory evidence to the City that, with respect to the work to be performed by him under the Contract, he has provided for and on behalf of the Railway Company or Railway Companies involved, Protective Public Liability Insurance in an amount as may be required by the Railway Company, which amount shall be specified in the bid documents. Policies shall not include liability for negligence on the part of the Railway Company, its agents or employees, except as set out in Coverage A, B, or C of the form of policy, or amendments thereto, referred to under paragraph 6 below. This insurance applies to each and all Railway Companies involved in the work.
- E. General.** The insurance hereinbefore specified shall be carried in Insurance Companies approved by the City, and where applicable the Railway Company, during all times when work is being carried on under the terms of the Contract, until all work required to be performed under the Contract is satisfactorily completed as evidenced by the formal acceptance by the City.
- F. Certificates of Insurance.** Required insurance shall be documented by Certificates of Insurance which provide that the OWNER shall be notified at least thirty (30) days in advance of cancellation, non-renewal or adverse change. The Certificate of Insurance shall show the OWNER as the named insured.

For general liability, the CONTRACTOR shall provide an indication of the amounts of claims, payments or reserves chargeable to the aggregate amount of liability coverage.

## **PART 26 - SAFETY STANDARDS AND ACCIDENT PREVENTION**

With respect to all work performed under this Contract, the CONTRACTOR shall:

- A. Comply with the safety standards provisions of applicable laws, building and construction codes and the Manual of Accident Prevention in Construction published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596), and the requirements of Title 29 of the Code of Federal Regulations, Section 1910 or 1926 as applicable.
- B. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.
- C. Trench Excavation and Safety System: All work under this item shall be in accordance with the current edition of the OSHA Standard for Excavation and Trench Safety Systems, 29 CFR 1926 Subpart P.

The CONTRACTOR shall notify all utility companies and OWNERS in accordance with the OSHA requirements given in 29 CFR 1926.651 (b) (2) for the purpose of locating utilities and underground installations.

Where the trench or excavation endangers the stability of a building, wall, street, highway, utilities, or other facility, the CONTRACTOR shall provide support systems such as shoring, bracing, or underpinning to ensure the stability of such facility. The CONTRACTOR may elect to remove and replace or relocate such facilities with the written approval of the facility owner, the ENGINEER, and the OWNER.

Payment for the work required by this item shall be included in the lump sum price bid. With each periodic payment request, CONTRACTOR shall submit a certification that the CONTRACTOR has complied with the provisions of the OSHA standards.

## **PART 27 - WAGE RATES**

NO SPECIFIC REQUIREMENTS FOR THIS PROJECT.

## **PART 28 - WORKMEN**

The CONTRACTOR shall employ foreman and skilled laborers where necessary, and if any person employed on the work shall refuse or neglect to obey orders of the ENGINEER or Inspector when such orders are in keeping with the provisions of these specifications or shall appear to the ENGINEER or his Inspector to be incompetent, disorderly or unfaithful, he shall, upon order of the ENGINEER, be at once discharged and not again employed upon any part of the work. It shall be the responsibility of the superintendent representing the CONTRACTOR to transmit all necessary orders and instructions. If requested by the ENGINEER, the CONTRACTOR shall submit, in written form, qualifications including work experience of any workman used on the project.

## **PART 29 - NUMBER OF WORKING DRAWINGS AND SPECIFICATIONS**

The ENGINEER will furnish to the CONTRACTOR not more than two (2) sets of drawings and specifications for construction. The CONTRACTOR may procure additional copies of drawings

and specifications for construction at cost of reproduction. Such costs are reimbursable by the ENGINEER.

**PART 30 - PRECONSTRUCTION CONFERENCE**

Prior to the commencement of work at the site, a preconstruction conference will be held at a mutually agreed time and place. The conference shall be attended by:

- A. CONTRACTOR and his superintendent.
- B. Principal SUBCONTRACTORS.
- C. Representatives of principal suppliers and manufacturers as appropriate.
- D. ENGINEER and its Resident Project Representative.
- E. Representatives of OWNER.
- F. Government representatives as appropriate.
- G. Others as requested by CONTRACTOR, OWNER, or ENGINEER.
- H. Unless previously submitted to ENGINEER, CONTRACTOR shall bring to the conference a preliminary schedule for each of the following:
  - 1. Progress.
  - 2. Procurement.
  - 3. Values for progress payment purposes.
  - 4. Shop Drawings and other submittals.

The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The agenda will include:

- A. CONTRACTOR'S preliminary schedules.
- B. Transmittal, review, and distribution of CONTRACTOR'S submittals.
- C. Processing applications for payment.
- D. Maintaining record documents.
- E. Critical work sequencing.
- F. Field decisions and change orders.
- G. Use of premises, office and storage areas, security, housekeeping, and OWNER'S needs.
- H. Major equipment deliveries and priorities.
- I. CONTRACTOR'S assignments for safety and first aid.

ENGINEER will preside at the conference and will arrange for keeping the minutes and distributing the minutes to all persons in attendance.

### **PART 31 - PROGRESS MEETINGS**

CONTRACTOR shall schedule and hold regular progress meetings at least monthly and at other times as requested by ENGINEER or required by progress of the work. CONTRACTOR, ENGINEER, and all SUBCONTRACTORS active on the site shall be represented at each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and other SUBCONTRACTORS.

CONTRACTOR shall preside at the meetings. Meeting minutes will be prepared and distributed by CONTRACTOR. The purpose of the meetings will be to review the progress of the work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop.

### **PART 32 - SUBSTANTIAL AND FINAL COMPLETION**

All work including site restoration shall be finished within the time called out on the Bid Form for final completion.

### **PART 33 - EXCAVATION**

All excavation shall be unclassified. No additional payment shall be made for rock, groundwater, or other natural formations encountered. Payment for excavation shall be included in other items of work.

### **PART 34 - SUBCONTRACTORS**

CONTRACTOR is to prepare a list of proposed SUBCONTRACTORS including material suppliers and submit to ENGINEER for approval before SUBCONTRACTORS are awarded.

No SUBCONTRACTOR is to be employed on work unless approved by OWNER and ENGINEER.

### **PART 35 - RIGHT-OF-WAY/PROJECT VIDEO**

CONTRACTOR shall video the complete right-of-way of the project prior to initiating construction and deliver video tape to the ENGINEER at the pre-construction conference. The video shall be taken in such a way to document pre- construction conditions for use in documenting satisfactory right-of-way restoration and other issues relative to initial conditions prior to construction.

### **PART 36 - RECORD DRAWINGS**

#### **36.1 GENERAL**

- A. The CONTRACTOR shall be responsible for accumulation and maintenance of a complete set of Project Record Documents and upon completion and acceptance of the project shall submit these documents to the ENGINEER, as the OWNER'S representative, for a permanent record.
- B. The Project Record Documents shall consist of:

1. One complete set of drawings, with revisions.
2. One complete Project Manual with all addenda, field bulletins and change orders.
3. Complete set of all field test data.
4. Complete set of approved shop drawings, product data brochures and samples.
5. Six complete sets of maintenance and operating instructions, parts lists and supplier identification on all operating fixtures and equipment.

### **36.2 MAINTENANCE OF RECORD DOCUMENTS**

- A. The CONTRACTOR shall maintain, on the site, one complete set of contract documents, other than those used for construction, throughout the life of the job.
  1. This set of documents shall be marked "Record Set" and shall be maintained up to date at all times and available to the ENGINEER for inspection.
  2. The only notations or other markings to be made on this set are notations of field variations made from the work shown on the drawings for purposes of "Record Drawings" revisions when the project is complete. Failure to record revisions by each CONTRACTOR, shall be considered a breach of contract.
  3. This set of Documents will be turned over to the ENGINEER for preparation of "Record Drawings" **prior to approval of final application for payment.**

### **36.3 MAINTENANCE AND OPERATING INSTRUCTIONS**

- A. A complete set of maintenance and operating instructions on the project shall be prepared for the OWNER'S continual use.
  1. To be bound in booklet form, 8-1/2" x 11" in size, labeled "Operating Manual".
  2. To be indexed for quick reference use.
  3. To contain manufacturer's printed data, record forms, diagrams, parts lists, maintenance procedures, start-up procedures, operating procedures, service requirements and schedules, and names, addresses and phone numbers of SUBCONTRACTOR, manufacturer and local service agent.
  4. To contain all written warranties and guarantees.
- B. Each CONTRACTOR shall submit six complete copies of this "Operating Manual" material from his trade to the ENGINEER at the completion of the project.
- C. The ENGINEER shall assemble, bind, label and index this material for the OWNER as stated above. Failure to submit the data listed on the part of any CONTRACTOR may be considered cause to withhold final payment until all such information is received.

### **PART 37 - CHANGES IN THE WORK**

**ALL CHANGES SHALL BE MADE IN WRITING AND APPROVED BY THE OWNER OR ENGINEER. THIS INCLUDES CHANGES INVOLVING COST OR THOSE NOT INVOLVING COST. NO CHANGE WILL BE ACCEPTABLE UNLESS APPROVED IN WRITING.**



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The OWNER, without invalidating the Contract, may order extra work or make changes by altering, adding to or deducting from the work with the Contract Total being adjusted accordingly. All changes involving cost shall be made using a written modification order and shall be supported with necessary documentation as to the increase or decrease in cost and time. No increase or decrease in cost or time will be made without an approved modification order that is completed at or before the change is made. Increases in cost or time will not be allowed at the end of the job for work completed earlier without an approved change order. The OWNER shall have authority to make minor changes in the work which do not involve extra cost, and which do not significantly change the design. All such changes shall be made with a written field order.

**END OF SECTION 01 00 00**

**SECTION 01 11 00 - SUMMARY OF WORK**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. The work covered by these specifications and drawings shall consist of all materials, transportation costs, equipment, and tools that are related to, or are to be incorporated in this contract and must be received, unloaded, stored, installed, erected, service connections provided, and coordinated with the construction by the CONTRACTOR under this contract. Installation of equipment and materials shall mean furnishing of all labor and materials as required to place the improvements in successful operation. The CONTRACTOR shall be responsible for all equipment and materials and shall replace at his own expense all such equipment and materials found defective in manufacture or damaged in handling after delivery by the manufacturer. The improvements are as listed:

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- B. This contract shall include minor items not specifically mentioned herein but shown on the accompanying plans or obviously necessary to provide a complete job.
- C. The following description, while not intended to cover all details, outlines some items of the work to be accomplished under this Contract:

Construct one (1) approximately 10 acre construction and demolition debris cell with access road including the following:

1. **Unclassified excavation and on-site stockpile**
2. **Protective sand layer (1' thickness)**
3. **Grading for access road**
4. **Excavation and re-compaction of 3' clay liner**
5. **In-situ liner borings**
6. **In-situ liner post excavation/pre-disposal tests**

**Note: The Municipal Solid Waste Landfill must stay in operation throughout construction. Temporary operational coordination shall be considered incidental and included in the cost of other bid items.**

- D. The price named in the Proposal shall include the furnishing of all labor, material, transportation costs, equipment rental, etc., necessary to construct the project as herein specified and as shown on the accompanying plans.

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- E. The CONTRACTOR shall cooperate with the OWNER during construction so as to place the improvements in operation at minimum inconvenience and without significant disruption of the OWNER. The CONTRACTOR shall minimize his area of operation. Any areas disturbed will be restored to the OWNER'S satisfaction.

**END OF SECTION 01 11 00**

**SECTION 01 21 19 - TESTING LABORATORY-SERVICES (CONTRACTOR-Employed Lab)**

**PART 1 - GENERAL**

**1.1 REQUIREMENTS INCLUDED**

- A. CONTRACTOR shall employ and pay for the services of an independent testing laboratory to perform specified services and testing.

**1.2 RELATED REQUIREMENTS**

- A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders, or approvals of public authorities.
- B. Respective sections of specifications: Certification of products.
- C. Respective sections of specifications, laboratory tests required, and standards for testing.

**1.3 QUALIFICATION OF LABORATORY**

- A. Meet "Recommended Requirements for Independent Laboratory Qualification," published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction."
- C. Authorized to operate in the state in which the project is located.
- D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- E. Testing Equipment
  - 1. Calibrated at reasonable intervals by devices of accuracy traceable to either
    - a. National Bureau of Standards.
    - b. Accepted values of natural physical constants.

**1.4 LABORATORY DUTIES**

- A. Cooperate with OWNER'S REPRESENTATIVE and CONTRACTOR; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
  - 1. Comply with specified standards.
  - 2. Ascertain compliance of materials with requirements of Contract Documents.

