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SECTION A

GENERAL REQUIREMENTS

SECTION A01010

SUMMARY OF WORK

1.0 GENERAL

1.01 BRIEF PROJECT DESCRIPTION

A. These construction specifications are for the Ina Road Construction Debris Landfill (IRCL) and consists of two sections, General Requirements and Site Work. The IRCL is located approximately twelve miles northwest of downtown Tucson, just to the west of Interstate 10, on Ina Road in the Town of Marana. The IRCL is located in Township 13S, Range 12E, within the east half of the northwest quarter of Section 1, of the Gila and Salt River Base Line and Meridian. The IRCL operated as a municipal solid waste (MSW) landfill from the early 1960's to 1973 and again from 1977 to 1983. In 1983 the Tangerine Regional Landfill was opened and MSW operations at the IRCL were discontinued. In September of 1989 the IRCL was re-opened strictly as a construction and demolition debris landfill. Between 1989 and 1995 (based upon 1984 and 1995 topographic differences) approximately 1,307,440 cubic yards (cy) construction debris was landfilled at the IRCL. The cumulative construction debris tonnage landfilled between 1998 and 2008 is 301,700 tons. The IRCL has been inactive since 2008, other than the placement of inert materials such as dirt.

B. Facility Address and Location Information
   OWNER: Pima County Solid Waste Management (PCSWM)
   Address: 5301 West Ina Road, Tucson, Arizona 85743
   County: Pima
   Township: 13S
   Range: 12E
   Section: 1, East Half of Northwest Quarter
   Latitude: 32° 19' 58" North
   Longitude: 111° 04' 32" West

C. PCSWM (OWNER) plans to close the inactive Ina Road landfill. As part of this closure some waste will be relocated to achieve final cover subgrade elevations. Specifications and drawings showing the details of the landfill closure and detention basin construction have been prepared.

D. The IRCL occupies approximately 75 acres. Closure activities will consist of the installation of an alternative final cover section over the existing 71.5 acre disposal area footprint and associated site improvements such as drainage channels and perimeter fencing.

1.02 EXISTING SITE CONDITIONS

A. The site is currently an inactive landfill that received municipal solid waste and construction and demolition waste on a regulated basis. The IRCL is currently configured as a West Disposal Area (29.5 acres) and an East Disposal Area (42.0 acres)

B. The drawings depict topographical information by Aerial Mapping Company, flight date June 11, 2018. Actual elevations and contours may vary at the time of final cover construction due to ongoing settlement of the in-place waste.

D. The existing landfill has soil cover varying from six inches to over ten feet. The CONTRACTOR must relocate, grade and compact the existing in-place waste prior to placement of structural fill and the foundation soil layer (Foundation Layer). The three foot final cover section will be installed on top of the foundation layer in Phase 2 of this closure project.

1.03 CONTRACTOR'S USE OF PROPERTY

A. The CONTRACTOR will have unrestricted access and egress from the site, as necessary, to perform the work under this Contract. The CONTRACTOR shall

obtain all necessary permits and approvals to accomplish all work.

B. The CONTRACTOR shall limit use of the site to only work and storage related to this Contract.
C. The CONTRACTOR shall assume full responsibility for the protection and safekeeping of equipment and materials on or off the site that are related to this Contract.
D. The CONTRACTOR shall obtain a business license, and any other permits necessary to work in the Town of Marina.

1.04 WORK SEQUENCE

A. A Construction Quality Assurance (CQA) ENGINEER will be retained to assist PCSWM, as the landfill OWNER, to perform the quality assurance and quality control during construction.
B. A Notice-to-Proceed (NPT) to begin work under these Contract Documents will be issued by Pima County after the bid award.
C. The CONTRACTOR shall be responsible for planning, scheduling, and otherwise executing the work in a manner that meets the requirements of the specifications for this project.

1.05 BROAD SCOPE

A. This section describes the project in general and provides an overview of the intent of the work to be performed under this Contract. The CONTRACTOR shall review 1.06 Narrow Scope for a more detailed description, and the entire set of Contract Documents shall be reviewed to gain a thorough understanding of the detailed project requirements.
B. CONTRACTOR shall provide all labor, equipment, and materials for the construction of the IRCL structural fill over the existing waste, and a 12-inch

thick foundation layer, drainage channels, and detention basins.

C. CONTRACTOR shall provide all labor, equipment, and materials for the construction of temporary utilities, roads, storage, and other facilities necessary for closure construction as part of this contract.

D. CONTRACTOR shall perform the work in accordance with the Contract Documents: Project Construction Drawings, Construction Specifications, referenced design reports, subsequent addenda, and approved shop drawings and submittals.

E. Throughout construction the CONTRACTOR shall maintain one set of red-line field drawings to show the structures as-constructed. These drawings shall remain onsite during the project for periodic review by the OWNER or ENGINEER. Upon completion of the construction activities, one set of red-line drawings with revised survey data shall be submitted to the OWNER or ENGINEER for incorporation into As-built Drawings. The CONTRACTOR shall provide all as-built survey information to the ENGINEER in digital format suitable to import into ACAD.

1.06 NARROW SCOPE

A. This section describes the bid approach for this project in more detail and provides the CONTRACTOR with the extent of the work to be performed under this Contract. The statement of work includes but is not limited to the following:

1. Provide rough and final construction grade staking as required for the IRCL foundation layer construction, slopes, detention basins, and drainage channels as noted on the Construction Drawings.
2. Excavate in-place waste and/or construction debris as necessary to obtain rough sub-grade elevations on which final cover soil will be placed. This waste relocation must be completed prior to the placement of any foundation layer soil.
3. After placement and compaction of the relocated waste on top of the existing

landfill footprint, place structural fill up to the final cover sub-grade elevations shown on the Construction Drawings. Phase 1 work includes placement and compaction of the 12" foundation layer. Fill material may consist of on-site soil or stockpiled material. The stockpile locations for fill material are shown on the Construction Drawings.

4. Conduct rough grading of the IRCL foundation layer, slopes, detention basin, and drainage channels as noted on the Construction Drawings.
5. Transport, process, and moisture condition on-site material from the stockpile(s) and install the 12-inch thick foundation soil layer over entire final cover area.
6. Construct drainage structures as shown on the Construction Drawings. Construct down drain systems as shown on the Drawings. This Phase 1 work does not include the placement of channel lining rip-rap in the drainage channels or downdrains.
7. Grade the surface of the foundation layer over the entire surface such that there are **no** low points that will pond storm water.
8. Construct the detention basins as shown on the drawings.
9. Construct the perimeter road and drainage channels as shown on the drawings.

2.0 PRODUCTS

NOT USED

3.0 EXECUTION

NOT USED

END OF SECTION

SECTION A01015

ABBREVIATIONS AND DEFINITIONS

1.0 GENERAL

REGULATORY AGENCY - The Regulatory Agency, which in this context is the Arizona Department of Environmental Quality (ADEQ), is responsible for the review of the Closure Plan, including the CQA Plan, compliance with the Agency's regulations, and determining whether to issue or deny a permit to construct the final cover system based upon their review. The Occupational Safety and Health Administration (OSHA) administers regulations for the CONTRACTOR's site safety requirements.

OWNER - The OWNER refers to the Pima County, acting through its' legally constituted officials or employees. As OWNER of the IRCL, Pima County is responsible for preparation of the Drawings, Specifications, and CQA Plan for this Project and the maintenance of the final cover system. The address and contact person of the OWNER shall be:

Pima County Solid Waste Management (PCSWM)
Department of Environmental Quality
33 N. Stone Avenue, Suite 700
Tucson, Arizona 85701
Contact: Mr. David Eaker
Phone: 520-724-7400

ENGINEER - An individual or firm who is responsible for all construction quality assurance (CQA) testing, observation, and documentation related to the construction of the final cover system including the IRCL cap, drainage systems, perimeter maintenance roadways, and placement and compaction of all earth material backfill. The ENGINEER shall be retained by the Pima County. The ENGINEER will decide on all questions which may arise as to the compliance and acceptability of materials furnished, work performed, and all questions as to

the fulfillment of the technical and design issues of the contract on the part of the CONTRACTOR. The ENGINEER will make these decisions after consultation with OWNER.

The ENGINEER shall be responsible for the acceptance or rejection of work based on compliance with the Specifications and design intent; the ENGINEER will recommend the suspension of work for unsafe conditions, for failure to carry out provisions of the Contract by the CONTRACTOR and for unsuitable weather conditions. The ENGINEER shall also review the CONTRACTOR's submittals, make recommendations, and review payment requests to verify the actual amount of work completed. The ENGINEER shall be responsible for issuing daily reports, performance of laboratory and field testings, data evaluation, issuance of documentation reports, attendance at and recording of progress meetings, informing the CONTRACTOR and the OWNER regarding the construction compliance evaluation, and observation and testing of repairs of deficiencies identified during the construction of the final cover system.

OPERATOR - The Pima County was also the OWNER and Operator of the facility.

FINAL COVER SYSTEM - The final cover system consists of discrete layers of earthen material and storm water control systems placed on the top of a closed landfill to minimize infiltration of storm water so as to reduce generation of leachate which may escape to the environment such as the vadose zone and/or groundwater. The layers of earth on top of the IRCL are placed to slopes and grades to efficiently drain stormwater runoff, compensate for landfill settlement, and minimize soil erosion. For the IRCL, the final cover system shall consist of:

- Structural Fill - Structural fill will consist of native earthen material or imported soil to be placed after compaction of the underlying relocated waste and prior to the placement of the final cover system. This layer may be required in order to achieve the design sub-grade elevations;

- Foundation Layer - The 12-inch thick foundation layer will consist of native or imported earthen material to be placed after compaction of the underlying waste and structural fill material, and prior to the placement of the Infiltration Layer. This layer shall act as support for the infiltration layer; and
- Drainage Facilities – Perimeter drainage channels to convey storm water from the final cover to the storm water detention basin and downdrains from the perimeter channels to the detention basins. The construction of the drainage system is included in this project.

In this document, for the IRCL Project, the final cover system is sometimes referred to as the landfill cap.

DESIGNER - Also known as Design ENGINEER, is an individual, a firm, or an organization who is responsible for preparation of the Plans, the Specifications, and Construction Quality Assurance (CQA) Plan for the Project. The consulting company of Tetra Tech, a Tetra Tech Company was responsible for completion of the Design and development of the Specifications of the Project. Tetra Tech was responsible for development of the Specifications and CQA Plan. The address and contact name for Tetra Tech is provided below.

Tetra Tech, Inc.
3822 E. University Drive, Suite 2
Phoenix, AZ. 85034
Contact: Keith A. Johnson, P.E.
Phone: (602) 267-0336

Tetra Tech will be responsible for addressing all concerns or questions which may arise as to the interpretation of the drawings, grading, design elements, Specifications (including the CQA Plan), material evaluation, and testing. In interpreting the Plans or Specifications, the Designer may make modifications to the work which shall not involve extra work and shall not be inconsistent with the purpose of the work. In cases where modifications are necessary

to comply with site conditions, unforeseen circumstances or in emergency situations endangering life or property, the Designer may modify the Plans and Specifications at the OWNER's approval and the CONTRACTOR shall be compensated at the rate previously established by the Contract Bid.

PART 1 – GENERAL

1.01 DESCRIPTION

A. When a standard is specified by reference, the CONTRACTOR shall comply with requirements and recommendations stated in that standard, except when requirements are modified by the Contract Documents, or when applicable codes established more strict standards.

B. When published standards are referenced, the publication in effect on the date of issue of the Contract Documents shall apply unless specified otherwise.

1.02 ABBREVIATIONS, NAMES, AND ADDRESSES OF ORGANIZATIONS

The CONTRACTOR shall obtain copies of referenced standard direct from the publication source, when needed for proper performance of Work, or when required for Submittal by Contract Documents.

AASHTO American Association of State Highway
and Transportation Officials
44 North Capital Street, NW
Washington, D.C. 20001

ADOT Arizona Department of Transportation
1655 West Jackson
Room 112F
Phoenix, Arizona 85007

ADEQ Arizona Department of Environmental Quality

ADEQ Main Office

1110 W. Washington Street

Phoenix, AZ 85007

ASCE American Society of Civil Engineers

1801 Alexander Bell Drive

Reston, VA 20191-4400

ASTM American Society for Testing and Materials

100 Barr Harbor Drive

West Conshohocken, PA 19428

USEPA United States Environmental Protection Agency

Ariel Rios Building

1200 Pennsylvania Avenue, N.W.

Washington, D.C. 20460

1.03 REFERENCES

A. Latest version of American Society for Testing and Materials (ASTM) standards:

1. ASTM A351, Standard Specifications for Castings, Austenitic, Austenitic-Ferritic (Duplex), for Pressure-Containing Parts.
2. ASTM D421, Standard for Dry Prep of Soil Samples for Particle-Size Analysis and Determination of Soil Constants.
3. ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.
4. ASTM D638, Standard Test Method for Tensile Properties of Plastics.
5. ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft^3 [600 kN-m/m^3]).
6. ASTM D792, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
7. ASTM D1004, Standard Test Method of Initial Tear Resistance of Plastic Film and Sheeting.
8. ASTM D1140, Standard Test Method for Amount of Material in Soils Finer than the No. 200 (75-um) Sieve.

9. ASTM D1238, Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.
10. ASTM D1248, Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.
11. ASTM D1505, Standard Test Method for Density of Plastics by the Density-Gradient Technique.
12. ASTM D1556, Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
13. ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft^3 [2,700 kN-m/m^3]).
14. ASTM D1587, Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes.
15. ASTM D1603, Standard Test Method for Carbon Black in Olefin Plastics.
16. ASTM D1693, Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.
17. ASTM D1777, Standard Method for Measuring Thickness of Textile Materials.
18. ASTM D1785, Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedule 80.
19. ASTM D2216, Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock.
20. ASTM D2434, Standard Test Method for Permeability of Granular Soils (Constant Head).
21. ASTM D2466, Standard Specification for Polyvinyl Chloride and D-2467 (PVC) Plastic Pipe Fittings, Schedule 80.
22. ASTM D2487, Standard Classification of Soils for ENGINEERing Purposes (Unified Soil Classification System).
23. ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

24. ASTM D2564, Standard Specification for Solvent Cement for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings.
25. ASTM D2657, Standard Practice for Heat-Joining for Polyolefin Pipe and Fillings.
26. ASTM D2837, Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
27. ASTM D2855, Standard Practice for Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings.
28. ASTM D2922, Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
29. ASTM D2937, Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method.
30. ASTM D3017, Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
31. ASTM D3042, Test Method for Insoluble Residue in Carbonate Aggregates.
32. ASTM D3350, Standard Specification for Polyethylene Plastics Pipe and Fitting Materials.
33. ASTM D3776, Standard Test Method for Measuring Mass Per Unit Area (Weight) of Woven Fabric.
34. ASTM D3786, Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabric-Diaphragm Bursting Strength Tester Method.
35. ASTM D4218, Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds By the Muffle-Furnace Technique.
36. ASTM D4220, Standard Practices for Preserving and Transporting Soil Samples.
37. ASTM D4318, Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

38. ASTM D4354, Standard Practice for Sampling of Geosynthetics for Testing.
39. ASTM D4355, Standard Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
40. ASTM D4491, Standard Test Method for Water Permeability of Geotextiles by Permittivity.
41. ASTM D4533, Standard Test Method for Trapezoidal Tearing Strength of Geotextiles.
42. ASTM D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
43. ASTM D4643, Standard Test Method for Determination of Water Content of Soil or Rock by Microwave Oven Heating.
44. ASTM D4716, Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
45. ASTM D4718, Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles.
46. ASTM D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
47. ASTM D4833, Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
48. ASTM D5080, Standard Test Method for Rapid Determination of Percent Compaction.
49. ASTM D5093, Standard Test Method for Field Measurement of Infiltration Rate Using a Double-Ring Infiltrometer with a Sealed-Inner Ring.
50. ASMT D5199, Standard Test Method for Measuring Nominal Thickness of Geosynthetics.
51. ASTM D5261, Standard Test Method for Measuring Mass Per Unit Area of Geotextiles.

52. ASTM D5321, Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method.
53. ASTM D5397, Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test.
54. ASTM D5596, Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics.
55. ASTM D5890, Standard Test Method for Swell Index of Clay Mineral Component of Geosynthetic Clay Liners.
56. ASTM D5891, Standard Test Method for Fluid Loss of Clay Component of Geosynthetic Clay Liners.
57. ASTM D5887, Standard Test Method For Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter.
58. ASTM D5993, Standard Test Method for Measuring Mass Per Unit of Geosynthetic Clay Liners.
59. ASTM D5994, Standard Test Method for Measuring Core Thickness of Textured Geomembrane.
60. ASTM D6243, Standard Test Method for Determining the Internal and Interface Shear Resistance of Geosynthetic Clay Liner by the Direct Shear Method.
61. ASTM D6392, Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.
62. ASTM D6693, Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes.
63. ASTM F656, Standard Specification for Primers for Use in Solvent Cement Joints at Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.

64. ASTM F714, Standard Specification for Polyethylene (PE) Plastics Pipe (SDR-PR) Based on Outside Diameter.

65. ASTM F904, Standard Test Method for Comparison of Bond Strength or Ply Adhesion of Similar Laminates Made from Flexible Materials.

B. Daniel, D.E. and R.M. Koerner, (1993), Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities, EPA/600/ R-93/182.

C. USEPA, (1991), *Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams*, EPQ/530/SW-91/051.

D. Geosynthetic Research Institute Test Method GM6, "Pressurized Air Channel Test for Dual Seamed Geomembranes."

E. Geosynthetic Research Institute Test Method GC7, "Determination of Adhesion and Bond Strength of Geocomposites."

1.04 DEFINITIONS OF TECHNICAL TERMINOLOGY

Appurtenances:	Detailed items such as drainage facilities, and items that are necessary and related to the proper functioning of the IRCL final cover system.
Atterberg Limits:	The liquid limit and plastic limit of soil.
Clay:	Soil material with an equivalent mean grain size smaller than 0.002 mm. Clay soils are also defined as plastic fines.
Clay Clod:	A chunk of cohesive soil or clay soils (also referred to as "clod").
Cohesive Soils:	Soil material which has a high plasticity index, is sticky, and tends to form clods when dry.
Compaction Curve:	Plot of dry unit weight versus molding water content, based on the data obtained from the moisture-density relationship tests.

Dry Density:	The dry weight of soil material per total volume, including air space, also known as dry density. The dry weight is usually measured after drying in an oven at 212 degrees F (°F) for 30 hours or until a constant weight is achieved.
Electrical Conductivity:	Electrical conductivity, abbreviated as EC, of soil is defined as the ease at which electrical current flows through soil mass. According to Ohm's law, EC equals the inverse of the electrical resistivity. In soils, the resistivity of the individual soil grains are high and therefore, if there is to be a passage of current through a soil mass it will be exclusively through electrolytic action due to the presence of dissolved salts and solids within the pore spaces of the soil particles. The EC of soil is indicative of the soil's acidity or alkalinity.
Geosynthetics:	Generic term for all geosynthetic materials such as geotextiles, geomembranes, geonets, geogrids, geosynthetic clay liners, and geocomposites.
Geotextile:	A permeable geosynthetic material fabricated with only textiles which may be woven, non-woven, or knitted.
Gravel:	Soil material which is coarser than 4.76 mm in least one dimension, or as retained on a No. 4 sieve.
Hydraulic Conductivity:	Also known as permeability, refers to the capacity of a material to discharge certain fluids through a material. Discharge of fluid through a unit cross-sectional area of a porous media under a unit hydraulic gradient, and standard temperature of 68 degrees F defines this property.
Lift:	Discrete layer of soil (usually 6 to 10 inches thick) placed and compacted for construction of engineered fill.
Liquid Limit:	The minimum water content of soil at which the soil behaves like a viscous liquid. It is the arbitrary limit between the liquid and plastic state of soil.