- C. Promptly notify OWNER'S REPRESENTATIVE and CONTRACTOR of observed irregularities or deficiencies of work or products.
- D. Promptly submit written report of each test and inspection; one copy each to OWNER'S REPRESENTATIVE, OWNER, CONTRACTOR, and one copy to Record Document File. Each report shall include:
  - 1. Date issued.
  - 2. Project title and number.
  - 3. Testing laboratory name, address, telephone number.
  - 4. Name and signature of laboratory inspector.
  - 5. Date and time of sampling or inspection.
  - 6. Record of temperature and weather conditions.
  - 7. Date of test.
  - 8. Identification of product and specification section.
  - 9. Location of sample or test in the project.
  - 10. Type of inspection or test.
  - 11. Results of tests & compliance with Contract Documents.
  - 12. Interpretation of test results, when requested by OWNER'S REPRESENTATIVE.
- E. Perform additional tests as required by OWNER'S REPRESENTATIVE or the OWNER.

**1.5 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY**

- A. Laboratory is not authorized to:
  - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
- B. Approve or accept any portion of the work.
- C. Perform any duties of the CONTRACTOR.

**1.6 CONTRACTOR'S RESPONSIBILITIES**

- A. Cooperate with laboratory personnel, provide access to work, to manufacturer's operations.
- B. Secure and deliver to the laboratory adequate quantities of representation samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.

- D. Furnish copies of products test reports as required.
- E. Furnish incidental labor and facilities:
  - 1. To provide access to work to be tested.
  - 2. To obtain and handle samples at the project site or at the source of the product to be tested.
  - 3. To facilitate inspections and tests.
  - 4. For storage and curing of test samples.
- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
  - 1. When tests or inspections cannot be performed after such notice, reimburse OWNER for laboratory personnel and travel expenses incurred due to CONTRACTOR'S negligence.
- G. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required:
  - 1. For the CONTRACTOR'S convenience.
  - 2. When initial tests indicate work does not comply with Contract Documents.

**1.7 CONTRACTOR'S GENERAL RESPONSIBILITIES**

- A. No failure of test agencies to perform adequate inspections or tests or to properly analyze or report results shall relieve CONTRACTOR of responsibility for fulfillment of requirements of contract documents. It is recognized that required inspection and testing program is intended to assist the CONTRACTOR, OWNER, ARCHITECT, ENGINEER, and governing authorities in nominal determination of probable compliances with requirements for certain elements of work. The program is not intended to limit the CONTRACTOR'S regular quality control program, as needed for general assurance of compliances.

**END OF SECTION 01 21 19**

## **SECTION 01 33 00 - SUBMITTALS AND SUBSTITUTIONS**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

##### A. Work Included

1. Wherever possible throughout the contract documents, the minimum acceptable quality of workmanship and materials has been defined by manufacturer's name and catalog number, reference to recognized industry and government standards, or description of required attributes and performance.
2. To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for their review by the ENGINEER.
3. Make all submittals required by the contract documents, and revise and resubmit as necessary to establish compliance with the specified requirements.

B. Related Work Described Elsewhere: Individual requirements for submittals are described in pertinent other Sections of these specifications.

#### **1.2 QUALITY ASSURANCE**

A. Coordination of Submittals: Prior to each submittal, carefully review and coordinate all aspects of each item being submitted and verify that each item and the submittal for it conforms in all respects with the requirements of the contract documents. By affixing the CONTRACTOR'S signature to each submittal, certify that this coordination has been performed.

##### B. Certificates of Compliance

1. When requested, certify that materials used in the work comply with specified provisions thereof. Certification shall not be construed as relieving the CONTRACTOR from furnishing satisfactory materials if, after tests are performed on selected samples, the material is found to not meet specified requirements.
2. Show on each certification the name and location of the work, name and address of CONTRACTOR, quantity and date or dates of shipment or delivery to which the certificate applies, and name of the manufacturing or fabricating company. Certification shall be in the form of letter or company-standard forms containing all required data. Certificates shall be signed by an officer of the manufacturing or fabricating company.
3. In addition to the above information, all laboratory test reports submitted with certificates of compliance shall show the date or dates of testing, the specified requirements for which testing was performed, and results of the test or tests.

### **1.3 SUBMITTALS**

- A. Submittal Schedule: Within 10 days after award of Contract, and before any items are submitted for approval, submit to the ENGINEER two copies of the schedule described in Article 2.1 of this Section.
- B. Certificates of Compliance: Upon completion of the work, and as a condition of its acceptance, submit to the ENGINEER all Certificates of Compliance.
- C. Procedures: Make submittals in strict accordance with the provisions of this Section.
- D. Schedule of Values: Within 10 days of the Pre-Construction Conference, submit a schedule of values for lump sum bid items indicating the cost breakdown of lump sum bid items for use in progress payment preparation. Submit to the ENGINEER two copies of the schedule described in Article 2.2 of this Section.

## **PART 2 - PRODUCTS**

### **2.1 SUBMITTAL SCHEDULE**

- A. General: Compile a complete and comprehensive schedule of all submittals anticipated to be made during progress of the work. Include a list of each type of item for which CONTRACTOR'S drawings, Shop Drawings, Certificates of Compliance, material samples, guarantees, Operations and Maintenance manuals or other types of submittals are required. Upon approval by the ENGINEER this schedule will become part of the Contract and the CONTRACTOR will be required to adhere to the schedule except when specifically otherwise permitted.
- B. Coordination: Coordinate the schedule with all necessary subcontractors and materials suppliers to ensure their understanding of the importance of adhering to the approved schedule and their ability to so adhere. Coordinate as required to ensure the grouping of submittals as described in Article 1.3.
- C. Revisions: Revise and update the schedule on a monthly basis as necessary to reflect conditions and sequences. Promptly submit revised schedules to the ENGINEER for review and comment.

### **2.2 SCHEDULE OF VALUES**

- A. The ENGINEER will review the tentative schedule of values to determine whether, in his judgment, the schedule of values is of sufficient detail and if the prices included are "unbalanced" or "front-end loaded", in an effort to inflate the prices of those items of work to be completed in the early stages of the work.
- B. Breakdown cost to list major products or operations for each line item which has an installed value of more than \$5,000.00. The sum of the items listed on the schedule of values shall equal the contract lump sum price.



- C. The ENGINEER will provide the CONTRACTOR with his comments and/or may request additional information from the CONTRACTOR to justify certain item quantities and prices, therefore. On the basis of the ENGINEER'S comments, the CONTRACTOR shall revise and resubmit the tentative schedule for further review and/or approval.
- D. Once the ENGINEER accepts the tentative schedule, it shall become the schedule of values to be used in determining partial payment estimates. Two (2) copies of this schedule shall be submitted to the ENGINEER for distribution and his use. No modifications will be made to the schedule of values, except as required by approved change orders.
- E. No partial payment request (including the first) shall be approved until the schedule of values has been approved by the OWNER and ENGINEER.

### **2.3 SHOP DRAWINGS AND COORDINATION DRAWINGS**

- A. Shop Drawings
  - 1. Scale and Measurements: Make all Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the work.
  - 2. Type of Prints Required: Submit all Shop Drawings in the form of electronic (.pdf) or hardcopy, minimum of 8 ½" by 11".

### **2.4 MANUFACTURERS' LITERATURE**

- A. General: Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly indicate which portion of the contents is being submitted for review.
- B. Number of Copies Required: Submit the number of copies which are required to be returned plus two copies which will be retained by the ENGINEER. Under no circumstances shall less than five copies be submitted.

### **2.5 SAMPLES**

- A. Accuracy of Samples: Samples shall be of the precise article proposed to be furnished. Samples shall have stickers or tags which bear identification of the project, the subcontractor, the vendor or manufacturer, the product color name or number, model, style or series, and the size and thickness of components.
- B. Number of Samples Required: Unless otherwise specified, submit all Samples in the quantity which is required to be returned plus one which will be retained by the ENGINEER.
- C. Reuse of Samples: In situations specifically so approved by the ENGINEER, the ENGINEER'S retained sample may be used in the construction as one of the installed items.

- D. Match Existing Materials: Brick or other materials that are to match existing materials shall require a "test panel" to be erected adjacent to the existing material to allow the OWNER to approve the match in size, color, and texture.

## **2.6 COLORS AND PATTERNS**

- A. Unless the precise color and pattern is specifically described in the contract documents, and whenever a choice of color or pattern is available in a specified product, submit accurate color and pattern charts to the ENGINEER for review and selection.

## **2.7 SUBSTITUTIONS**

### **A. Approval Required**

1. The Contract is based on the standards of quality established in the contract documents.
2. All products proposed for use, including those specified by required attributes and performance, shall require approval by the ENGINEER before being incorporated into the work.
3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this work by the ENGINEER.

### **B. "Or Equal":**

1. Where the phrase "or equal" or "approved or equal" occurs in the contract documents, do not assume that materials, equipment, or methods will be approved as equal unless the item has been specifically approved for this work by the ENGINEER.
2. The decision of the ENGINEER shall be final.

## **PART 3 - EXECUTION**

### **3.1 IDENTIFICATION OF SUBMITTALS**

- A. General: Bind submittals with cover label that identifies project, division of work, subcontractor, and vendor/manufacturer. Consecutively number all submittals. Accompany each submittal with a letter of transmittal containing all pertinent information required for identification and checking of submittals.
- B. Internal Identification: On at least the first page of each copy of each submittal, and elsewhere as required for positive identification, clearly indicate the submittal number in which the item was included.
- B. Resubmittals: When material is resubmitted for any reason, transmit under a new letter of transmittal and with a new submittal number.

### 3.2 COORDINATION OF SUBMITTALS

- A. General: Prior to submittal for approval, use all means necessary to fully coordinate all material including, but not necessarily limited to:
  - 1. Determine and verify all interface conditions, catalog numbers, and similar data.
  - 2. Coordinate with other trades as required.
  - 3. Clearly indicate all deviations from requirements of the contract documents.
- B. Grouping of Submittals: Unless otherwise specified, make all submittals in groups containing all associated items to ensure that information is available for checking each item when it is received. Partial submittals may be rejected as not complying with the provisions of the contract documents and the CONTRACTOR shall be strictly liable for all delays so occasioned.

### 3.3 TIMING OF SUBMITTALS

- A. General: Make all submittals far enough in advance of scheduled dates for installation to provide all time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.
- B. ENGINEER'S Review Time: In scheduling, allow at least 21 calendar days for review by the ENGINEER following his receipt of the submittal. Should unanticipated circumstances prevent the normal review time, a minimum of 10 working days review time must be allowed for reviews.
- C. Delays: Delays caused by tardiness in receipt of submittals will not be an acceptable basis for extension of the contract completion date.

### 3.4 ENGINEER'S REVIEW

- A. CONTRACTOR'S approval: Prior to submission to the ENGINEER, all submittals shall have been reviewed and approved by the CONTRACTOR.
- B. General: Review by the ENGINEER shall not be construed as a complete check, but only that the general method of construction and detailing is satisfactory. Review shall not relieve the CONTRACTOR from responsibility for errors which may exist.
- C. Authority to Proceed: The notations "Reviewed, No Exceptions Noted" or "Reviewed, Exceptions Noted" authorize the CONTRACTOR to proceed with fabrication, purchase, or both, of the items so noted, subject to the revisions, if any, required by the ENGINEER'S review comments.
- D. Revisions: Make all revisions required by the ENGINEER. If the CONTRACTOR considers any required revision to be a change, he shall so notify the ENGINEER as provided for under "Changes" in the General Considerations. Show each drawing revision by number, date, and subject in a revision block on the drawing. Make only those revisions directed or approved by the ENGINEER.

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- E. Revisions After Approval: When a submittal has been reviewed by the ENGINEER, resubmittal for substitution of materials or equipment will not be considered unless accompanied by an acceptable explanation as to why the substitution is necessary.

**END OF SECTION 01 33 00**

## **SECTION 01 45 00 - QUALITY CONTROL**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

A. Section Includes

1. Quality assurance - control of installation.
2. Tolerances
3. References and standards.
4. Mock-up.
5. Testing laboratory services.
6. Inspection services.
7. Manufacturers' field services.
8. Subcontracting.

B. Related Sections

1. Section 01 33 00 – Submittals and Substitutions: Submission of manufacturers' instructions and certificates.

#### **1.2 QUALITY ASSURANCE**

- A. The CONTRACTOR will be held strictly to the intent of the contract documents in regard to the quality of materials, workmanship, and execution of the work. Inspections may be made at the factory or fabrication plant of the source of material supply.
- B. The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedure, or construction safety.
- C. The CONTRACTOR shall monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- D. The CONTRACTOR will supervise and direct the work. He will be solely responsible for the means, methods, techniques, sequences, and procedures of construction. The CONTRACTOR will employ and maintain on the work a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervisor and coordination of the work.
- E. The CONTRACTOR shall comply with manufacturers' instructions, including each step in sequence.