NICET:	An acronym for the National Institute for Certification in ENGINEERing Technologies, an organization that administers examinations for bituminous material, concrete, geosynthetics, and earthen materials for construction.
Outliers:	Data points which do not fit into the specified or required maxima or minima values.
Permittivity:	For a geotextile, the volumetric flow rate of water per unit cross-sectional area, per unit head, under laminar flow conditions, in the normal direction through the fabric.
pH of Soil:	The pH of a soil sample measures the hydrogen-ion concentration and is indicative of the soil's acidity or alkalinity.
Plasticity or Plastic Index (PI):	The range of moisture content of soil at which the soil behaves like a plastic solid. The numerical value is the difference between the liquid limit and plastic limits.
Plastic Limit (PL):	The minimum water content above which a soil material behaves like a plastic solid.
Polymer:	A macromolecular material formed by the chemical combination of monomers having either the same or different chemical composition. Plastics, rubbers, and textile fibers are all high-molecular-weight polymers.
Polyolefin:	A family of polymeric materials that includes polypropylene and polyethylene, the former being very common in geotextiles, the latter in geomembranes. Many variations of each exist.
Seam Strength:	Strength of a seam of geotextile material measured either in shear or peel modes. Strength of seams are reported either in absolute units (pounds per inch of width), or as a percent of the strength of the geotextiles.

Unit Weight: Weight of soil samples per total volume including air space. May include weight of water present within the pore spaces.

1.05 OTHER DEFINITIONS

A. Base Course: The upper course of the granular base of a pavement or the lower course of an asphalt concrete pavement structure.

B. Batch: A quantity of resin, usually the capacity of one railcar, used in the fabrication of high density polyethylene (HDPE) geomembrane or geonet rolls. Each finished roll will be identified by a number corresponding to the resin batch.

C. Bridging: Refers to either an incomplete compaction of material that leaves void pockets beneath a granular material or where geosynthetic material is not in complete contact with the underlying materials.

D. CONTRACTOR: The individual, firm, partnership, corporation or combination thereof entering into a contract with the Contracting Agency to perform the advertised Work.

E. Culvert: Any structure not classified as a bridge, which provides an opening under or adjacent to the roadway.

F. Full Depth Pavement: An asphalt concrete pavement structure in which the granular base and subbase are replaced by proportionate thicknesses of asphalt concrete.

G. Furnish: Purchase, supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.

H. Install: Operations at the Project Site including unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, and protecting, cleaning, and similar operations.

I. Pavement: Any surfacing of streets, alleys, sidewalks, courts, driveways, etc., consisting of mineral aggregate bound into a rigid or semi-rigid mass by a suitable binder such as, but not limited to, Portland cement or asphalt cement.

J. Pavement Structure: The combination of subbase, base course, and surface course placed on a subgrade to support the traffic load and distribute it to the roadbed.

K. Plans: All approved drawings or reproductions thereof pertaining to the Work and details therefore, which are made a part of the Contract Documents.

L. Profile Grade: The trace of a vertical plan intersecting the top surface of the proposed wearing surface, usually along the longitudinal centerline of the roadbed. Profile grade means either elevation or gradient of such trace according to the context.

M. Right-of-way: A general term denoting land, property, or interest therein, usually in a strip acquired for or devoted to a street, highway, or other public improvement.

N. Road: A general term denoting a public way for purposes of vehicular travel, including the entire area within the Right-of-way.

O. Roadway: The proportion of the Right-of-way intended primarily for vehicular traffic, and including all appurtenant structures and other features necessary for proper drainage and protection. Where curbs exist, it is that portion of roadway between the faces of the curbs.

P. Shoulder: The portion of the Roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.

Q. Storm Drain: Any conduit and appurtenance intended for the reception and transfer of storm water.

R. Subbase: The lower course of the base of a roadway, immediately above the Subgrade.

S. Subgrade: The supporting structures on which the pavement and its special undercourses rest.

T. Surface Course: The finished or wearing course of an asphalt concrete pavement structure.

U. Traveled Way: The portion of the Roadway for the movement of vehicles, exclusive of Shoulders and auxiliary lanes.

V. Utility: Pipe lines, conduits, ducts, transmission lines, overhead or underground wires, railroads, storm drains, sanitary sewers, irrigation facilities, street lighting, traffic signals, and fire alarm systems, and appurtenances of public utilities and

those of private industry, businesses or individuals solely for their own use or use of their customers which are operated or maintained in, on, under, over or across public Right-of-way or public or private easement.

W. Provide: To furnish and install, complete and ready for the intended use.

X. Installer: The CONTRACTOR or another entity engaged by the CONTRACTOR, either as an employee, Subcontractor, or CONTRACTOR of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

Y. Experienced: The term experienced, when used with the term Installer, means having a minimum of 5 previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authorities having jurisdiction.

Z. Project Site: Is the space available for performing construction activities, either exclusively or in conjunction with others performing Work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

AA. Specifications: This refers to this document or parts thereof or to a second document source.

BB. Obstructions: Shall mean existing features, utilities, canals, power lines, buried pipelines, gas lines, water lines, buried communications, public roads, etc.

CC. Compaction: Shall mean the process of increasing the density or unit weight of soil by rolling, tamping, vibrating, or other mechanical means.

DD. Unit Weight: Shall mean the weight of a soil weight per unit volume, usually expressed in lb/ft^3 or kN/m^3.

EE. Extrusion Weld: Shall mean a bond between two high density polyethylene (HDPE) materials which is achieved by extruding a bead of HDPE over the leading edge of the seam between the upper and lower sheet using a hand held apparatus.

FF. Fusion Weld: Shall mean a bond between two high density polyethylene (HDPE) materials which is achieved by fusing both HDPE surfaces in a homogenous bond

of the two surfaces using a power driven apparatus capable of heating and compressing the overlapped portions of the Geomembrane sheets.

GG. HDPE Geomembrane or Geomembrane: Shall mean a relatively impermeable thin sheet of high density polyethylene used as a barrier liner or cover to prevent liquid or vapor migration into or from liquid or solid storage facilities.

HH. In Situ: Shall mean in-place naturally.

II. Moisture Content: Shall mean the ratio of weight of water in the soil to the weight of the soil solids (dry soil), expressed in percentage; also referred to as water content.

JJ. Textured Geomembrane: Shall mean Geomembrane with roughened, high-friction surfaces created by co-extrusion, impingement, lamination or other methods approved by the ENGINEER.

KK. OWNER: The Pima County.

LL. Geomembrane: A very low permeability synthetic liner or barrier used to minimize fluid migration in civil engineering works.

MM. Drawings: Drawing recording the dimensions, details, and coordinates of the facility after construction is completed.

NN. Operations Layer: See Protective Layer.

OO. Protective Layer: The operation layer placed on top of the lining system to protect the liners from protruding objects or to protect liner from damage done by operations equipment during placement and compaction of waste. Also known as Operations Layer, Protective Soil, and Protective Materials.

PP. Protective Soil: See Protective Layer.

QQ. Protective Material: See Protective Layer.

1.06 DELINEATION OF RESPONSIBILITIES

1. The following are clarifications of the responsibilities and definitions of job titles to be adhered to during the period of time required to complete the construction of the Project.

2. The OWNER and Operator of the facility, Pima County, shall be responsible for the construction of the final cover system in compliance with the regulatory and design requirements. For this purpose, Pima County shall retain the services of a CONTRACTOR for the construction and retain the services of an independent consultant for construction quality assurance services. Pima County shall be responsible for the work of the CONTRACTOR and the ENGINEER and therefore, shall execute separate contractual agreements with these parties accordingly.

3. The ENGINEER is the firm, individual, corporation, or any combination thereof, having a contract with the OWNER for observation, monitoring, testing, and documenting activities related to construction compliance evaluation during general earthwork construction, placement and compaction of all earthen material backfills and appurtenant structures (including roadways, drainage facilities, etc.), and during the procurement and installation of channel lining. The ENGINEER is also responsible for issuing daily reports, test results, data, summaries, and documentation report for all earthwork and related work at the Project site. The Documentation Report shall bear the seal of an Arizona Registered Professional ENGINEER.

The ENGINEER is responsible for observing and documenting the activities of the CONTRACTOR in such detail and continuity so as to satisfy the requirements of the CQA Plan and to provide a level of confidence acceptable to the EPA and other applicable regulatory Agencies that the work has been carried out in compliance with the project Design, Specifications, and CQA Plan.

The ENGINEER is also responsible for issuing a Construction Certification Report on the proper construction of the IRCL cap and drainage facilities, which are to be in compliance with the project Design, Specifications, and CQA Plan. The Construction Certification Report shall include, at a minimum, the weekly reports, the results of all field and laboratory tests, meeting notes, as-built documentation for the drainage facilities, photographic records, failing tests, mitigation activities, and all other data and pertinent details that are deemed required for

certification of the IRCL final cover system. Representatives of the ENGINEER shall perform all tests necessary to ascertain the physical characteristics of requisite earthwork of the facility final cover system. The ENGINEER's representative shall issue daily reports containing field monitoring such as:

- Visual observations;
- CQA test results;
- Deficiencies encountered and results of retesting;
- Summary details of significant events;
- Weather conditions; and
- Other field observations which are deemed necessary for the completion of the Project.

4. The CONTRACTOR is the individual, firm, corporation, or any combination thereof, contracted by the OWNER, who is responsible for construction of the final cover system in accordance with the Project Plans, Specifications, and CQA Plan. The CONTRACTOR has overall control of all construction operations, including scheduling. The CONTRACTOR is also responsible for informing the OWNER and the ENGINEER of the scheduling and occurrence of all construction activities. The CONTRACTOR is responsible for work performed by the Subcontractor(s), if any.

The CONTRACTOR is responsible for the clearing, relocation of waste and/or construction debris, and construction of the final cover system including processing and compaction of soil from stockpile and import areas, drainage facilities, and perimeter roadways, as contained in the Contract Documents, or as deemed necessary and in accordance with the Specifications. The CONTRACTOR is also responsible to coordinate his/her work with the ENGINEER, the OWNER, the Designer, and other related parties.

5. The Testing Laboratories are individuals, firms, corporations, or any combinations thereof, responsible for performing CQA tests which require laboratory services. Each Testing Laboratory shall have their own internal quality control plan to ensure that the laboratory

procedures conform to appropriate standards, such as the American Society for Testing and Materials (ASTM) and/or other applicable standards. The Testing Laboratory is responsible for ensuring that tests are performed in accordance with applicable methods and standards. The Testing Laboratory must be willing to allow the OWNER/Operator, Regulatory Agency, and/or Design ENGINEER to observe the sample preparation and testing procedures, or record keeping procedures, if they so desire. The OWNER/Operator, Regulatory Agency, and Design ENGINEER may request that they be allowed to observe any test procedure, announced or unannounced. The Testing Laboratory personnel must be willing to accommodate such a request, but the observer(s) shall not interfere with the testing or slow the testing process. The Testing Laboratory shall be licensed to do business in the State of Arizona, and shall be accredited by the Arizona Department of Transportation and Association of Material Reference Laboratories.

1.07 QUALIFICATIONS AND TRAINING

This section provides a description of minimum levels of experience and training of the CONTRACTOR and the ENGINEER necessary to demonstrate that the installation methods and procedures will be implemented properly by qualified personnel. Included are qualifications and training requirements for the CONTRACTOR and the ENGINEER.

1. CONTRACTOR - The CONTRACTOR shall have experience in constructing projects of this nature and/or general earthwork construction and shall demonstrate sufficient knowledge as to the construction procedures required for construction of the infiltration layer.

The CONTRACTOR shall include the following information with their bid to the OWNER:

- List of at least 3 similar earthwork projects;
- Bonding capacity and a list of outstanding contracts;
- List of personnel assigned to the Project including field superintendent, project manager, land surveyors and their qualifications and experience and,

- Protocols and a plan to process, mix, transport, place, and compact any soil materials utilized in construction of the infiltration layer or Landfill cap at the site, especially within the sloping portions of the waste footprint.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3.01 FAMILIARIZATION

A. Prior to submitting a bid, the CONTRACTOR shall become thoroughly familiar with the site, the site conditions, and all portions of the Work falling within these Project Specifications, Contract Documents, and Drawings.

B. Inspection:

1. Prior to implementing any of the Work in this Section, the CONTRACTOR shall carefully inspect the site as related to the Work described in all other Sections and verify that all Work may properly commence per the CONTRACTOR'S bid and without adverse impact.
2. If the CONTRACTOR has any concerns regarding the site, the CONTRACTOR shall notify the OWNER in writing within 48 hours of the site visit. Failure to notify the OWNER prior to submission of their bid will be construed as the CONTRACTOR'S acceptance of the related Work in all other Sections.
3. The CONTRACTOR shall verify site conditions prior to placement and/or excavation of any material.

END OF SECTION

SECTION A01025

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

All quantities are approximate. The CONTRACTOR is responsible to determine the exact bid quantities required to complete the project per the Drawings and described in the Specifications, haul distances, and all other information required to complete the Bid Sheet.

1.01 Contract Pay Items

Load counts shall not be used for an acceptable means of measuring any material fill quantities for payment purposes.

A. Proposal Item 1 - Mobilization and Demobilization

1. Measurement

Basis of Measurement: Lump Sum (LS). The Work required for this item will be measured on the basis of satisfactory evidence of mobilization of sufficient labor, equipment and material to adequately advance the Work.

2. Payment

Basis of Payment: The Lump Sum Price for Mobilization and Demobilization shall be payment in full for, but not limited to, all labor, equipment, material and other incidentals to the site, as well as CONTRACTOR provided utilities and ongoing related expenses, considered normal for administration of the work. Twenty-five (25) percent of the Lump Sum price bid will be paid with the first payment request following satisfactory evidence of mobilization of sufficient labor, equipment and material to adequately progress the work of this contract. Twenty-five (25) percent of the Lump Sum price bid will be paid with the payment request subsequent to the payment request in which the initial payment for this item is made. Fifty (50) percent of the Lump Sum price bid will be paid with the Final Payment request. The price bid in the proposal for this item shall not exceed three (3) % of the original contract amount.

Proposal Item 2 – Survey As-Built Subgrade

1. Measurement

Basis of Measurement: This is a lump sum bid item. The contractor shall employ a licensed Arizona surveyor to perform all site surveying, layout and prepare stamped as-built drawings. Survey as-built coordinates for all roads, channels, fencing and any other significant features shall be submitted to the engineer before completion of project. As-built data shall be provided in an AutoCAD compatible electronic format.

2. Payment

Basis of Payment: Payment for this work will be made on a lump sum basis.

Proposal Item 3 – Waste and Soil Relocation

1. Measurement

Basis of Measurement: Measured by the acre (AC). The CONTRACTOR will be responsible for cutting and filling in order to achieve subgrade elevations over both West and East disposal areas. The CONTRACTOR will encounter both construction debris and clean soil as the IRCL is graded to final cover subgrade elevations (top of foundation layer). The CONTRACTOR will make best efforts to preserve the soil stockpiles for the top layer of the subgrade. The ENGINEER will coordinate with the CONTRACTOR to determine quantities based on the acreage of subgrade completed and ready to receive final cover.

2. Payment

Basis of Payment: shall be payment in full for, but not limited to, all costs to excavate, load, haul, control dust, backfill, compact, and cover relocated waste. The CONTRACTOR will determine the areas where waste will need to be relocated based on his survey staking and Drawings 3, 4 & 5. All waste will be relocated to the fill areas shown on Drawings 3, 4 & 5, or as directed by the ENGINEER. The CONTRACTOR will adjust subgrade elevations as necessary such that the cut and fill volumes balance. Interim payments will be made only on fully completed and accepted acreage as approved by the ENGINEER. The CONTRACTOR may construct temporary haul routes, as necessary, to shorten haul times if approved by the ENGINEER.

Proposal Item 4 – Subgrade Preparation

1. Measurement

Basis of Measurement: Measured by the acre (AC).

2. Payment

Basis of Payment: shall be payment in full for, but not limited to, all costs to control dust, excavate, screen and/or process, load, haul, place, moisture condition, and compact in-place as shown on the Drawings and described in the Specifications. Payment will be made on per acre of completed in-place, compacted and accepted final cover subgrade. The distribution of existing excess waste/soil or surface materials within the limit of waste to balance cut and fill volumes is included. This item shall include eliminating any uneven areas and low spots.

Proposal Item 5 – 24" Culvert Pipe

1. Measurement

Basis of Measurement: Lineal Foot (LF) of ADS N-12 WT pipe installed per Details 5 & 6 on Sheet 15 (similar). Includes 1,194 LF of 24" ADS N-12 pipe with 12" thick rip-rap pads at the outlets. Headwalls are not included in the Phase 1 work.

2. Payment

Basis of Payment: shall be payment in full for, but not limited, to all costs to furnish material, prepare sub-grade, excavate, control dust, and complete drainage facilities and/or tie-in to existing or newly constructed drainage facilities in accordance with the Drawings and Specifications.

Proposal Item 6 – Perimeter Stormwater Channel

1. Measurement

Basis of Measurement: 10,612 Lineal Foot (LF) of perimeter channel completed per Details 4 on Sheet 15 and Detail 3 on Sheet 16.

2. Payment

Basis of Payment: shall be payment in full for, but not limited, to all costs to furnish material, prepare sub-grade, excavate, control dust, and complete drainage facilities and/or tie-in to existing or newly constructed drainage facilities in accordance with the Drawings and Specifications. Installation of non-woven geotextile and rip-rap is not included in the Phase 1 work. The CONTRACTOR will be responsible for verifying that stormwater collected in the perimeter channels flows to the basins.

Proposal Item 7 – Basin B Construction

1. Measurement

Basis of Measurement: Lump sum for a complete basin as shown on the construction drawings.

2. Payment

Basis of Payment: shall be payment in full for, but not limited to, all costs to prepare sub-grade, excavate, screen and/or process, condition, moisture condition, load, haul, control dust, place, compact, and fine grade the basin as shown on the Drawings and in accordance with the Specifications. Excess soil will be stockpiled on top of existing waste cells for use as fill. Interim payments will not be made.

Proposal Item 8 – Basin C Construction

2. Measurement

Basis of Measurement: Lump sum for a complete basin as shown on the construction drawings.

2. Payment

Basis of Payment: shall be payment in full for, but not limited to, all costs to prepare sub-grade, excavate, screen and/or process, condition, moisture condition, load, haul, control dust, place, compact, and fine grade the basin

as shown on the Drawings and in accordance with the Specifications. Excess soil will be stockpiled on top of existing waste cells for use as fill. Interim payments will not be made.

Proposal Item 9 – Basin B Bank Protection

1. Measurement

Basis of Measurement: 65,722 Square Foot (SF) of two foot (2') thick Rip Rap Installed.

2. Payment

Basis of Payment: shall be payment in full for, but not limited to, all costs to furnish and place Rip Rap and non-woven geotextile materials, install geotextiles, fasten, and seam (either sewing or heat fusion) as shown on the Drawings and described in the Specifications. All geotextile overlaps required during installation shall be considered incidental to this pay item and shall not be considered in the overall pay quantity.

Proposal Item 10 – Power Pole Protection

1. Measurement

Basis of Measurement: Each (EA) Installed per Detail 7 on Sheet 14.

2. Payment

Basis of Payment: This item shall be payment in full for, but not limited to all costs to protect the existing power poles. This item includes, but not limited to, all costs to excavate, load, haul, control dust, backfill, compact, and placement of soil adjacent to the pole. The CONTRACTOR shall be responsible for any damage to the power poles.

Proposal Item 11 – Removal of Fencing and Installation of Temporary Fencing

1. Measurement

Basis of Measurement: 4,581 Linear Foot (LF) as shown on the Drawings.