- F. Should the manufacturers' instructions conflict with Contract Documents, the CONTRACTOR shall request clarification from ENGINEER before proceeding.
- G. The CONTRACTOR shall comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- H. The CONTRACTOR shall perform work by persons qualified to produce required and specified quality.
- I. The CONTRACTOR shall verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- J. The CONTRACTOR shall secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

### **1.3 IMPROPER COVERAGE OF BURIED CONSTRUCTION**

- A. If any work is covered contrary to the written instructions of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for the ENGINEER'S observation, and replaced at the CONTRACTOR'S expense.
- B. If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such work is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction; if, however, such work is not found to be defective, the CONTRACTOR will be allowed an increase in the contract price or an extension of the contract time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate change order shall be issued.
- C. Defect Assessment
  - 1. Replace the work, or portions of the work, not conforming to specified requirements.
  - 2. If, in the opinion of the ENGINEER it is not practical to remove and replace the work, the ENGINEER will direct an appropriate remedy or adjust payment.
- D. Tolerances
  - 1. The CONTRACTOR shall monitor fabrication and installation tolerance control of all products to produce acceptable work. Do not permit products and installation outside of allowable tolerances to accumulate.
  - 2. The CONTRACTOR shall comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from ENGINEER before proceeding.

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3. The CONTRACTOR shall adjust products to appropriate dimension and position before securing products in place.

### E. References and Standards

1. For products or workmanship specified by association, trade, or other consensus standards, the CONTRACTOR shall comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
2. The CONTRACTOR shall conform to reference standard by date of issue current date for receiving bids, except where a specific date is established by code.
3. The CONTRACTOR shall obtain copies of standards where required by product specification sections.
4. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the ENGINEER shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

### F. Mock-Up

1. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.
2. The CONTRACTOR shall assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
3. Accepted mock-ups shall be a comparison standard for the remaining work.
4. Where mock-up has been accepted by ENGINEER and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so.

### G. Testing Services

1. The OWNER will appoint and employ services of an independent firm to perform testing. OWNER shall pay for services.
2. The independent firm will perform tests and other services specified in individual specification sections and as required by the ENGINEER.
3. Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the ENGINEER or the OWNER.
4. Reports will be submitted by the independent firm to the ENGINEER and CONTRACTOR, in duplicate indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
5. The CONTRACTOR shall cooperate with the independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

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- a. Notify ENGINEER and independent firm 24 hours prior to expected time for operations requiring services.
  - b. Make arrangements with independent firm and pay for additional samples and tests required for CONTRACTOR'S use.
6. Testing does not relieve CONTRACTOR to perform work to contract requirements.
  7. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the ENGINEER. Payment for re-testing will be charged to the CONTRACTOR or by deducting testing charges from the Contract Sum/Price.
- J. Removal of Defective and Unauthorized Work
1. All work which has been rejected or condemned shall be repaired, or, if it cannot be satisfactorily repaired it shall be removed and replaced at the CONTRACTOR'S expense. Defective materials shall be removed immediately from the site of the work.
  2. Work done without lines and grades having been given, work done beyond the lines or not in conformity with the grades shown on the plans or as given, save as herein provided, work done without proper inspection will be done at the contractor's risk and will be considered unauthorized and at the option of the ENGINEER may not be accepted and may be ordered removed at the CONTRACTOR'S expense.
  3. If any work is covered contrary to the written instructions of the ENGINEER it must, if requested by the ENGINEER, be uncovered for the ENGINEER'S observation, and replaced at the CONTRACTOR'S expense.
  4. If the ENGINEER considers it necessary or advisable that covered work be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such work is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction; if, however, such work is not found to be defective, the CONTRACTOR will be allowed an increase in the contract price or an extension of the contract time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate change order shall be issued.
- K. Inspection Services
1. OWNER will appoint, employ, and pay for specified services of an independent firm to perform inspection.
- L. Manufacturers' Field Services
1. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of



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equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

2. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
3. Refer to Section 01 33 00 – Submittals and Substitutions, Manufacturers' Field Reports article.
4. Coordination of Plans, Specifications, and Special General Conditions: The plans, these specifications, Special General Conditions, and all supplementary documents are intended to describe a complete work and are essential parts of the contract. A requirement occurring in any of them is binding. In case of discrepancies, figured dimensions shall govern over scaled dimensions; plans shall govern over specifications. Special General Conditions shall govern over both General and Standard Specifications, and the plans and quantities shown on the plans shall govern over those shown on the proposal. The CONTRACTOR shall take no advance of any apparent error or omission in the plans and specifications, and the ENGINEER shall be permitted to make such corrections or interpretations as may be deemed necessary for the fulfillment of the intent of the plans and specification.

In the event the CONTRACTOR discovers any apparent error or discrepancy, he shall immediately bring such error or discrepancy to the attention of the ENGINEER, and request in writing an interpretation thereof by the ENGINEER.

### M. Subcontracting

1. The CONTRACTOR may utilize the services of specialty SUBCONTRACTORS on those parts of the work which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.
2. The CONTRACTOR shall not award work to SUBCONTRACTOR(S) in excess of fifty (50) percent of contract price, or in excess of fifty (50) percent of the labor and equipment required to install the project, without prior written approval of the OWNER.
3. The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of its SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as the CONTRACTOR is for the acts and omissions of persons directly employed by the CONTRACTOR.
4. The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the contract documents insofar as applicable to the work of SUBCONTRACTORS and to give the CONTRACTOR the same power as regards terminating any subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.
5. Nothing contained in this CONTRACT shall create any contractual relationship between the SUBCONTRACTOR and the OWNER.

## PART 2 - PRODUCTS

NOT USED.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

**3.2 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

**END OF SECTION 01 45 00**

## **SECTION 01 78 39 - PROJECT RECORD DOCUMENTS**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION OF WORK**

- A. Maintain at the site for the OWNER one record copy of:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other modifications to the contract.
  - 5. Approved shop drawings, product data and samples.
  - 6. Field test records.
- B. Related Requirements in other parts of the Project Manual:
  - 1. Conditions of the Contract.

#### **1.2 MAINTENANCE OF DOCUMENTS AND SAMPLES**

- A. Store documents and samples in CONTRACTOR'S field office apart from documents used for construction.
  - 1. Provide files and racks for storage of documents.
  - 2. Provide locked cabinet or secure storage space for storage of samples.
- B. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- C. Make documents and samples available at all times for inspection by OWNER'S REPRESENTATIVE.

#### **1.3 RECORDING**

- A. Label each document "PROJECT RECORD" in neat large printed letters.
- B. Record information concurrently with construction progress.
  - 1. Do not conceal work until required information is recorded.
  - 2. All reports should include the requirements from Section 1.5 of EPA Technical Guidance Document in accordance with OAC 252:515-11-4(a)(1).
- C. Drawings: Legibly Mark to Record Actual Construction:
  - 1. Location of C&D debris cell, referenced to permanent improvements.
  - 2. Actual construction of C&D debris cell.

3. Actual construction of permanent installation.
- D. Specifications and Addenda; Legibly Mark Each Section to Record:
1. Manufacturer, trade name, catalog number, and supplier of Representative for the OWNER.
  2. Changes made by Change Order.
- E. Drawings and Specifications: Post addenda items, whether written or drawn, on the pages affected such that:
1. Cut-outs of items are securely attached to the sheet that the addenda modified.
  2. The addenda number is reflected in each posted item.
  3. Completely revised sheets are posted over the sheet revised and the outdated sheet is labeled "void".

#### **1.4 SUBMITTALS**

- A. At contract close-out, deliver Record Documents to OWNER'S REPRESENTATIVE.
- B. Accompany submittal with transmittal letter in duplicate, containing:
1. Date.
  2. Project title and number.
  3. CONTRACTOR'S name and address.
  4. Title and number of each Record Document.
  5. Signature of CONTRACTOR or his authorized REPRESENTATIVE.

**END OF SECTION 01 78 39**

**DIVISION 31 – EARTHWORK**

**SECTION 31 00 00 – GENERAL EARTHWORK**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section covers the requirements and procedures for excavation and backfill for structures.

**1.2 STANDARD SPECIFICATIONS**

A. The following is a list of standard specifications with the accompanying abbreviations used in this specification section:

1. American Association of State Highway and Transportation Officials Standard Specifications - AASHTO.

**1.3 QUALITY ASSURANCE**

A. Compaction shall be in accordance with Section 31 23 33 – 70 Trenching, Backfilling and Compaction.

B. The OWNER shall be the sole and final judge of suitability of all materials.

C. Materials in question, pending test results, shall not be used in the work. The CONTRACTOR shall remove all materials that fail to meet the requirements of the specifications, whether in stockpiles or in place.

D. Fills, embankments, backfills or subgrades which do not meet the specification requirements shall be removed or recompacted until the requirements are satisfied.

**1.4 PROTECTION**

A. Protection of Existing Improvements

1. Protection shall be provided to prevent damage to existing improvements indicated to remain in place on the OWNER'S property and adjoining properties.
2. Damaged improvements shall be restored to their original condition, as acceptable to parties having jurisdiction.
3. Land areas outside the limits of permanent work performed under this contract shall be preserved in their present condition. The CONTRACTOR shall confine his construction activities to areas defined for work on the Drawings.

B. Protection of Existing Utilities

1. The CONTRACTOR shall verify all existing utility locations either shown or not shown on the drawings.

2. The CONTRACTOR shall immediately notify the OWNER and applicable utility company of any damages to existing utilities.
  3. Repairs to damaged utilities shall be made in accordance with the requirements of the OWNER and applicable utility company at no extra cost to the OWNER.
  4. The CONTRACTOR shall coordinate with the OWNER and the applicable utility company for shutoff of or connection to active utilities. Existing utility services shall not be interrupted except as authorized in writing by the OWNER.
- C. Protection of Work Site: Barricades or other type protectors shall be provided to prevent unauthorized personnel from entering work sites.

## 1.5 JOB CONDITIONS

### A. Classification of Excavation

1. No classification shall be made to differentiate the various surface and subsurface conditions the CONTRACTOR may encounter during his performance under this contract.
2. It is the CONTRACTOR'S sole responsibility to verify the site surface and subsurface conditions.

### B. Dewatering

1. Excavation and embankment shall be performed in such manner that the area of the site and the area immediately surrounding the site will be continually and effectively drained by gravity or temporary pumps.
2. Water shall not be permitted to accumulate in excavations or other areas of the site.
3. The excavation shall be drained by methods which prevent the softening of subgrades and embankments.

### C. Blasting shall not be allowed.

1. Shoring, including sheet piling, shall be furnished and installed as necessary to protect workmen, banks, adjacent paving, structures, and utilities.
2. Shoring, bracing, and sheeting shall be removed as excavations are backfilled, in a manner to prevent caving.

## PART 2 - PRODUCTS

### 2.1 SUITABLE MATERIALS

- A. Suitable materials for fill and, backfill include materials that are free of debris, roots, organic or frozen materials, stones having a maximum dimension of four (4) inches in the upper six (6) inches of fill or six (6) inches in the remainder of fill.

- B. Otherwise, suitable material which is unsuitable due to excess moisture content will not be classified as unsuitable material unless it cannot be dried by manipulation, aeration or blending with other materials to the satisfaction of the OWNER.
- C. Unsuitable materials shall include those materials that are determined by the OWNER to be inadequate for providing a stable slope, fill, subgrade, or foundation for structure.
- D. Expansive clay soils shall be classified as unsuitable unless treated or mixed in a manner approved by the OWNER.

**2.2 CAPILLARY WATER BARRIER**

A. Coarse Aggregate (Gravel) Capillary Water Barrier.

- 1. Coarse aggregate shall meet the requirements of AASHTO M80.
- 2. Coarse aggregate shall consist of gravel, crushed gravel, or crushed stone.
- 3. Gradation of coarse aggregate shall conform to the requirements of AASHTO M 43, Size Number 57:

| Sieve          | Mass-Percent Passing |
|----------------|----------------------|
| 1 ½ inches     | (38 mm) 100          |
| 1 inch         | 95 – 100             |
| ½ inch (13 mm) | 25 – 60              |
| No. 4          | 0 – 10               |
| No. 8          | 0 - 5                |

- 4. Maximum allowable percent of deleterious substances shall meet the requirements of AASHTO M 80, Class B.

B. Fine Aggregate (Sand) Capillary Water Barrier:

- 1. Fine aggregate shall meet the requirements of AASHTO M6.
- 2. In general, fine aggregate shall consist of natural sand having hard, strong, durable particles free from deleterious substances and meeting the following gradation requirements:

| Sieve             | Mass-Percent Passing |
|-------------------|----------------------|
| 3/8 inch (9.5 mm) | 100                  |
| No. 4             | 95 – 100             |
| No. 16            | 45 – 80              |
| No. 50            | 10 - 30              |
| No. 100           | 2 - 10               |

**2.3 FINE AGGREGATE (SAND) BACKFILL**

- A. Fine aggregate backfill shall meet the requirements of Paragraph 2.2.B.