2. Payment

Basis of Payment: This item shall be payment in full for, but not limited to, all costs to remove specified fence sections, posts, barbed wire, gates, and all associated hardware. Remove and dispose of all specified fence and gates posts.

After completion of the Phase 1 grading the CONTRACTOR will install temporary fencing in all locations where permanent fencing was removed. The CONTRACTOR shall assume that the temporary fencing will remain in place for a period of one calendar year. The temporary fencing will be removed prior to beginning Phase 2 grading. The OWNER may choose to extend the temporary fence period beyond one year at their own cost.

Proposal Item 12 – AZPDES Permit/NOI/BMPs

1. Measurement

Basis of Measurement: Lump Sum (LS).

3. Payment

Basis of Payment: This item shall be payment in full for, but not limited to, obtaining and executing the provisions of an AZPDES permit for the construction activities relating to this Work.

A completed (typed) NOI shall be submitted to the ENGINEER at the preconstruction conference. AZPDES Compliance is the responsibility of the CONTRACTOR.

A monthly Stormwater Pollution Prevention Plan (SWPPP) Report must be submitted with each Progress Payment. Failure to submit this report will cause rejection of the payment request.

A completed (typed) Notice of Termination (NOT) shall be submitted to the ENGINEER at final acceptance. See the Section AZPDES Compliance in the Information for Bidders.

1.02 Load Counts

A. Load counts shall not be used for an acceptable means of measuring any and/or all material fill quantities for payment purposes.

1.03 Non Pay items

A. No separate payment will be made for items not specifically set forth in the bid proposal. Include the costs of such items in prices named in bid proposal for identified items of work. Items of work described in Contract Documents, but not listed in schedule of Work items of bid form are, in general, applicable to more than one listed work item. No separate work item is provided therefore. Include the costs of work not listed but necessary to complete project per Contract Document in listed Work items of the bid form.

1.04 Total Cost

A. Bids for Work are intended to establish a total cost for the work in its entirety. Should the CONTRACTOR feel that the cost for the Work has not been established by specific items in the bid form, he shall include the cost for that work in some related bid item so that his bid proposal reflects the total cost for completing the work in its entirety.

1.05 Quantity Overruns

A. No payment will be made for quantity overruns unless work is expressly required by Contract documents or authorized in writing by OWNER or OWNER's Representative.

1.06 Staking Rods

A. Detail 3 on Sheet 14 depicts a staking rod. The staking rods are measuring devices that will be used to determine the CONTRACTOR'S payment for the final cover section. The staking rods will be installed by the CONTRACTOR on top of the finished and approved foundation layer before placement of the infiltration layer begins. The staking rods will be the sole means of determining layer thickness. A staking rod that is destroyed during construction will be replaced with a test pit excavated at the CONTRACTOR'S expense.

1.07 Equipment Damage

A. The OWNER or ENGINEER will not be responsible for equipment damage associated with the relocation of waste at the IRCL. Equipment damage, such as a buried rebar puncturing a rubber tire, is the responsibility of the CONTRACTOR.

PART 2 - PRODUCTS

Not Used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION A01030

SPECIAL INSTRUCTIONS

1.0 GENERAL

1.01 INTRODUCTION

These instructions are site specific for the IRCL site. The CONTRACTOR shall comply with, but is not limited to, all Special Instructions listed in this section

1.02 WORKING HOURS AND HOLIDAYS

All work shall be performed during normal daylight hours unless specifically authorized by the ENGINEER or otherwise stated in the Specifications. The CONTRACTOR shall advise the ENGINEER of the CONTRACTOR's intended regular work hours prior to construction. The CONTRACTOR shall not work on holidays, or other days specified by Pima County, unless specifically authorized by the ENGINEER.

1.03 PARKING

The CONTRACTORs and his employees will only be allowed to park in areas as designed by the ENGINEER. The CONTRACTOR will be responsible for any work to prepare the designed area for parking. Any area disturbed by the CONTRACTOR will be restored to its original condition as approved by the ENGINEER. The CONTRACTOR is responsible for any cost required to repair and/or restore the designated parking area.

1.04 SMOKING POLICY

Smoking is not allowed at the IRCL.

1.05 CONTRACTOR KEY AND LOCKS

The CONTRACTOR shall be responsible for securing and locking the site entrance during non-working hours. Five keys to the construction entrance shall be provided to the ENGINEER by the CONTRACTOR.

1.06 SPECIAL CLEAN-UP

Any trash generated on the project site by the CONTRACTOR or his employees will be cleaned up daily by the CONTRACTOR for disposal offsite. Mud and dirt deposited in public areas (such as paved access roads and any other off-site roads) by the CONTRACTOR shall be scraped clean daily and washed down at least once per week.

1.07 LIMITING PUBLIC ACCESS

All necessary precautions including barricades and/or traffic cones will be used to prevent the public from entering the working area. The CONTRACTOR is reminded that the IRCL is a hazardous area containing explosive gases.

1.08 BIOHAZARDS

Waste may contain biohazards such as medical waste or dead animals. The CONTRACTOR's Health and Safety Plan, as required in Section A01110, shall address the potential for contact with hazardous waste and biohazards.

1.09 SUPERINTENDENT CELLULAR PHONES

The CONTRACTOR's superintendent shall be equipped with a cell phone through which the OWNER, and/or ENGINEER can reach the Superintendent during working hours.

1.10 MATERIALS DELIVERY

The CONTRACTOR is to have all materials delivered to his work site and/or staging area. The OWNER and ENGINEER will not accept material deliveries.

1.11 EMERGENCIES

The CONTRACTOR will provide the ENGINEER with the phone number of an individual who may be contacted in an emergency on a 24 hour, 7 day per week, including holidays, basis. To prepare for emergencies, the CONTRACTOR will insure that his employees know the location of appropriate fire and first aid equipment and emergency phone numbers. In the event of an emergency such as damage or rupture of a gas pipeline, the CONTRACTOR shall immediately notify the ENGINEER and/or the OWNER. Should such an emergency occur after hours the CONTRACTOR will notify the ENGINEER. This is in addition to the CONTRACTOR taking any appropriate immediate emergency response measures to correct the problem.

1.12 GENERAL SAFETY

The CONTRACTOR shall be responsible for maintaining safety on the project site in accordance with the provisions of the contract and including OSHA and NFPA regulations. In addition, the CONTRACTOR shall supply all necessary safety equipment for his employees and any site visitors. Tool box safety meetings shall be conducted a minimum of once per week for all site personnel.

1.13 MATERIAL SAFETY DATA SHEETS (MSDS)

The MSDS for any chemicals being used by the CONTRACTOR or his employees shall be posted in a location designated by the ENGINEER.

1.14 SANITARY FACILITIES

The CONTRACTOR shall provide adequate chemical toilet facilities for all personnel. The number of facilities shall be as required by Federal and State Safety and Occupational Standards. Chemical toilets shall be kept in a sanitary condition. The CONTRACTOR shall remove chemical toilets upon completion of the work and disinfect the premises.

1.15 STORM DAMAGE

The CONTRACTOR shall be responsible for the repair of any storm damage to the work prior to the Final Inspection by the ENGINEER. An example of storm damage would be erosion gullies in the final cover system caused by thunderstorm activity. Prompt repair of any storm damage shall be the responsibly of the CONTRACTOR.

1.16 EQUIPMENT FUELING AND MAINTENANCE

The CONTRACTOR shall fuel and maintain equipment in designated areas of the site as directed by the ENGINEER. Any fuel spills will be immediately cleaned up, and the contaminated soil removed from the site by the CONTRACTOR.

1.17 PRECEDENCE OF CONTRACT DOCUMENTS

In case of a discrepancy or conflict in the contract documents, the following order of precedence will be used:

Highest Precedence: Contract Documents – Construction Plans (Contract Drawings)
Project Specifications
Approved Change Orders
ADOT Specifications

The CONTRACTOR shall be advised that Contract drawings with smallest scale take first precedence for dimensional information, and, consequently; the lowest precedence shall be assigned to drawings with largest scale for purposes of dimensional information.

Where a conflict occurs between Section A and Section B of the Project Specifications, Section B Site Work shall govern.

1.30 PROJECT DOCUMENT CHANGE CONTROL

A structured process for controlling project Plan and Specification changes will be implemented by the ENGINEER. "Controlled" copies of the Plans and Specifications will be issued to the CONTRACTOR, OWNER and OWNER. Only these "controlled" copies will be updated with any future project addendums.

END OF SECTION

SECTION A01050

SURVEYING

GENERAL

1.01 SUMMARY DESCRIPTION

A. Work associated with this section includes labor, materials and equipment necessary to perform new construction layout and grade staking.

B. This section also covers required surveying for the development and maintenance of red-line as-built drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. All work covered by the Contract Documents.

1.03 QUALITY CONTROL

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary skills and who are completely familiar with the specified requirements and methods needed for proper performance of the work described in this Section.

1.04 SUBMITTALS

A. Submit the following:

1. Qualifications of persons proposed to be engaged for surveying services.
2. Certification, signed by the CONTRACTOR's retained Registered Land Surveyor that elevations and locations of buried structures and utilities are in conformance or

non-conformance with requirements of the Contract.

2.0 PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. Equipment and materials necessary for proper construction surveying will be at the CONTRACTOR's discretion.

3.0 EXECUTION

3.01 PROCEDURES

A. The CONTRACTOR shall complete the layout of the work and will be responsible for all measurements that may be required for the preparation of the project record drawings to the location and limit marks prescribed in the specifications or on the Contract Drawings. These locations and limits are subject to such modifications as the ENGINEER may require to meet changed conditions or as a result of necessary modifications to the Contract Work.

B. The CONTRACTOR shall furnish, at his own expense, such stakes, templates, platforms, equipment, tools and material, and all labor as may be required in laying out any part of the work from the survey control. It shall be the responsibility of the CONTRACTOR to maintain and preserve all stakes and other marks established work is complete and record information is satisfactory to the ENGINEER.

C. The ENGINEER may require the 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.

D. Locate and protect control points before starting work on the site.

E. Preserve permanent reference points during progress of the Work.

F. Do not change or relocate reference points or times of the Work without specific approval

from the ENGINEER.