## **2.4 SELECTION OF BORROW MATERIAL**

- A. Borrow material, if required, shall be selected to meet requirements and conditions of the particular fill for which it is to be used.
- B. For borrow material obtained outside the limits of the project site, the CONTRACTOR shall obtain the right to procure material and shall pay all royalties and other charges involved.

## **PART 3 - EXECUTION**

### **3.1 EXCAVATION**

- A. Excavation, regardless of material encountered, shall conform to the dimensions and elevations indicated on the Drawings for each building and structure, and shall include trenching for utility and foundation drainage systems to a point five (5) feet beyond the building line of each building and structure.
- B. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms, installation of services, and for inspection, except where the concrete for walls and footings is authorized by the OWNER to be deposited directly against excavated surfaces.
- C. Suitable excavated material shall be transported to and placed to fill areas within the limits of the work.
- D. Unsuitable materials encountered within the limits of the work shall be excavated below grade and replaced with suitable materials as directed by the OWNER, except that concrete footings shall be increased in thickness to the bottom of the over-depth excavations and over-break in rock excavation.
- E. No excavated material shall be wasted without the authorization of the OWNER.
  - 1. Surplus excavated material and unsuitable material shall be disposed of by the CONTRACTOR at his own expense and responsibility.
  - 2. Material authorized to be wasted shall be disposed of in such manner as not to obstruct the flow characteristics of any stream or to impair the efficiency or appearance of any structure.
- F. No excavated material shall be deposited in a manner that may endanger a partly finished structure by direct pressure or by overloading banks contiguous to the operations or that may otherwise be detrimental to the completed work.
- G. Blasting shall not be allowed.

### **3.2 PREPARATION OF GROUND SURFACE FOR FILL**

- A. Areas upon which fills are to be placed shall be cleared and grubbed before the fill is started.



- B. Sloped ground surfaces steeper than one (1) vertical to four (4) horizontal on which fill is to be placed shall be plowed, stepped, or benched, or broken up as directed by the OWNER, in such a manner that the fill material will bond with the existing surface.
- C. When surfaces on which fills are to be placed do not meet the specified density requirements, the ground surface shall be broken up, pulverized, and compacted to the specified density.
- D. When surfaces on which fills are to be placed do not meet the specified moisture content requirements, the ground shall be wetted, aerated, or dried to the specified density.
- E. When the subgrade is part fill and part excavation, the excavated portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill.

### **3.3 FILL AND BACKFILL**

- A. Fills and backfills shall conform to the dimensions and elevations indicated on the Drawings for each building and structure.
- B. Placing Fill and Backfill
  - 1. Suitable material shall be placed in successive horizontal uniformly spread layers of loose material not more than six (6) inches thick, except that in areas not accessible or permitted for the use of self-propelled rollers or vibrators, the loose layer shall be four (4) inches thick.
  - 2. Fills and backfills shall not be placed in wet or frozen areas.
- C. Backfill
  - 1. Backfill shall not begin until construction below finish grade has been completed, underground utility systems have been inspected and tested, form removed, and the excavation cleaned of trash and debris.
  - 2. Fine aggregate backfill shall be placed to the dimensions and elevations indicated on the Drawings.
  - 3. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted by power-driven hand tampers suitable for the material being compacted.
  - 4. Backfill shall be placed carefully around pipes to avoid damage to coatings.
  - 5. Backfill shall not be placed against foundation walls prior to 7 days after placement of the walls.
  - 6. As far as practical, backfill shall be brought up evenly on each side of the wall and sloped to drain away from the wall.

7. Where fill or backfill is to be placed and compacted against structure walls, the walls shall be supported laterally as necessary to prevent damaging or displacing the walls. Any wall so damaged as a result of the CONTRACTOR'S operation shall be completely and promptly replaced.

### **3.4 COMPACTION**

- A. For fill and backfill compaction densities and moisture contents, see Section 31 23 33.
- B. Compaction shall be accomplished by those methods listed in Section 31 23 33. Material shall be aerated or moistened to maintain the required moisture content.
- C. Fine aggregate backfill shall be compacted with a minimum of two (2) passes of a power-driven hand tamper.

### **3.5 CAPILLARY WATER BARRIER**

- A. Either coarse aggregate (gravel) or fine aggregate (sand) capillary water barriers shall be installed under slabs-on-grade as indicated on the Drawings.
- B. The capillary water barrier shall be placed directly on the subgrade after the subgrade has been compacted to the required density and placed to the elevation indicated on the Drawings.
- C. The barrier shall be constructed to the thickness shown in layers not exceeding six (6) inches in compacted thickness.
- D. Each layer shall be compacted to the required density, with a minimum of two passes of a plate-type vibratory compactor.

### **3.6 FINISH GRADING**

- A. Excavated and filled sections, and adjacent transition areas, shall be uniformly smoothly graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes.
- B. The degree of finish shall be that ordinarily obtainable from blade-grader operations, except as otherwise specified.
- C. The surface of fills or excavated areas for slabs-on-grade shall not vary more than 0.05 foot from the established grade.
- D. Other finished surfaces shall not vary more than 0.15 foot from the established grade and cross section and shall be free of depressed areas where water would pond.

**END OF SECTION 31 00 00**

## **SECTION 31 22 00 – SITE GRADING**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. The work covered under this item includes all supervision, labor, equipment, and materials required for rough and final site grading. Included in this item are any stripping, filling, excavating, backfilling and compaction required to complete the grading as shown on the plans or as specified herein.

#### **1.2 DUST AND BLOWING MATERIAL CONTROL**

- A. The CONTRACTOR shall use all means necessary to control dust on and near the site and on and near all off-site borrow areas if such dust is caused by the CONTRACTOR'S operations during performance of the work or if resulting from the condition in which the CONTRACTOR leaves the site.
- B. All surfaces shall be thoroughly moistened as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the site.
- C. Any landfilled material which is uncovered during any construction operation will immediately be covered with a minimum of 12 inches of soil and compacted to 90% Standard Proctor Density. The CONTRACTOR will be responsible for ensuring that existing landfilled material is not allowed to be blown or carried off the site and will clean up any material uncovered by his operations which is blown from the site.
- D. Protection of Existing Utilities
  - 1. The CONTRACTOR shall verify all existing utility locations either shown or not shown on the Drawings.
  - 2. The CONTRACTOR shall immediately notify the OWNER and applicable utility company of any damages to existing utilities.
  - 3. Repairs to damaged utilities shall be made in accordance with the requirements of the OWNER and applicable utility company at no extra cost to the OWNER.
  - 4. The CONTRACTOR shall coordinate with the OWNER and the applicable utility company for shutoff of or connection to active utilities. Existing utility services shall not be interrupted except as authorized in writing by the OWNER.
- E. Protection of Work Site: Barricades or other type protectors shall be provided to prevent unauthorized personnel from entering work sites.

### **PART 2 - PRODUCTS**

#### **2.1 FILL MATERIAL, GENERAL**

- A. All fill material shall be subject to the approval of the ENGINEER.

**2.2 ON-SITE FILL MATERIAL**

- A. All on-site fill material used shall be soil or soil-rock mixture which is free from organic matter and other deleterious substance. It shall contain no rocks or lumps over 6 inches in greatest dimension, and not more than 15 percent of the rocks or lumps shall be larger than 2-1/2 inches in greatest dimension.

**2.3 IMPORTED FILL MATERIAL (BORROW)**

- A. All imported fill material shall meet the requirements stated in Section 31 00 00 and, in addition, shall be predominantly granular with a maximum particle size of 2 inches and a plasticity index of 12 or less.
- B. Any fill material, including topsoil, must be approved by the ENGINEER prior to placement. The CONTRACTOR shall notify the ENGINEER at least four working days in advance of intention to import material, designating the location of proposed borrow material. The CONTRACTOR shall be responsible for obtaining any permits or permission required for ENGINEER to sample, as necessary, from the borrow area for the purpose of making acceptance tests to prove the quality of proposed borrow material.

**2.4 OTHER MATERIALS**

- A. All other materials, not specifically described but required for a complete and proper installation, shall be as selected by the CONTRACTOR subject to the approval of the ENGINEER.

**PART 3 – EXECUTION**

**3.1 FINISH ELEVATIONS AND LINES**

- A. Grade stakes will be set by the CONTRACTOR and approved by OWNER'S REPRESENTATIVE establishing rough and finish elevations and lines. The CONTRACTOR shall take care to preserve all survey control data and monuments set by the ENGINEER and, if displaced or lost, immediately replace to the approval of the ENGINEER and at no additional cost to the OWNER.

**3.2 GRADING**

- A. General Requirements
  - 1. The CONTRACTOR will perform all rough and finish grading required to obtain the elevations shown in the Drawings.
- B. Grading Tolerances
  - 1. All rough and finished grading shall be performed with approved equipment to a tolerance of plus or minus 0.1 ft.

C. Compaction

1. Existing cover material will be compacted prior to the placement of any additional fill material. Two passes, at right angles to each other, will be made on existing cover with a sheep's foot roller, to obtain this compaction.
2. New fill material and material disturbed by grading will be compacted to a minimum of 90% Standard Proctor Density using approved compaction equipment.

D. In-Situ Liner

1. No less than two (2) weeks prior to completing grading, CONTRACTOR shall provide written notice to the ENGINEER of completion date.
2. After grading is completed, the CONTRACTOR and ENGINEER shall perform a visual inspection according to Oklahoma Administrative Code (OAC) 252:515-11-73(a).
3. The ENGINEER shall collect samples and test soil according to OAC 252:515-11-73.

E. Treatment after Completion of Grading

1. After grading is completed and the ENGINEER has finished his inspection, no further excavating, filling, or grading except with the approval of an inspection of the ENGINEER will be allowed.
2. The CONTRACTOR shall use all means necessary to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed. The water content of the soil shall be maintained at equal to or greater than optimum until placement of the soil protective layer.
3. Upon approval by the ENGINEER, the CONTRACTOR shall cover the in-situ liner with a 12-inch soil protective layer.

**END OF SECTION 31 22 00**

## **SECTION 31 23 19 - DEWATERING**

### **PART 1 – GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specifications sections, apply to this section.

#### **1.2 SUMMARY**

- A. This section includes construction dewatering.
- B. Related sections include the following:
  - 1. Division 31- Section 31 00 00 - Earthwork

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control ground water flow into excavations and permit construction to proceed on dry, stable subgrades.
  - 1. Maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
  - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
  - 3. Accomplish dewatering without damaging existing buildings adjacent to excavation.
  - 4. Remove dewatering system if no longer needed.

#### **1.4 SUBMITTALS**

- A. Shop Drawings for Information: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of headers and discharge lines; and means of discharge and disposal of water.
  - 1. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
  - 2. Include a written report outlining control procedures to be adopted if dewatering problems arise.
  - 3. Include shop drawings signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

C. Record drawings at project closeout identifying and located capped utilities and other subsurface structural, electrical, or mechanical conditions performed during dewatering.

1. Note locations and capping depth of wells and well points.

## **1.5 QUALITY ASSURANCE**

A. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction. Discharge water into existing storm drainage system.

B. Pre-installation Conference: Conduct conference at project site to comply with requirements in Division 01.

## **1.6 PROJECT CONDITIONS**

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by OWNER or others unless permitted in writing by OWNER and then only after arranging to provide temporary utility services according to requirements indicated.

B. Project Site Information: Boring logs have been prepared for this Project and are available for information only. OWNER / ENGINEER will not be responsible for interpretations or conclusions drawn from this data.

1. Make additional test borings and conduct other exploratory operations necessary for dewatering.

C. Survey adjacent structures and improvements, employing a qualified professional engineer or land surveyor, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During dewatering, regularly re-survey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify ENGINEER if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

## **PART 2 – PRODUCTS**

NOT USED.

## **PART 3 – EXECUTION**

### **3.1 PREPARATION**

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.

2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

### **3.2 INSTALLATION**

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
- B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until sewers and structures have been constructed and fill materials have been placed, or until dewatering is no longer required.
- C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.
- E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction of completed. Dispose of water in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities.
- F. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to OWNER.
1. Remove dewatering system from project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches (900 mm) below overlying construction.



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G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

**END OF SECTION 31 23 19**

## **SECTION 31 23 33 - TRENCHING, BACKFILLING & COMPACTION**

### **PART 1 - GENERAL**

#### **1.1 SCOPE**

- A. The work under this item shall include all earth, shale, gravel, loose rock, solid rock, debris, junk and/or other material excavated or otherwise removed in the preparation of the trench; all work in connection with the excavation, removal and subsequent handling and disposal of such material, regardless of its type, character, composition, or condition; subgrade preparation, all sheeting, piling, shoring, bracing; dewatering of trenches; protection of adjacent property; backfilling; standard bedding material; grade base stabilization; all specified backfill consolidation; and other work necessary or required.

### **PART 2 - PRODUCTS**

#### **2.1 STANDARD BEDDING MATERIAL**

- A. Standard Bedding Material (SBM) shall meet the requirements of ASTM D-2321 for the class of materials described in this subsection.
1. Class I shall be an angular, 1/4 in. to 1-1/2 in. graded crushed stone.
  2. Class IB shall be crushed stone or gravel and shall be well graded containing several sizes of particles ranging from 3/4 inch maximum to No. 4. Unless otherwise approved by the ENGINEER, the material shall meet the requirements of ASTM C-33, Gradation 67.
  2. Class II shall include coarse sands and gravels with maximum particle size of 1-1/2 inch. These materials may have small percentages of fines but shall be generally granular and non-co-adhesive, either wet or dry. Class II materials shall include Unified Soil Classification System (USCS) Soil Types GW, GP, SW and SP.
  3. Class III shall include fine sands, sand-clay mixtures and gravel-clay mixtures. USCS Soil Types GM, GC, SM and SC are included in this class.

### **PART 3 - EXECUTION**

#### **3.1 TRENCH EXCAVATION**

- A. The trench shall be excavated so that the pipe can be laid to the alignment and grades shown on the drawings, or as directed by the OWNER'S REPRESENTATIVE. It shall be excavated a maximum of 100 feet in advance of pipe laying, or less, as permitted by the OWNER'S REPRESENTATIVE. Opening of trenches in excess of the maximum requires specific approval of the ENGINEER.
- B. Trenches shall be dry when the trench bottom is prepared. The trench bottom shall be shaped so that even bearing is obtained for the barrel of the pipe, with the bells unsupported.

- C. The standard trench width as shown on the Standard Details, shall not be exceeded at any elevation below a point 12 inches above the top of the pipe. If, for any reason this portion of the trench exceeds the permitted width and if the OWNER'S REPRESENTATIVE shall determine that cradling or encasement then is required, said concrete cradle or encasement shall be installed.
- D. Any part of the bottom of the trench excavated more than 4 inches below the specified grade shall be corrected with approved material as directed by the OWNER'S REPRESENTATIVE. In the event suitable material is not available, standard bedding material shall be used. When rock is encountered and concrete cradle is required, it shall be excavated 4 inches below the bottom of the pipe and the trench refilled to grade with standard bedding material.
- E. When quicksand or other unstable earth is encountered, the ENGINEER shall inform the CONTRACTOR of the construction procedures and materials to use.

### **3.2 STANDARD BEDDING MATERIAL**

- A. Standard Bedding Material (SBM) shall be used for embedding all pipe as shown on the Standard Details. SBM shall be carefully placed and compacted along the entire length of the pipe to be installed to the limits of trench excavation until the thickness specified in the Standard Details is obtained. This layer of bedding material shall be smoothed by flat bottomed shovel or other appropriate means prior to the placement of pipe.
  - 1. Gravity Pipelines: SBM shall be placed simultaneously on each side of pipe and shall be carefully compacted in accordance with the SPECIFICATIONS for the type of pipe to be installed.
    - a. Class I SBM requires little or no compaction due to the nature of the angular particles.
    - b. Class II SBM shall be compacted to a minimum 85% Standard Proctor Density using hand or mechanical tamping methods. Slightly damp material will generally result in maximum compaction with minimum effort. Avoid saturation of Class II SBM.
    - c. Class III SBM shall be compacted to a minimum 90% Standard Proctor Density using hand or mechanical methods. Take care to avoid excessive moisture in using Class III SBM.
  - 2. Pressure Pipelines (except Rural Water): SBM shall be placed simultaneously on each side of pipe and compacted by hand sufficiently to maintain proper grade and alignment.

### **3.3 BACKFILL**

- A. When the type of backfill material to be placed above the standard bedding material is not indicated on the drawings or specified, the backfill may be made with the excavated material, provided that such material, in the opinion of the OWNER'S REPRESENTATIVE, is suitable for backfilling. In the event the excavated material is not suitable, standard bedding material or other approved material shall be used.

- B. From 6 inches to 18 inches above the pipe, the trench shall be backfilled by hand or by other methods approved by the OWNER'S REPRESENTATIVE. Special care shall be used in placing this portion of the backfill to avoid damaging or moving the pipe. The remainder of the trench may be backfilled by mechanical methods. Backfilling operation shall be completed within 100 feet or less of the finished line at all times as directed by the OWNER'S REPRESENTATIVE.
- C. ALL clearing requiring proposed underground sewer line trench backfill materials and its placement must meet referenced ASTM D 2321, in accordance with OAC 252:656-5-3(b).

### **3.4 EXCAVATION ACROSS PAVEMENT**

- A. All trenches excavated across any paved street or alley, across any travelled portion of unpaved streets or alleys, across any proposed roadways or proposed roadway fills, and as shown on the drawings shall be backfilled and compacted to the same density as the existing soil adjacent to the side of the trench but shall not be less than 95% Standard Proctor Density, provided the excavated materials consist of soil that can be readily compacted at the optimum moisture. If the excavated material consists of mostly clay or silt containing an excess of moisture, such excavated material shall be removed from the site of the work and the trench filled with Standard Bedding Material, Class I. If the backfilling has been completed and the backfill material does not meet the requirements for compaction, all the material shall be removed and hauled from the job site and the trenches refilled with material as specified above. All trenches excavated across and/or along paved or unpaved streets shall be replaced in accordance with the Standard Details for the type paving excavated.

**END OF SECTION 31 23 33**

## **SECTION 31 25 00 - EROSION AND SEDIMENTATION CONTROL**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

A. Section Includes:

1. Temporary and permanent erosion control systems.
2. Slope protection systems.

#### **1.2 REFERENCES**

A. United States Environmental Protection Agency (EPA):

1. NPDES - National Pollutant Discharge Elimination System.

B. Oklahoma Department of Environmental Quality (ODEQ):

1. DEQ General Storm Water Permit (OKR10 and OKR05)

C. Oklahoma Department of Transportation (ODOT):

1. ODOT - State of Oklahoma Department of Transportation Standard Specifications for Highway Construction, Section 735 - Material for Roadside Development and Erosion Control.

#### **1.3 QUALITY ASSURANCE**

A. Perform Work in accordance with the following ODOT standards:

1. Section 220 – Management of Erosion Sedimentation, and Storm Water Pollution Prevention and Control
2. Section 221 - Temporary Sediment
3. Section 230 - Sodding and Sprigging.

B. Regulatory Requirements: Conform to requirements of local Authority Having Jurisdiction for prevention of erosion and sediment control.

1. Conform to NPDES and ODEQ requirements, where required.

#### **1.4 PROJECT CONDITIONS**

A. Environmental Requirements: Protect adjacent properties and water resources from erosion and sediment damage throughout work. Take all necessary measures to prevent sedimentation from construction operations to enter adjacent property. Offsite discharge of sedimentation is not permitted.

B. Storm Water Pollution Prevention Plan: Maintain plan at project site at all times available for inspection during contract duration.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Quick Growing Grasses: Wheat, rye, or oats.
- B. Straw Bales: Free of weed seed.
- C. Fencing for Siltation Control: UV resistant geotextile fabric.
- D. Slab Sod: Rectangular slabs of Bermuda grass.
- E. Temporary Mulches: Loose straw, netting, wood cellulose, or agricultural silage free of seed.
- F. Bale Stakes:
  - 1. Minimum 3 feet length.
  - 2. 2 No. 4 steel reinforcing bars or,
  - 3. 2 steel pickets or,
  - 4. 2 - 2x2 inch hardwood stakes driven 18 inches to 24 inches into ground.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive work.
- B. Report in writing to ENGINEER prevailing conditions that will adversely affect satisfactory execution of the work of this section. Do not proceed with work until unsatisfactory conditions have been corrected.
- C. By beginning work, CONTRACTOR accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the OWNER.

### **3.2 EROSION CONTROL AND SLOPE PROTECTION**

- A. Provide erosion control and slope protection measures to prevent sediment from site entering adjacent property or public right-of-way to include but not be limited to:
  - 1. Temporary silt fences.
  - 2. Straw bales placed around culvert openings or inlets.
  - 3. Diked area with earth berm and silt trap for draining dredged material.
- B. Install erosion control and slope protection in accordance with ODOT standards.
- C. Place all erosion and siltation control measures before start of earthwork and grading construction operations.

- D. Mulch and seed all storm and sanitary sewer trenches not in streets no later than 10 days after backfill. Do not permit more than 500 feet of trench to be open at any one time.
- E. Place all excavated material on uphill side of trenches where possible. Do not place materials in stream beds. Seed any stockpiled material which remains in place longer than 30 days with temporary vegetation and mulch.
- F. Mulch and seed all temporary earth berms, diversions, erosion barriers and temporary stockpiles with temporary vegetative cover with 10 days after grading.
- G. Do not stockpile or otherwise place dredged, excavated or other material, at any time, in or near stream bed which may increase turbidity of water. If turbidity producing materials are present, hold surface drainage from cuts and fills within construction area and from borrow and waste disposal areas in suitable sedimentation ponds or grade surface drainage to control erosion within acceptable limits. Provide and maintain temporary erosion and sediment control measures such as berms, dikes, drains, or sedimentation basins, if required, until permanent damage and erosion control facilities are completed and operative. Hold to minimum area of bare soil exposed at any one time by construction operations.
- H. Drain dredged material minimum 7 days. Store material for drainage to a maximum height of 4 feet.
- I. OWNER'S REPRESENTATIVE may direct CONTRACTOR to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and may direct CONTRACTOR to provide immediate permanent or temporary erosion control measures.
- J. Maintain temporary erosion control systems as directed by OWNER'S Representative to control siltation during construction. Provide maintenance or additional work directed by OWNER'S REPRESENTATIVE immediately upon notification by OWNER'S REPRESENTATIVE.

**END OF SECTION 31 25 00**

**SECTION 31 35 26 – IN-SITU LINER (LANDFILLS)**

**PART 1 - GENERAL**

**1.1 SCOPE**

- A. The CONTRACTOR shall furnish all labor, materials, supervision and equipment to complete the excavation, embankment and a in-situ liner with a minimum thickness of five (5) feet with a hydraulic conductivity no greater than  $1.0 \times 10^{-5}$  cm/sec, as shown on the Plans and as included in these Specifications.

**1.2 DEFINITIONS**

The following list of definitions is provided for reference:

- A. **"Authorized Representation"** shall mean a duly named individual who has the authority to execute a change order on behalf of the City.
- B. **"City"** shall mean the City of Altus, Oklahoma.
- C. **"Classification System"** shall mean the soil classification system shall be in accordance with the standard test method for classification of soils for engineering purposes (ASTM D2487- 83).
- D. **"Compaction"** shall mean the process of increasing the density of soil by rolling, tamping, vibrating, or other mechanical means.
- E. **"Contractor"** shall mean the party entering into this general contract.
- F. **"Atterberg Limits"** includes the liquid limit, plastic limit, and shrinkage limit for soils (ASTM D4318-84 and D427-83, respectively). The water content when the soil behavior changes from the liquid to the plastic state is the liquid limit; from the plastic to the semi- solid state is the plastic limit; and from the semi-solid to the solid state is the shrinkage limit.
- G. **"Density"** shall mean the mass density of a soil is its weight per unit volume; usually reported in pounds per cubic foot.
- H. **"Department"** shall mean the Oklahoma Department of Environmental Quality, Land Protection Service (ODEQ/LPS).
- I. **"Engineer"** shall mean the consulting engineering firm providing design and general supervision, monitoring of earthwork and liner construction, construction surveillance, and surveying services and who is responsible interpreting for and enforcing the Specifications outlined herein.
- J. **"EPA Document"** shall mean the EPA (U.S. Environmental Protection Agency) Technical Guidance Document "Quality Control and Quality Assurance for Waste Containment Facilities", EPA/600/R-93/182, dated September 1993.
- K. **"In Situ"** shall mean ", "as is", or as it exists in-place naturally.