G. Promptly advise the ENGINEER when a reference point is lost or destroyed or requires relocation because of other changes in the Work.

    1. Upon direction of the ENGINEER, require the Survey Party Chief to replace reference stakes or markers.
    2. Locate replacement stakes or markers according to the original survey control.

H. The CONTRACTOR shall make such surveys and computations as are necessary to determine the quantities of work performed or placed during each period for which a progress payment is to be made. All original field notes, computations and other records for the purpose of layout and progress surveys shall be furnished promptly to the ENGINEER at the site of the Work. A copy of the original notes, computations and records furnished to the ENGINEER shall be retained by the CONTRACTOR.

I. The CONTRACTOR shall make such surveys and computations as are necessary to determine the thickness of the various layers placed and compacted work progresses in accordance to the CONTRACTOR's approved quality control plan.

J. Provide survey control during the final grading of the foundation layer, infiltration layer, detention basin and the runoff collection channels within ±0.1 feet.

K. Provide survey control before and after placement for structural fill and infiltration control layer, including one monument along the ridge line after the project has been completed.

END OF SECTION

SECTION A01106

COORDINATION AND MEETINGS

1.0 GENERAL

This section provides information on coordination, the pre-construction meeting, progress meetings, and resolution meetings during the construction.

1.01 COORDINATION

1. The CONTRACTOR shall coordinate his work schedule, submittals, and various works to ensure an efficient sequence of the work and material.
2. The CONTRACTOR shall coordinate with the OWNER, the ENGINEER, and other involved parties with regard to the work, safety, and utilization of the site. The project will require open and continuous communication.

1.02 PRE-CONSTRUCTION MEETING

1. A pre-construction meeting will be held at the project site which will be scheduled by the ENGINEER in consultation with the OWNER, and the CONTRACTOR.
2. The meeting will be attended by the ENGINEER, the Designer(s), the OWNER, and the CONTRACTOR. The ENGINEER shall conduct the meeting and will take minutes of the meeting.
3. The meeting agenda shall include the site Health and Safety Plan for the project.

1.03 PROGRESS MEETINGS

1. Weekly progress meetings may be held at the site at the request of the ENGINEER.

2. The progress meetings will be attended by the ENGINEER, the OWNER, the CONTRACTOR, and if necessary other affected parties.
3. The meeting agendas shall be provided by the ENGINEER.

1.04 RESOLUTION MEETING(S)

1. To resolve conflicts, discrepancies, and differences of opinion, the ENGINEER shall convene Resolution meetings.
2. The Resolution meeting shall be attended by the affected parties.
3. The agenda of Resolution meetings shall depend on circumstances; however, the general idea(s) is to reach an amicable solution for both parties without incurring attorney fees.

1.06 PAYMENT

No payment will be made for meetings. The bid price shall include the cost that may be incurred to attend, respond to action items as a result of meetings, and provide coordination.

END OF SECTION

SECTION A01110

SITE ACCESS AND HEALTH & SAFETY REQUIREMENTS

1.0 GENERAL

1.01 SITE ACCESS

The project shall be completed in compliance with the Contract Documents and applicable State and Federal regulations. Pima County, State and Federal regulatory personnel and/or their agents shall have complete access to the site to observe the work in progress and/or conduct testing they deem appropriate. The CONTRACTOR shall be responsible for providing protective clothing/safety equipment and safety instructions for all visitors. Visitors shall be required to check in at the construction office with the project superintendent prior to site access.

1.02 HEALTH AND SAFETY REQUIREMENTS

A. GENERAL. The CONTRACTOR shall comply with all applicable Federal, State and local safety codes, ordinances, and regulations regarding worker safety. **The CONTRACTOR shall be responsible for the health and safety of everyone on the site, including visitors. After closure capping of the landfill is complete, the CONTRACTOR shall perform general fine grading of site with the intent of making the site safe for a public end use.**

B. LANDFILL SAFETY HAZARDS.

1. Hazards that might occur could be one or more of the following:

A. Fires may start or be started from exposed and/or confined decomposing solid wastes. Landfill gas can be explosive when mixed with ambient air.

B. Fires or explosions may occur in confined or enclosed spaces.

C. Landfill gases displace oxygen and may cause an oxygen deficient atmosphere in underground trenches, vaults, conduits and structures.

D. Heavy acid gases, including hydrogen sulfide may be present. Hydrogen sulfide is a colorless, toxic, flammable gas which in low concentrations, has an offensive odor described as that of rotten eggs. It is unlikely that hazardous concentrations of hydrogen sulfide will build up except in vaults or other confined spaces. Hydrogen sulfide quickly numbs the olfactory senses so that reliance upon odor can lead to a very dangerous condition and cause instant death.

E. Wildlife which could represent hazards to humans including rattlesnakes, gila monsters, and black widows. Rodents, birds, and stray dogs should be treated as potential hazards. Many of Arizona's reptiles are protected by State law. Removal of protected reptiles shall be done by a qualified handler.

2. Air quality studies consistently show that concentrations of most potentially hazardous substances (Priority Pollutants) in the ambient air on and in the vicinity of landfills are well below threshold limits. However, in confined or enclosed areas or venting sources of gas or adjacent to landfills, dangerous concentrations of combustible and possibly toxic gases may accumulate. Oxygen depletion may also occur in these areas of confinement; therefore, planning shall be performed followed by safety procedures which shall be continuously observed.

   The site Health and Safety Plan (HASP) which addresses safety procedures and requirements shall be prepared by the CONTRACTOR and submitted at the pre-construction meeting. The ENGINEER will review the HASP and provide a redlined plan with the ENGINEER's comments for the CONTRACTOR. The CONTRACTOR is totally responsible for the development, implementation and job site adherence to the site HASP. The CONTRACTOR will revise the HASP for approval. The HASP **must** be approved prior to notice-to-proceed. The CONTRACTOR is wholly responsible for the implementation and job site adherence to the site HASP.

C. GENERAL REQUIREMENTS.

1. The CONTRACTOR shall assign a site Safety Officer during the course of the work. The Site Safety Officer shall conduct safety orientation and instruction at all meetings with all workers prior to the start of operations. This person shall be trained in the use of all of the recommended safety equipment. The workers shall be advised concerning the kind and degree of hazard associated with the operations and the safety precautions required. Any persons employed after the initiation of operations shall also be oriented and instructed on said safety hazards and precautions.
2. Smoking or open flames shall be prohibited within the IRCL site construction area.
3. No worker shall be allowed to work alone at any time in or immediately near an excavation and/or construction area. Another worker shall be present at the site, but shall maintain a safe distance to preclude possible adverse impacts from IRCL gas.
4. Periodically during excavation and construction, the work area shall be monitored for levels of methane and hydrogen sulfide with results recorded and available for review by the ENGINEER.
5. Construction equipment shall be equipped with a vertical exhaust at least 5 feet above grade and/or with spark arrestors.
6. Motors utilized in the excavation area shall be explosion-proof.
7. No welding shall be permitted in or within 50 feet of an excavation area.
8. No excavation or drilled hole greater than 12 inches deep shall be left open overnight unless securely covered in an acceptable manner.
9. A minimum of two fire extinguishers of the 50-pound dry chemical type shall be maintained or kept within easy access of working area.
10. In addition to conforming to the safety rules and regulations of governmental authorities having jurisdiction, the CONTRACTOR is advised of the presence of methane gas emanating from the natural decomposition of refuse buried at the job site and shall take precautions to ensure the safety of workers and the public.

11. The CONTRACTOR shall, on a daily basis, demonstrate that all safety equipment is functioning properly, that all monitoring instruments are calibrated, and that the instrument OWNERs are sufficiently knowledgeable in the use of the safety equipment.
12. A copy of the HASP shall be posted at the job site. Scheduled meetings shall be held to review the safety program.
13. The CONTRACTOR shall adequately identify and guard all hazardous areas and conditions by visual warning devices and, where necessary, physical barriers. Such devices shall, at a minimum, conform to the requirements of OSHA.

END OF SECTION

SECTION A01300

SUBMITTALS

PART 1 – GENERAL

1.01 SUMMARY

A. General:

1. Section includes:

a. Requirements and procedures of the Submittal process for Shop Drawings, operation and Maintenance Manuals, and miscellaneous Submittal items.

B. Related Sections include but are not necessarily limited to:

1. Division 1 – General Requirements.
2. Sections in Divisions 2 through 16 identifying required Submittals.

1.02 DEFINITIONS

A. Shop Drawings:

1. See General Conditions.
2. Product data and samples are Shop Drawing information.

B. Miscellaneous Submittals:

1. Submittals other than Shop Drawings:
2. Representative types of miscellaneous Submittal items include but are not limited to:

a. Construction schedule.

b. Concrete, soil compaction and pressure test reports.

c. Installed equipment and systems performance test reports.

d. Manufacturer's installation certification letters.

e. Instrumentation and control commissioning reports.

f. Warranties.

g. Service agreements.

h. Cost breakdown (Schedule of Values).

i. Traffic Control Plan.

j. Proposed Products List and Product Data.

k. Soil Samples.

l. Survey Equipment Certification.

1.03 TRANSMITTALS

A. Shop Drawings and Operation and Maintenance Manuals:

1. Transmit each Submittal with a transmittal form. Provide three (3) copies of each Submittal.

2. All transmittals must be from CONTRACTOR and bear his approval stamp and signed or initialed.

a. Shop Drawing transmittal stamp shall read "(CONTRACTOR's Name) has satisfied the CONTRACTOR's obligation under the Contract Documents with respect to the CONTRACTOR's review and approval. This review will include, but is not limited to, verification of products required, field dimensions, adjacent construction Work, and coordination of information with all trades."

b. Operation and Maintenance Manual transmittal stamp may be the CONTRACTOR's standard approval stamp.

3. Provide Submittal information defining specific equipment or materials utilized on the Project. Generalized product information not clearly defining specific equipment or materials to be provided will be rejected.