- L. **"Moisture Content"** shall mean the ratio of quantity of water in the soil (by weight) to the weight of the soil solids (dry soil), expressed in percentage; also referred to as water content.
- M. **"Optimum Moisture Content (OMC)"** shall mean the moisture content corresponding to maximum dry density as determined in the Standard Proctor (ASTM D-698) or Modified Proctor (ASTM D-1557) Test.
- N. **"OAC"** shall mean the Oklahoma Administrative Code.
- O. **"Permeability"** shall mean the ability of pore fluid to travel through a soil mass via interconnected void. "High" permeability indicates relatively rapid flow of pore fluid and vice versa. Coefficients of permeability are generally reported in centimeters per second.
- P. **"Plasticity"** shall mean the ability of soil mass to be remolded without raveling or breaking apart. The plasticity index, numerically equal to the difference between the liquid and plastic limit, is a comparative number, which describes the range of moisture contents over which a soil behavior is plastic.
- Q. **"QCA Engineer"** shall mean an independent consulting engineer and/or testing firm, working directly for the City, providing subsurface soil investigations, soil testing laboratory, oversight of earthwork and liner construction, and assisting in the construction surveillance, who is responsible for final approval of cell liner construction according to the Plans and Specifications outlined herein.

## PART 2 - PRODUCTS

### 2.1 IN-SITU LINER

- A. Preliminary Liner Soil Testing (Furnished by QAQC Firm)
  - 1. Suitability determination. The OWNER shall collect samples and test soil proposed to be used as liner material.
  - 2. Sample collection. At least one sample shall be collected for each type of material proposed for use as liner material. One composite sample shall be taken for every 10,000 cubic yards of soil or more frequently if visual observations indicate a change in material characteristics. At least five natural or in-place moisture and density tests per acre shall be taken.
  - 3. Testing. The soil samples shall be tested by a soil's laboratory under the direction of an independent professional ENGINEER registered in the State of Oklahoma. The test samples and report shall be sealed by a Registered Professional ENGINEER.
  - 4. Tests. The following tests shall be conducted on each type of soil samples:
    - a. Soil Classification ASTM D-2487
    - b. Particle-Size Analysis of Soil ASTM D-422
    - c. Sieve Analysis for the Following: #4, #10, #40, #200

- |                                  |                            |
|----------------------------------|----------------------------|
| d. Percent Fines (- #200 sieve)  | ASTM 1140                  |
| e. Atterberg Limits              | ASTM D-4318                |
| f. Moisture Content              | ASTM D-2216 or ASTM D-4643 |
| g. Moisture-Density Relationship | ASTM D698 or ASTM D1557    |
| h. Hydraulic Conductivity        | ASTM D-5084                |
5. Hydraulic Conductivity. At least three hydraulic conductivity tests shall be performed per acre on soil samples for each classified soil/rock layer that will form the sides and bottom of the proposed disposal area.
  6. Soils Report. A laboratory report of soil and rock characteristics shall be submitted as part of the application. All test results shall indicate the type of test used the method of testing and the condition, preparation, and orientation of each sample.

## **2.2. PERFORMANCE STANDARDS OF LINER MATERIAL**

- A. The soil tests required for preconstruction shall meet or exceed OAC 252:515-11-32. These tests shall be conducted at a minimum rate of one sample per 4,000 cubic yards and for each soil type or visual change in soil appearance.
- B. Soils shall meet a majority of the following standards. Minor deviations may be proposed so long as the hydraulic conductivity standard in OAC 252:515-11-71 is satisfied. The minimum performance standards of the in-situ liner material include:
  1. Plasticity Index must be no less than 10 percent and should be less than 30 percent
  2. Liquid Limit must be no less than 24 percent.
  3. Percent Fines Passing #200 Mesh Sieve shall be at least 30 percent.
  4. The amount of gravel (dry-weight percentage retained on the No. 4 sieve) must be less than or equal to 20 percent.
  5. The largest particle size allowed must be less than one (1) inches in diameter.
  6. The water content of the soil must be wet of optimum. The recommended range is 1 to 3 percent wet of optimum moisture or as determine by field geotechnical testing.
  7. The soil must have a hydraulic conductivity that is no greater than  $1.0 \times 10^{-5}$  cm./sec.

## **PART 3 - EXECUTION**

### **3.1 SEQUENCE OF CONSTRUCTION**

- A. The five (5) foot in-situ liner shall be constructed to the lines and elevations shown on the Contract Drawings and in accordance with these Specifications.
- B. During all phases of the project, construction will be tested, inspected, and evaluated prior to approval.

### **3.2 POST EXCAVATION / PRE-DISPOSAL TESTS**

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- A. Visual Inspection. After excavation and prior to disposal, a qualified soils scientist, engineer or geologist shall perform a visual inspection of the disposal area floor to:
  - 1. Locate any cracks, joints, fractures, roots, exposures or other physical phenomena that might indicate areas more permeable than allowed; and
  - 2. Locate the areas for the post excavation tests that follow.
- B. Thickness and Integrity Testing. A minimum of five continuous core samples per acre shall be collected to a depth of five feet below the top of the in-situ liner.
  - 1. A qualified soil scientist, engineer or geologist shall describe the soil types and check for uniformity.
  - 2. If variations are noted in the core samples, permeability testing must be performed on undisturbed samples of each soil type.
- C. Top of Liner Tests. The following tests must be performed on the top of the proposed liner:
  - 1. At least five natural or in-place moisture and density tests per acre; and
  - 2. In locations approved by the DEQ, at least three density tests per acre on the sides and bottom of the liner on samples of each soil layer.

### **3.3. PLUGGING BORE HOLES**

- A. All bore holes must be plugged with pelletized or chipped bentonite and rehydrated after the core sampling is completed.

### **3.4. PROTECTIVE LAYER**

- A. After construction, the liner shall be protected by a 12-inch soil protective layer and maintained to minimize desiccation.

### **3.5. FAILURE**

- A. If any areas fail to meet the permeability requirements, a reconstructed clay liner will be installed in accordance with Section 31 35 26.13.

**END OF SECTION 31 35 26**

**SECTION 31 35 26.13 - RECONSTRUCTED CLAY LINER (LANDFILLS)**

**PART 1 - GENERAL**

**1.1 SCOPE**

- A. The CONTRACTOR shall furnish all labor, materials, supervision and equipment to complete the excavation, embankment and a reconstructed clay liner with a minimum thickness of three (3) feet with a hydraulic conductivity no greater than  $1.0 \times 10^{-5}$  cm/sec, as shown on the Plans and as included in these Specifications.

**1.2 DEFINITIONS**

The following list of definitions is provided for reference:

- A. **"Authorized Representation"** shall mean a duly named individual who has the authority to execute a change order on behalf of the City.
- B. **"City"** shall mean the City of Altus, Oklahoma.
- C. **"Classification System"** shall mean the soil classification system shall be in accordance with the standard test method for classification of soils for engineering purposes (ASTM D2487- 83).
- D. **"Compaction"** shall mean the process of increasing the density of soil by rolling, tamping, vibrating, or other mechanical means.
- E. **"Contractor"** shall mean the party entering into this general contract.
- F. **"Atterberg Limits"** includes the liquid limit, plastic limit, and shrinkage limit for soils (ASTM D4318-84 and D427-83, respectively). The water content when the soil behavior changes from the liquid to the plastic state is the liquid limit; from the plastic to the semi- solid state is the plastic limit; and from the semi-solid to the solid state is the shrinkage limit.
- G. **"Density"** shall mean the mass density of a soil is its weight per unit volume; usually reported in pounds per cubic foot.
- H. **"Department"** shall mean the Oklahoma Department of Environmental Quality, Land Protection Service (ODEQ/LPS).
- I. **"Engineer"** shall mean the consulting engineering firm providing design and general supervision, monitoring of earthwork and liner construction, construction surveillance, and surveying services and who is responsible interpreting for and enforcing the Specifications outlined herein.
- J. **"EPA Document"** shall mean the EPA (U.S. Environmental Protection Agency) Technical Guidance Document "Quality Control and Quality Assurance for Waste Containment Facilities", EPA/600/R-93/182, dated September 1993.
- K. **"Gas Well"** shall mean a vertically installed slotted, perforated, or porous pipe with a solid riser pipe surrounded by a gravel-packed zone over the perforated pipe section to allow removal of landfill gas and any intercepted leachate.

- L. **"Geomembrane"** shall mean an impermeable membrane liner or barrier used in civil engineering for geotechnical products. It can also be reinforced with a fabric scrim for added strength.
- M. **"Geotextile"** shall mean a relatively porous construction or reinforcement fabric used in civil engineering for geotechnical projects. The fabric structure may be knit, woven, or nonwoven. Filter geotextile is a material, which provides separation of materials with different pore size openings to prevent clogging. Drainage geotextiles are materials with adequate transmissivity to provide planar flow of fluid. Reinforcing geotextile is a material with sufficient in-plane strength to support some or all of the load applied to a composite system (such as soil-geotextile).
- N. **"In Situ"** shall mean ", "as is", or as it exists in-place naturally.
- O. **"Moisture Content"** shall mean the ratio of quantity of water in the soil (by weight) to the weight of the soil solids (dry soil), expressed in percentage; also referred to as water content.
- P. **"Optimum Moisture Content (OMC)"** shall mean the moisture content corresponding to maximum dry density as determined in the Standard Proctor (ASTM D-698) or Modified Proctor (ASTM D-1557) Test.
- Q. **"OAC"** shall mean the Oklahoma Administrative Code.
- R. **"Permeability"** shall mean the ability of pore fluid to travel through a soil mass via interconnected void. "High" permeability indicates relatively rapid flow of pore fluid and vice versa. Coefficients of permeability are generally reported in centimeters per second.
- S. **"Plasticity"** shall mean the ability of soil mass to be remolded without raveling or breaking apart. The plasticity index, numerically equal to the difference between the liquid and plastic limit, is a comparative number, which describes the range of moisture contents over which a soil behavior is plastic.
- T. **"QCA Engineer"** shall mean an independent consulting engineer and/or testing firm, working directly for the City, providing subsurface soil investigations, soil testing laboratory, oversight of earthwork and liner construction, and assisting in the construction surveillance, who is responsible for final approval of cell liner construction according to the Plans and Specifications outlined herein.

## **PART 2 - PRODUCTS**

### **2.1 RECONSTRUCTED CLAY LINER**

- A. Preliminary Liner Soil Testing (Furnished by QAQC Firm)
  - 1. Suitability determination. The OWNER shall collect samples and test soil proposed to be used as liner material.
  - 2. Sample collection. At least one sample shall be collected for each type of material proposed for use as liner material. One composite sample shall be taken for every

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10,000 cubic yards of soil or more frequently if visual observations indicate a change in material characteristics. At least five natural or in-place moisture and density tests per acre shall be taken.

3. Testing. The soil samples shall be tested by a soil's laboratory under the direction of an independent professional ENGINEER registered in the State of Oklahoma. The test samples and report shall be sealed by a Registered Professional ENGINEER.
4. Tests. The following tests shall be conducted on each type of soil samples:
  - a. Soil Classification ASTM D-2487
  - b. Particle-Size Analysis of Soil ASTM D-422
  - c. Sieve Analysis for the Following: #4, #10, #40, #200
  - d. Percent Fines (- #200 sieve) ASTM 1140
  - e. Atterberg Limits ASTM D-4318
  - f. Moisture Content ASTM D-2216 or ASTM D-4643
  - g. Moisture-Density Relationship ASTM D698 or ASTM D1557
  - h. Hydraulic Conductivity ASTM D-5084
5. Test Pad. A test pad for the liner can be constructed and used to verify that the construction methods to produce the hydraulic conductivity of  $1.0 \times 10^{-5}$  cm./sec. or less throughout the reconstructed area. However, hydraulic conductivity tests shall be performed in the top 12 inches of the finished liner per Part 3.6 below.
6. Soils Report. A laboratory report of soil and rock characteristics shall be submitted as part of the application. All test results shall indicate the type of test used the method of testing and the condition, preparation, and orientation of each sample.

### 2.2. PERFORMANCE STANDARDS OF LINER MATERIAL

- A. The soil tests required for preconstruction shall meet or exceed OAC 252:515-11-32. These tests shall be conducted at a minimum rate of one sample per 4,000 cubic yards and for each soil type or visual change in soil appearance.
- B. The minimum performance standards required of recompacted liner material include:
  1. Plasticity Index must be no less than 10 percent and should be less than 30 percent
  2. Liquid Limit must be no less than 24 percent.
  3. Percent Fines Passing #200 Mesh Sieve shall be at least 50 percent.
  4. The amount of gravel (dry-weight percentage retained on the No. 4 sieve) must be less than or equal to 20 percent.
  5. The largest particle size allowed must be less than one (1) inches in diameter.
  6. The water content of the soil must be wet of optimum at the time the soil is compacted. The recommended range is 1 to 3 percent wet of optimum moisture or as determine by field geotechnical testing.

7. After the soil is compacted, it must have a hydraulic conductivity that is no greater than  $1.0 \times 10^{-7}$  cm./sec.

### **PART 3 - EXECUTION**

#### **3.1 SEQUENCE OF CONSTRUCTION**

- A. The three (3) foot reconstructed clay liner shall be constructed to the lines and elevations shown on the Contract Drawings and in accordance with these Specifications.
- B. The recompacted liner shall be constructed in the following sequence:
  1. Removal of Overburden
  2. Subgrade Preparation
  3. Three (3) Foot Reconstructed Clay Liner
- C. During all phases of the project, construction will be tested, inspected, and evaluated prior to approval.

#### **3.2 REMOVAL OF OVERBURDEN**

- A. CONTRACTOR shall remove and stockpile overburden on-site in a location coordinated with the OWNER.

#### **3.3 SUBGRADE PREPARATION FOR RECOMPACTED LINER**

- A. The upper six (6) inches of the surface on which the clay liner is to be placed must be scarified and recompacted to a minimum density of 95 percent of the standard proctor density.

#### **3.4. RECOMPACTED LINER PLACEMENT AND COMPACTION**

- A. The steps shall be followed in constructing each lift of a recompacted liner.
  1. Internal side slopes of disposal areas where liner shall be constructed shall be no steeper than 3:1 (run: rise).
  2. Liner material shall be placed at 1 to 3 percent wet of optimum moisture, or as indicated by soil tests. If the soil must be moistened to achieve the proper level of water content, then the water must be distributed equally throughout, and a full hydration of the soil must take place. This may require that the soil be moistened in a separate area and allowed to hydrate for some time before it is placed in the liner. Moisture content must be verified by either a 95% Standard Proctor Test or a 90% Modified Proctor test.
  3. Scarify the surface on which the lift shall be placed to a nominal depth of approximately one (1) inch.
  4. Place a lift of soil at a loose depth of nine (9) inches or less. On the final lift, no more than 5 percent of the final lift thickness determinations can exceed this requirement and no lift thickness can exceed the maximum allowable lift thickness by more than 1 inch.

5. Compact the lift to a depth of six (6) inches or less by the use of a heavy-footed roller with feet that fully penetrate the loose lift of soil and at least 1" into the underlying layer. The minimum weight of roller shall be 3,000 pounds per liner foot along the axis of the drum(s). The soil test results, and the type of compaction equipment used shall determine the minimum number of passes. A pass shall be constituted as one pass for a self-propelled roller or one pass of the drums(s) for a towed roller. The minimum compaction coverage (C) anticipated to meet compaction is 150 to 200 percent, where the Number of passes (N) can be estimated from the following:

$$N = C \cdot A_d / A_f / 100$$

Where:

|                |   |  |
|----------------|---|--|
| C              | = | Percent of coverage                      |
| A <sub>d</sub> | = | Surface area drum                        |
| A <sub>f</sub> | = | Sum of the area of the feet on the drums |

6. At least 5 to 15 passes may be necessary to remold and compact the clay liner sufficiently to achieve the required permeability. The minimum density of the lift shall be greater than or equal to 95 percent of the standard proctor density or 90% of modified proctor density. Heavy compaction equipment may require the minimum density to be 95 percent of the modified proctor density, at the discretion of the ENGINEER. The required number of passes shall be observed/determine at least one time, per acre, per lift.
7. Inspect for and remove all rocks, cobbles, roots, and other foreign objects over one inch in diameter, as well as all surface rocks, regardless of size.
8. Inspect for flaws, cracks, and other defects; and,
9. Corrective action will be required in all areas that do not conform with specifications. The defective area must be repaired out to the limits defined by passing soils tests unless the limits are determined by additional field tests.

\*The required inspections and removals must be continual as part of the placement of liner material.

### 3.5. RECOMPACTED LINER CONSTRUCTION TESTS

- A. The following moisture and density tests shall be performed on each compacted lift at a rate of at least three per acre for each approximately six-inch compacted lift. A minimum of two tests shall be performed on the bottom and one on side-slope areas.

1. Determination of moisture values of each lift by one of the following methods:
  - a. Nuclear density method ASTM D-2922
  - b. Drive-cylinder method ASTM D-2937
  - c. Rubber balloon method ASTM D-2167
  - d. Sand-cone method ASTM D-1556
  - e. Microwave drying method ASTM D-4643
  - f. Conventional oven drying method ASTM D-2216



- B. As part of the QC/QA procedures, every tenth sample tested with the above methods; must be tested by the conventional oven drying method (ASTM D2216). The results of these tests must be compared with field tests to identify any significant or systematic calibration errors.
  - 1. Determination of density values of each lift by one of the following methods:
    - a. Nuclear density method                      ASTM D-2922
    - b. Drive-cylinder method                          ASTM D-2937
    - c. Standard Proctor Test or                      ASTM D-698  
Modified Proctor Test                          ASTM D-1557
- C. As part of the QC/QA procedures, every twentieth sample tested with ASTM D-2922 must be tested with the sand cone method (ASTM D-155, rubber balloon method (ASTM D-2167) or undisturbed sample method (ASTM D-1587). The results of these tests must be compared with field tests to identify any significant or systematic calibration errors.
- D. Sampling patterns will be based on a grid system establish by the ENGINEER. Tests will be randomly staggered in successive lifts so that sampling points vary in successive lifts. Areas missed by randomly sampling will require additional tests for liner verification.

**3.6. RECOMPACTED LINER CONSTRUCTION VERIFICATION TESTS**

- A. After completion of recompacted liner construction, the following quality control measures shall be performed and documented.
  - 1. A control survey shall be performed on a 100-foot grid which verifies the thickness of the constructed liner.
  - 2. A visual inspection shall be performed to ensure liner integrity.
  - 3. Hydraulic conductivity shall be tested with at least one test per acre performed on the side-slopes and two per acre on the bottom, at DEQ approved locations, in the top 12" of the liner using one of the following methods:
    - a. Laboratory testing of undisturbed soil sample can be done according to ASTM Test Method D-5084 with a maximum confining stress of 35 kPa (5 psi). ASTM Method D-1587 shall be used to retrieve the undisturbed soil sample for an in-situ laboratory test.
    - b. A field test for hydraulic conductivity shall be according to the sealed double ring infiltrometer test (ASTM D-5093).
    - c. Any other method approved in advance by the ENGINEER and/or the OWNER in accordance with OAC 252:515-11-37(c)(2)(c).
      - i. The use of other verification test methods must be approved in advance by ODEQ.
  - 4. Liner Test Holes
    - a. All test holes deeper than three feet shall be plugged in accordance with OAC 252 :515-7-3 and OAC 785:35-11-2 (b).

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- (1) If no contaminated soil and groundwater is encountered in the boring, uncontaminated drill cuttings, uncontaminated surface clay, cement, and/or high solids (a minimum of twenty percent (20%) solids by dry weight) bentonite grout, pellets, or granules shall be placed from the bottom of the boring to an elevation fourteen (14) feet below land surface and a minimum of ten (10) feet shall be filled with cement grout to an elevation four (4) feet below land surface. The remaining four (4) feet to land surface shall be backfilled with compacted uncontaminated soil.
- (2) If contaminated soil or contaminated groundwater is encountered in the boring, or if the boring is located at an underground storage tank site or within 300 feet of the outside perimeter of an existing wastewater lagoon or is located on a tract of land where a wastewater lagoon is proposed, cement grout shall be placed from the bottom of the borehole to an elevation four (4) feet below land surface. Cement grout shall be placed in the borehole through a tremie pipe and filled r pumped from the bottom upward. The remaining four (4) feet to land surface shall be backfilled with compacted uncontaminated soil.
- (3) If the boring is twenty (20) feet or less in total depth and groundwater has not been encountered, the boring shall, at a minimum, be filled with compacted uncontaminated cuttings from the bottom of the boring to land surface.
- (4) Direct push geotechnical borings. Direct push geotechnical borings shall be plugged to prevent pollution of groundwater within thirty (30) days after completion of drilling or immediately if drilled by an unlicensed or uncertified person or if the Board determines that the well does not meet the minimum construction standards set forth in this Chapter as follows:
  - (a) Bentonite chips shall be placed and effectively compressed within the annulus space from the bottom of the borehole to within ten (10) feet of the land surface.
  - (b) Cement grout shall be installed through a tremie pipe in the remaining annulus space from ten (10) feet to land surface, provide that no cement grout shall be required if the boring is less than ten feet (10') in total depth and no groundwater and no contaminated soil was encountered.
- b. All holes, three feet or less in depth shall be plugged in accordance with OAC 252:515-11-74. All boreholes must be plugged with pelletized or chipped bentonite and rehydrated after the core sampling is completed.
- c. Maximum allowable percentages of failing materials tests shall be as follows:

| <b>Test</b>   | <b>Maximum Percentage of Outliers</b> |
|---|---------------------------------------|
| Atterberg Limits                                    | 5%                                    |
| Percent fines                                       | 5%                                    |
| Percent Gravel                                      | 10%                                   |
| Clod Size   | 10%                                   |
| Hydraulic Conductivity of Laboratory Compacted Soil | 5%                                    |

|                           |                  |
|---------------------------|------------------|
| Water Content             | 3% <sup>*1</sup> |
| Dry Density               | 3% <sup>*2</sup> |
| Number of Passes Required | 5%               |

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- \*1 No water content less than 2% nor more than 3% of the allowable value
- \*2 No dry density values less than 5 lbs. per cubic foot below the allowable Value

Failing tests concentrated in one lift or one area will not be acceptable even if the above percentages are met.

- f. A report, prepared by QCA ENGINEER, of the above quality control measures shall be submitted to the ENGINEER for approval of the Recompacked Clay Liner. All soil property values as required by OAC regulation or this specification shall also be included as well as a summary of all construction testing.

**3.7. REPAIR AND/OR REPLACEMENT OF FLAWED RECOMPACTED CLAY LINER**

- A. If the liner fails any construction verification tests, the liner shall be repaired or replaced until it meets the requirement. The defective area must be repaired out to the limits defined by passing soils tests unless the limits are determined by additional field tests.
- B. The CONTRACTOR may proceed, at his own risk, to place additional lifts before all test results are available; however, if the QCA ENGINEER rejects the lift based on completed test reports, the defective soil and all overlying materials that have been replaced will be removed and replaced.
- C. All repairs will be certified by the QCA ENGINEER and will be documented in the liner installation and testing report in accordance with QAC 252:515-11-38.

**3.8. PROTECTION OF RECOMPACTED CLAY LINER**

- A. The recompacked clay liner must be protected from desiccation, freezing, and excess surface water after construction. The Quality Assurance ENGINEER shall certify that the moisture content of OAC 252:515-11-33(6) was maintained in the liner until placement of the protective cover.
  - 1. The CONTRACTOR shall prevent the desiccation of the recompacked clay by any of the following methods or any other method approved by the ENGINEER and QCA ENGINEER:
    - a. Water the soil periodically (preferred).
    - b. Rolling the surface of the recompacked clay liner smooth with a drummed roller to produce a thin, dense layer of soil on the surface to minimize water transfer in and out of the liner.

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- c. Cover the recompacted clay liner, temporarily with a geomembrane, moist geotextile, or with moist soil.
  2. Damage from freezing is not anticipated, however, should freezing temperatures occur, the recompacted clay liner shall be inspected as outlined in Section 2.9.2.3 of the EPA Document.
  3. The CONTRACTOR shall provide adequate equipment to prevent ponding of water on the recompacted liner. Soils softened by excess rain, shall be removed, or allowed to dry by natural processes until the proper water content has been restored. The soil shall be disked and/or recompacted as necessary to restore the soils to meet the requirements of this section.
  4. No additional payment shall be made for protecting and reworking the recompacted clay liner as outlined above. Costs to be included in the unit price bid for recompacted clay liner.
- B. After construction, the liner shall be protected by a 12-inch soil protective layer.

**END OF SECTION 31 35 26.13**

**SECTION 31 41 00 - SHEET PILING, SHEETING, SHORING AND BRACING**

**PART 1 – GENERAL**

**1.1 DESCRIPTION**

- A. General provisions of the Contract Documents including General and Supplementary Conditions and Division 01 specifications sections apply to all work in this section.
- B. Work included: Furnishing and installing lateral restraint within trenches and excavations as required.

**1.2 SUBMITTALS**

- A. Submit under provisions of Section 01 33 00 – Submittals and Substitutions.
- B. Submit design of sheet piling, sheeting, shoring and bracing.