4. Calculations required in individual Specification Sections will be received for information purposes only and will be returned stamped "E. ENGINEER's Review Not Required" to acknowledge receipt.

5. Submittal schedule:

a. Schedule of Shop Drawings:

1) Submitted and approved within 20 days of receipt of Notice to Proceed.

2) Account for multiple transmittals under any Specification Section where partial Submittals will be transmitted.

b. Shop Drawings:

1) Submittal and approval prior to 50 percent completion.

c. Operation and Maintenance Manuals and Equipment Record Sheets:

1) Initial Submittal within 60 days after date Shop Drawings are approved.

d. Schedule Submittals to expedite the Project and deliver in the time frame specified. Coordinate submission of related items.

B. Miscellaneous Submittals:

1. Transmit under the CONTRACTOR's standard letter of transmittal or letterhead.

2. Submit in triplicate or as specified in individual Specification Section.

1.04 PREPARATION OF SUBMITTALS

A. Shop Drawings:

1. Scope of any letter of transmittal:

a. Limited to one Specification Section.

b. Do not submit under any Specification Section entitled (in part) "Basic Requirements."

2. Numbering letter of transmittal:

a. Include as prefix the Specification Section number followed by "-xx" beginning with "01."

b. If more than one Submittal under any Specification Section, number transmittals consecutively.

3. Describing transmittal contents:

a. Provide listing of each component or item in Submittal capable of receiving an independent review action.

b. Identify for each item:

1) Manufacturer and Manufacturer's drawing or data number.

2) Contract Document tag number(s).

3) Contract Drawings Section or detail number if appropriate.

4) Specification Article/Paragraph number if appropriate.

4. Resubmittals:

a. Number with original root number and a suffix letter starting with "A" on a (new) duplicate transmittal form.

b. Do not increase the scope of any prior transmittal.

c. Account for all components of prior transmittal.

1) If items in prior transmittal received "A" or "B" Action code, list them and indicate "A" or "B" as appropriate.

a) Do not include Submittal information for items with prior "A" or "B" Action in transmittal.

2) Indicate "Outstanding-To Be Resubmitted At a Later Date" for any prior "C" or "D" Action item not included in resubmittal.

a) Obtain the ENGINEER's prior approval to exclude items.

5. For 8-1/2 x 11 inch size sheets provide four (4) copies of each page for ENGINEER plus the number required by the CONTRACTOR. The number of copies required by the CONTRACTOR will be defined at the Preconstruction Conference, but shall not exceed ten (10).

6. For items not covered in Paragraph 1.04-A.5 submit one (1) reproducible transparency and one (1) print of each Drawing until approval is obtained. Utilize mailing tube; do not fold. The ENGINEER will mark and return the reproducible to the CONTRACTOR for his reproduction and distribution.

7. Provide clear space (three (3) inch square) for ENGINEER stamping of each component defined in 1.04-A.4.

8. The CONTRACTOR shall not use red color for marks on transmittals. Duplicate all marks on all copies transmitted, and ensure marks are photocopy reproducible. Outline CONTRACTOR marks on reproducible transparencies with a rectangular box.

9. Provide space on all Submittals for the CONTRACTOR and ENGINEER review stamps.

10. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed Work.

11. Copies of reviewed Submittals will be distributed by the CONTRACTOR as appropriate. Parties receiving reviewed Submittals shall be instructed to report any inability to comply with provisions.

12. Transmittal contents:

    a. Coordinate and identify Shop Drawing contents so that all items can be easily verified by the ENGINEER.

    b. Identify equipment or material use, tag number, Drawing detail reference, weight, and other Project specific information.

    c. Provide sufficient information together with technical cuts and technical data to allow an evaluation to be made to determine that the item submitted is in compliance with the Contract Documents.

    d. Submit items like equipment brochures, cuts of fixtures, product data sheets or catalog sheets on 8-1/2 x 11 inch pages. Indicate exact items or model and all options proposed.

    e. Include legible scale details, sizes, dimensions, performance characteristics, capacities, test data, anchoring details, installation instructions, storage and handling instructions, color charts, layout drawings, parts catalogs, rough-in diagrams, writing diagrams, controls, weights, and other pertinent data. Arrange data and performance information in format similar to that provided in Contract Documents. Provide, at minimum, the detail provided in the Contract Documents.

    f. If proposed equipment or materials deviate from the Contract Drawings or Specifications in any way, clearly note the deviation and justify the said deviation in detail in a separate letter immediately following transmittal sheet.

B. Samples:

1. Identification:
    a. Identify sample as to transmittal number, manufacturer, item, use, type, Project designation, tag number, Standard Specification Section or Drawing detail reference, color, range, texture, finish, and other pertinent data.
    b. If identifying information cannot be marked directly on sample without defacing or adversely altering samples, provide a durable tag with identifying information securely attached to the sample.
2. Include application specific brochures and installation instructions.
3. Provide the CONTRACTOR's stamp of approval on samples or transmittal form as indication of the CONTRACTOR's checking and verification of dimensions and coordination with interrelated Work.
4. Resubmit samples of rejected items.

C. Operation and Maintenance Manuals:
1. Number transmittals for Operation and Maintenance Manual with original root number of the approved Shop Drawing for the item.
2. Submit two (2) copies until approval is received.
3. Identify resubmittals with the original number plus a suffix letter starting with "A".
4. Submit Operations and Maintenance Manuals printed on 8-1/2 x 11 inch size heavy first quality paper with standard three-hole punching and bound in stiff metal hinged binder constructed as a three-ring style. Provide binders with titles on front and on spine of binder. Tab each Section of manuals for easy reference with plastic-coated dividers. Provide index for each manual. Provide plastic sheet lifters prior to first page and following last page.
5. Reduce Drawings or diagrams bound in manuals to an 8-1/2 x 11 inch or 11 x 17 inch size. However, where reduction is not practical to ensure readability, fold larger Drawings separately and place in vinyl envelopes which are found in the binder. Identify vinyl envelopes with Drawing numbers.

6. Transmittal Content:

   a. Submission of Operation and Maintenance Manuals is applicable but not necessarily limited to:

      1) Major equipment.

      2) Equipment used with electrical motor loads of 1/6 HP nameplate or greater.

      3) Specialized equipment including instrumentation and control system components.

   b. Operation and Maintenance Manuals shall include, but not necessarily be limited to, the following detailed information, as applicable:

      1) Equipment function, normal operating characteristics, limiting operations.

      2) Assembly, disassembly, installation, alignment, adjustment, and checking instructions.

      3) Operating instructions for start-up, routine and normal operation, regulation and control, shutdown, and emergency conditions.

      4) Lubrication and maintenance instructions.

      5) Guide to "troubleshooting."

      6) Parts list and predicted life of parts subject to wear.

      7) Outline, cross-section, and assembly Drawings; engineering data; and electrical diagrams, including elementary diagrams, wiring diagrams, connection diagrams, word description of wiring diagrams, and interconnection diagrams.

      8) Test data and performance curves.

      9) A list of recommended spare parts with a price list and a list of spare parts provided under these Specifications.

10) Copies of installation instructions, parts lists or other documents packed with equipment when delivered.

11) Instrumentation or tag numbers relating the equipment back to the Contract Documents.

12) Complete maintenance requirements in detail. Simple reference to the Manual is not acceptable.

1.05 ENGINEER'S REVIEW ACTION

A. Shop Drawings and Samples:

1. Items within transmittals will be reviewed for overall design intent and will receive one of the following actions:

a. A – FURNISH AS SUBMITTED.

b. B – FURNISH AS NOTED (BY ENGINEER).

c. C – REVISE AND RESUBMIT.

d. D – REJECTED.

e. E – ENGINEER'S REVIEW NOT REQUIRED.

2. ENGINEER will review and process all Submittals promptly. Allow 14 calendar days review time for each Submittal excluding delivery time to and from the CONTRACTOR.

3. Transmittals received will be initially reviewed to ascertain inclusion of the CONTRACTOR's approval stamp. Drawings not stamped by the CONTRACTOR or stamped with a stamp containing language other than that specified in Paragraph 1.03-A.2.a will not be reviewed for technical content and will be returned without any action.

4. Transmittals returned with Action "A" or "B" are considered ready for fabrication and installation. If for any reason a transmittal that has an "A" or "B" Action is resubmitted, it must be accompanied by a letter defining the changes that have been made and the reason for the resubmittal. Destroy or conspicuously mark "SUPERSEDED" all documents having previously received "A" or "B" Action that are superseded by a resubmittal.

5. Transmittals with Action "A" or "B" combined with Action "C" (Revise and Resubmit) or "D" (Rejected) will be individually analyzed giving consideration as follows:
    a. The portion of the transmittal given "C" or "D" will not be distributed (unless previously agreed to otherwise at the Preconstruction Conference). One (1) copy or the one (1) transparency of the "C" or "D" Drawings will be marked up and returned to the CONTRACTOR. Correct and resubmit items so marked.
    b. Items marked "A" or "B" will be fully distributed.
    c. If portions of the items or system proposed are acceptable, however, the major part of the individual Drawings or documents are incomplete or require revision, the entire Submittal may be given "C" or "D" Action. This is at the sole discretion of the ENGINEER. In this case, some Drawings may contain relatively few or no comments or the statement, "Resubmit to maintain a complete package." Distribution to the OWNER and field will not be made (unless previously agree to otherwise).
6. Failure to include any specific information specified under the Submittal paragraphs of the Specifications will result in the transmittal being returned to the CONTRACTOR with "C" or "D" Action.
7. Transmittals such as Submittals which the ENGINEER considers as "Not Required," Submittal information which is supplemental to but not essential to prior submitted information, or items of information in a transmittal which have been reviewed and received "A" or "B" Action in a prior transmittal, will be returned with Action "E. ENGINEER's Review Not Required."
8. Samples may be retained for comparison purposes. Remove samples when directed. Include in bid all costs of furnishing and removing samples.

9. Approved samples submitted or constructed, constitute criteria for judging completed Work. Finished Work or items not equal to samples will be rejected.