**1.3 REGULATORY REQUIREMENTS – LATERAL RESTRAINT**

- A. Materials and installation work shall conform to all applicable federal, state and local regulations.
- B. Provide material for sheet piling, sheeting, shoring and bracing. Drive or set in place in accordance with federal, state and local regulations for excavations and construction, and as may be required to protect the workers and the public, or to maintain the trench widths as specified.
- C. Design Requirements:
  - 1. The CONTRACTOR shall retain the services of a registered PROFESSIONAL ENGINEER to design lateral restraint facilities. This design will include any necessary sheet piling, sheeting, shoring or bracing to protect any facilities, stockpiles, excavations or construction materials adjacent to the excavation and/or personnel required to be in or near the excavation. The CONTRACTOR shall retain the services of a registered PROFESSIONAL ENGINEER to design all aspects of shoring and bracing.
- D. Bracing elements shall not be cast into or included in the permanent concrete work, except where directed by the ENGINEER, in which case the proper keys, cutoffs, water stops and waterproofs must be provided.
- E. The CONTRACTOR shall indemnify and save harmless the ENGINEER and the OWNER from any and all personal injuries or property damages resulting from his failure to provide and properly maintain the previously mentioned lateral restraints.

## **1.4 QUALITY ASSURANCE**

- A. Prior to installation, review methods and procedures related to excavation support and protection system including, but not limited to, the following:
  - 1. Geotechnical report
  - 2. Existing utilities and subsurface conditions
  - 3. Proposed excavations
  - 4. Proposed equipment
  - 5. Monitoring of excavation support and protection system
  - 6. Working area location and stability
  - 7. Coordination with waterproofing
  - 8. Abandonment or removal of excavation support and protection system

## **PART 2 – MATERIALS**

### **2.1 MATERIAL REQUIREMENTS**

- A. Materials, wales and braces shall be new or of sound material. If steel, they shall be standard structural steel sections, as listed in the American Institute of Steel Construction's "Manual of Steel Construction," current edition. If timber, they shall be of structural grade southern pine or Douglas fir.
- B. The steel sections used shall have no more than surface rust and shall conform to the requirements of the ASTM Specification A36 or A572, "Requirements for Delivery of Structural Steel," current edition, in respect to straightness, defect deformations, camber and any other condition which would affect efficient performance in the bracing system.

## **PART 3 – EXECUTION**

### **3.1 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
  - 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

- C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.
- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protections system remain stable.
- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

### **3.2 SOLDIER PILES AND LAGGING**

- A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment.
- B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.
- C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

### **3.3 SHEET PILING**

- A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Accurately place the piling, using templates and guide frames unless otherwise recommend in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches (1500 mm). Accurately align exposed faces of sheet piling to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment. Cut tops of sheet piling to uniform elevation at top of excavation.

### **3.4 TIEBACKS**

Most tieback systems are proprietary. Insert material requirements in Part 2 if a particular tieback is required. If tiebacks are permanent, consider level of corrosion protection of tendons and anchorage connections.

- A. Tiebacks: Drill, install, grout, and tension tiebacks. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks
  - 1. Test loading shall be observed by a qualified professional engineer responsible for design of excavation support and protection system.
  - 2. Maintain tiebacks in place until permanent construction is able to withstand lateral soil and hydrostatic pressures.

### **3.5 BRACING**

- A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by ENGINEER.
  2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
  3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

### **3.6 REMOVAL AND REPAIRS**

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
1. Remove excavation support and protection systems to a minimum depth of 48 inches (1200 mm) below overlaying construction and abandon remainder.
  2. Fill voids immediately with approved backfill compacted to density specified in Division 2 Section "Earthwork."
  3. Repair or replace, as approved by ENGINEER, adjacent work damaged or displaced by removing excavation support and protection systems.
  4. Leave excavation support and protection systems permanently in place.

**END OF SECTION 31 41 00**



**SECTION 32 92 00 – TURF AND GRASSES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Restore all disturbed grass and landscaped areas to conditions equal to or better than before the work began and to the satisfaction of OWNER.

**1.2 SUBMITTALS**

- A. Manufacturer's product data:

- 1. Complete materials list of all materials proposed to be furnished and installed under this section.
- 2. Specifications and other data required to demonstrate compliance with the specified requirements.

- B. Pre-Construction Photos

- 1. Provide pre-construction photos of the existing conditions prior to disturbance of proposed areas of construction.

**1.3 GUARANTEE**

- A. If a satisfactory stand of lawn/grass has not been produced, the CONTRACTOR shall renovate and reseed the lawn and unsatisfactory portions thereof immediately or during the next planting season if proper weather conditions do not exist for germination. A satisfactory stand is defined as a section of lawn that has:

- 1. No bare spots larger than 3 square feet.
- 2. Not more than 10 percent of total area with bare spots larger than 1 square foot.

- B. Disturbed areas that will be exposed in excess of 10 days shall be temporarily mulched until proper weather conditions exist for establishment of permanent vegetative cover.

**1.4 DISTURBED AREAS**

- A. All areas disturbed will have erosion controls in place during and after all construction efforts and until permanent restorations are completed and approved. BMPs to be maintained daily and modified as site conditions change. SWPP reports logging changes in BMP controls, bi-weekly and weather driven inspections and modifications are to be submitted with daily reports. Refer to the Oklahoma Department of Environmental Quality OKR10, for requirements applicable for ground stabilization methods.

- B. All areas that have been disturbed by construction activities shall be returned to equal or better conditions by the use of Solid Slab Sod, Seeding, or Hydro-Mulching to achieve substantial 70% coverage over the entire disturbed area to the satisfaction of OWNER.
- C. Restore and replace shrubbery, fencing, or other disturbed surfaces or structures to conditions equal to or better that before the work began and to the satisfaction of OWNER.

## **PART 2 - PRODUCTS**

### **2.1 TOPSOIL**

- A. Topsoil shall not contain more than 40 percent clay in that portion passing a No. 10 sieve. Topsoil shall contain between 4 percent and 20 percent organic matter as determined by loss on ignition of samples oven-dried to constant weight at 212°F.

### **2.2 FERTILIZER**

- A. Provide a commercial fertilizer consisting of the standard materials of the grade required by Contract and by recommendation of the grower for the season and climate. Fertilizer grade refers to the percentage of total nitrogen, available phosphate, and soluble potash, in accordance with the Oklahoma Department of Agriculture, Food and Forestry. Provide fertilizer in standard, factory-sealed containers, labeled in accordance with the Oklahoma Department of Agriculture, Food and Forestry. Broadcast dry fertilizer in a pellet or other granular form.
  - 1. Fertilizer for Solid Slab Sod shall be composed of a ratio of 17-6-6.
  - 2. Fertilizer for Seeded Areas shall be composed of a ratio 10-20-10.
  - 3. Or as by recommendation of Oklahoma Department of Agriculture, the grower and approved by OWNER.

### **2.3 SOD and SEED**

- A. Sod
  - 1. Provide a dense source of Bermuda grass sod, or other acceptable type as approved by AW, containing a deep-rooted stand of fertile topsoil. Ensure the source for sod is free of weeds classified as "Prohibited Noxious" and legally "Restricted Noxious" plant materials in accordance with Oklahoma Department of Agriculture Seed Law.
  - 2. Sodding consists of the roots (stolon and rhizome) and the visible stem and blades. Ensure grass vegetative parts exist throughout the slab. Provide slabs of dense vegetative growth capable of being transported in its original state. Insure that slabs are a minimum of 16 inches in width.

B. Seed

1. In the growing season, seed all disturbed areas with Bermuda Seed using the seed type "Cynodon Dactylon". In the non-growing months mix the Bermuda (Cynodon Dactylon) with Rye Grass (Gulf) to stabilize area. Other stabilization methods may be required until 70% growth has been achieved.

**2.4 SOIL EROSION CONTROL BLANKETS**

- A. When or if required for use, soil erosion control blankets shall be machine produced mat of wood excelsior formed from a web of interlocking wood fibers, covered on one side with either plastic netting or twisted Kraft paper cord netting. Soil erosion control blankets shall not be installed on flat surfaces and sloped surfaces up to and including 10:1 slopes. Soil erosion control blankets shall be used on surfaces with a slope greater than 10:1 as per the manufacturer's installation guidelines.

**2.5 MULCH**

- A. Mulch shall be straw, reasonably free of weed seed and foreign materials which may affect plant growth. Other materials may be used if approved by OWNER.

**PART 3 - EXECUTION**

**3.1 PREPARATION OF SEED BED**

A. Topsoil Areas

1. Topsoil shall be replaced with adequate amounts of topsoil material to restore the disturbed area to its original pre-disturbance grade and depth of topsoil but not less than 4 inches.
2. Topsoil shall be placed where excavation and backfill operations have left soil unsuitable for sod or seed establishment. Topsoil must be free from weeds, rocks, roots, and other debris. When available, topsoil can be segregated from the excavation and re-used. If the existing area is void of topsoil, then topsoil must be imported. Remove, store, and use suitable topsoil available from the excavated material to backfill the top 4 inches of the excavation. Remove and dispose of all imported granular fill, grass, weeds, roots, sticks, stones, and other debris 1-inch or greater in diameter. Prepare the topsoil to a smooth surface devoid of pits or bumps in a manner that matches surrounding grades, slopes and drainage by means of hand raking. Ensure slopes will allow proper cut angles for mowing equipment.
3. When there is insufficient topsoil available from the site excavated materials, furnish 4 inches of topsoil to be used as a seed bed as described in, Paragraph Part 3.1.A of this Section.

B. Non-Topsoil Areas

1. The trench backfill may be used as a seed bed, where excavated soil may be classified as topsoil, or when approved by AW. After the backfill has been given a reasonable time to settle, bring to finished grade and harrow to a depth of 3 inches. Remove and dispose of all grass, weeds, roots, sticks, stones and other debris 1 inch or greater in diameter. Carefully smooth the topsoil to match surrounding slopes, grades and drainage by hand raking. Ensure slopes will allow proper cut angles for mowing equipment.

C. Hydromulch/Hydroseed

1. In the appropriate growing season Hydroseed disturbed areas with an approved seed mix as recommended by local conditions and meeting regulatory requirements. Fertilization to be determined by installer for best results. Topsoil and maintenance per Part 3 Execution; 3.1 and 3.6.

**3.2 FERTILIZING**

- A. Apply fertilizer uniformly to all areas to be seeded at the rate of 1 pound per 100 square feet in topsoil and 2 pounds per 100 square feet in non-topsoil. Disk, harrow, or rake the fertilizer thoroughly into the soil to a depth of not less than 2 inches. Immediately before sowing the seed, rework the surface until it is a fine, pulverized, smooth seed bed varying not more than 1 inch in 10 feet.

**3.3 SEEDING**

- A. Seed immediately after preparation and fertilization of the seed bed. Mix the seed thoroughly and sow it evenly over the prepared areas at the rate of 3 pounds per 1,000 square feet. Sow the seed dry or hydraulically. After sowing, rake or drag the area to cover the seed to a depth of approximately 1/4 inch. Sod all areas with slopes greater than 10%.

**3.4 SODDING**

- A. Sod all areas disturbed by construction activities. At a minimum, sod shall be fibrous, well rooted approved grass type. The grass shall be cut to a height of less than three (3) inches. Edges of sod shall be cleanly cut, either by hand or machine, slab is to a uniform thickness of not less than one (1) inch (plus or minus 1/4"), to a uniform width of not less than sixteen (16) inches, and in strips of not less than three (3) feet in length. Sod shall be free from all primary noxious weeds. Keep the sod moist from harvesting at the source until planting.

DO NOT USE SOD THAT IS COMPLETELY DRIED OUT OR HAS LESS THAN 1/2" OF SLAB.

- B. Lay sod with tight staggered joints. On slopes, start placement at the foot of the incline. Use wood pegs driven flush to hold sod in place on slopes 4:1 or greater. Use

two wood pegs per strip of sod. Roll the sod lightly after placement. Fill any open joints with topsoil and/or sod. When installed, all sod edges must be slightly excavated and tucked to mitigate any potential trip hazards. Provide rolling equipment of a size and weight capable of firmly compacting the sod into the topsoil and removing air voids. In non-growing months, Rye grass (Gulf) can be used to stabilize Bermuda grass until rooted.

- C. Around walkways, driveways, grass, or other existing borders, remove sufficient soil so that the surface of the sod will be level with the existing surfaces and will not pose a tripping hazard.

### **3.5 MULCHING**

- A. Place mulching material evenly over all seeded areas within 48 hours of seeding. Place mulch at the rate of approximately 2 tons per acre, when seeding is performed in recognized growing season and at the approximate rate of 3 tons per acre when seeding is performed in a recognized non-growing season if applicable.

### **3.6 MAINTENANCE**

- A. Carefully maintain, tend, and water all seeded and sodded areas necessary to secure a good, well-established turf, matching adjacent areas. As needed, fill, grade, re-seed or re-sod and maintain all areas where remediation efforts are deficient or otherwise fail. Maintain the condition of seeded and sodded areas until area meets final stabilization requirements per OKR10, Part 9.12.1. and OWNER approval.

**END OF SECTION 32 92 00**