B. Operation and Maintenance Manuals:

1. ENGINEER will review and indicate one of the following review actions:
   a. ACCEPTABLE.
   b. FURNISH AS NOTED.
   c. REVIEW AND RESUBMIT.
   d. REJECTED.
2. Acceptable Submittals will be retained with the transmittal form returned with a request for five (5) additional copies.
3. Deficient Submittals will be returned along with the transmittal form which will be marked to indicate deficient areas.

PART 2 – PRODUCTS

2.01 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate at the Pre-Construction meeting.

B. Construction operations will be scheduled to allow uninterrupted operation of existing adjacent facilities.

1. Coordinate connections with existing Work to ensure timely completion of interfaced items.

C. At no time shall the CONTRACTOR or his employees modify operation of the existing facilities or start construction modifications without approval of the OWNER except in emergency to prevent or minimize damage.

D. Within ten (10) days prior to construction startup, the CONTRACTOR to submit for approval a critical path type schedule.

1. Schedule to include any information discussed in preconstruction meeting.
2. Account for schedule of Subcontracts.
   a. Include proper sequence of construction, various crafts, purchasing time, Shop Drawing approval, material delivery, equipment

fabrication, startup, demonstration, and similar time consuming factors.

3. Show on schedule as a minimum, earliest starting, earliest completion, latest starting, latest finish, and free and total float for each task or item.

E. Evaluate and update schedule as necessary to reflect changes in the Scope of Work and CONTRACTORS work progress, but no less than bi-weekly.

1. Show changes since previous Submittal including major scope changes, activities modified since previous Submittal and other identifiable changes.
2. Update, correct, and rerun schedule and submit to the ENGINEER in triplicate with pay application to show rescheduling necessary to reflect true job conditions.
3. When shortening of various time intervals is necessary to correct for behind schedule conditions, indicate actions to implement to accomplish Work in shorter duration.
4. Information shall be submitted to the ENGINEER in writing with revised schedule.
    a. Review progress schedules during progress meetings.
    b. Submit a computer-generated graphic type schedule with separate line for each item of Work or operation identifying first Work day of each week.
    c. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities.
        1) Indicate the early and late start, early and late finish, float dates, and duration, and critical items.
    d. Indicate estimated percentage of completion for each item of Work at each submission.
    e. Indicate Submittal dates and review periods required for Shop Drawings, product data, samples, and product delivery dates, including those furnished by the OWNER.

f. Coordinate schedule with the ENGINEER for the ENGINEER's supplied information.

g. Coordinate schedule with Work Plan.

F. If the CONTRACTOR does not take necessary action to accomplish Work according to schedule, the CONTRACTOR may be ordered by the OWNER in writing to take necessary and timely action to improve Work progress at the CONTRACTOR's expense.

1. The OWNER may require increased Work forces, extra equipment, extra shifts or other action as necessary at the CONTRACTOR's expense.

2. Should the CONTRACTOR refuse or neglect to take such action authorized, under provisions of this Contract, the OWNER may take necessary actions including, but not necessarily limited to, withholding of payment and termination of Contract.

G. Indicate Submittal dates and review periods required for Shop Drawings, product data, samples, and product delivery dates, including those furnished by the OWNER.

H. Indicate surveys for layout, As-builts, and measurement for payment.

2.02 PROPOSED PRODUCTS LIST

A. At the Pre-construction meeting after date of Notice to Proceed, submit list of major products, if any, proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

2.03 SHOP DRAWINGS

A. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

2.04 PRODUCT DATA, (If Required)

A. Submit two (2) copies and a pdf electronic file to the ENGINEER for review and approval.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

2.05 SURVEY EQUIPMENT CALIBRATIONS

A. Provide certificates of calibration for all survey equipment used during the Project.

B. Submit calibrations to the ENGINEER five (5) days prior to putting equipment into use.

C. Re-calibrate as recommended by equipment manufacturer, then re-submit.

2.06 CORRESPONDENCE

A. The OWNER will provide a correspondence matrix identifying requirements for submitting and sharing correspondence among the parties involved in the Project.

2.07 CONTRACTOR'S WORK PLAN

A. Submit a preliminary Work Plan in accordance with Section 01310.

2.08 CONTRACTOR'S WATER USAGE LOG

A. Submit a monthly log of water used for dust control to the ENGINEER with each pay application. Update every month.

1. The water usage log of water shall include the following:

a. Date water was used.

b. How many hours each day the water was used.

c. Number of loads per day.

d. Number of water trucks/pulls used per day.

e. Loads of water per hour per day.

f. Subcontractor gallons of water used on any date the CONTRACTOR used water.

g. Pre-wet water usage, gallons per day.

h. Identify size of water trucks/pulls used and how many gallons each pieces of equipment placed per day.

i. Cumulative total per day and total gallons of water used per month.

2.09 AS-BUILT DRAWINGS

A. When any fabrication deviates from the Contract Documents, the CONTRACTOR shall prepare complete As-built Drawings of the actual fabrication. This will include detailed Specifications, dimensions, material used, parts, devices and other accessories used in the fabrications. Two complete sets of As-built Drawings shall be submitted to the ENGINEER.

B. The CONTRACTOR shall maintain a neat and accurately marked set of As-built Drawings showing the final locations and layout of all civil, mechanical, electrical, instrumentation equipment, piping and conduit, structures and other improvements. Drawings shall be updated daily with all Work instructions and change orders, accommodations and adjustments shown. As-built Drawings shall be kept in the job site trailer, or other location as approved by the ENGINEER, and shall be subject to inspection by the ENGINEER at all times. Progress payments, or portions thereof, may be withheld if the As-built Drawings are not accurate and current. As-built Drawings shall be separate, clean blueprints reserved for the purpose of showing the complete picture of the components and assemblies actually installed.

C. Upon completion of the Work, these As-built Drawings shall be transferred to the ENGINEER. Completed As-built Drawings will be signed by the CONTRACTOR, dated and returned to the ENGINEER for approval. Hand drawn sketches will not be accepted as completed As-built Drawings.

D. As-built coordinates will be provided for all significant system features, including existing and new gas extraction wells, extraction well control valves, extraction well tie-ins to the main header, header sample ports, flanges, and valves, etc. The ENGINEER shall determine what system features will require As-built coordinates. As-built coordinates shall be referenced to known benchmarks or survey monuments. **The Surveyor shall submit As-built Drawings in electronic format. Electronic files shall be AutoCAD compatible (i.e., dxf format).**

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION A01310

CONSTRUCTION WORK PLAN AND SCHEDULE

PART 1 – GENERAL

1.01 PRELIMINARY WORK PLAN AND SCHEDULE

A. Prepare and submit at the pre-construction meeting, a Work Plan and construction schedule.

B. The ENGINEER will review the preliminary Work Plan and construction schedule prior to the commencement of construction activities.

C. The CONTRACTOR may be interviewed by the ENGINEER to determine the CONTRACTOR's understanding of the Project, and ability to complete the Work in a timely and efficient manner.

D. Submit copy of Arizona Pollutant Discharge Elimination System (AZPDES) and earthmoving permit at Pre-construction meeting.

1.02 CONTRACTOR'S WORK PLAN CONTENTS

A. Include with Work Plan a drawing detailing various Work areas, the CONTRACTOR's utilities, phasing of Work, excavation, testing, and any other information related to proposed operations.

B. Describe personnel, equipment, and procedures required to accomplish specific items of Work, including:

1. Method of coordinating Subcontractors, if any, and maintaining Project schedule.
2. Methods and routes for moving and stockpiling materials on site. Include detailed drawings showing haul routes and logistics.
3. Methods for reducing or increasing the moisture content of wet or dry soils prior to using them for constructing engineered fills during construction.
4. Methods and equipment for excavating, hauling, and placing materials.
5. Dewatering methods, equipment and schedules.
6. Site drainage during construction.
7. Methods and equipment for site clearing.
8. Methods for erosion prevention and sediment control.

9. Plans for maintaining As-built information.
10. Health and Safety Plan.
11. Project Schedule.
12. List of Personnel and equipment.
13. List of Subcontractor's and Subconsultants.
14. List and organizational chart of Project personnel responsibility.
15. Other information required in the Technical Specifications.
16. Emergency action plan and contacts' telephone numbers.
17. Spill Prevention Control and Countermeasures (SPCC) Plan, if required based on quantity of petroleum products stored.
18. Stormwater Pollution Prevention Plan (SWPPP).

1.03 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Prepare a schedule as described in Section 01300.

B. Coordinate schedule with the OWNER for all OWNER supplied materials.

C. Coordinate schedule with Work Plan.

1.04 PROJECT MEETINGS

A. Construction Meetings:

1. The ENGINEER will conduct construction meetings involving:
    a. CONTRACTOR's Project Manager.
    b. CONTRACTOR's Project Superintendent.
    c. OWNER's designated representative(s).
    d. ENGINEER's designated representative(s).
    e. CONTRACTOR's Subcontractor(s) as appropriate to the Work in progress.
    f. OWNER's Construction Quality Control Consultant.
2. Meetings will be conducted every week.
3. The ENGINEER will take meeting minutes and submit copies of meeting minutes to participants and designated recipients identified at the Preconstruction Conference.

a. Corrections, additions, or deletions to the minutes shall be noted and addressed at the following meeting.

4. The ENGINEER will schedule meetings for most convenient time frame.
5. The ENGINEER will have available at each meeting full chronological files of all previous meeting minutes.
6. The CONTRACTOR shall have available at each meeting up-to-date As-built Drawings.

B. Pre-Installation Conferences:

1. Coordinate and schedule with the ENGINEER for each material, product, or system specified. Conferences to be held prior to initiating installation, but not more than two (2) weeks before scheduled initiation of construction.
   a. Conferences may be combined if installation schedule of multiple components occurs with the same two (2) week interval.
   b. Review manufacturers' recommendations and Contract Documents and Specifications.
2. The CONTRACTOR's Superintendent and individual who will actually act as foreman of the installation crew (Installer), if other than the Superintendent shall attend.

1.05 VIDEO RECORDING

A. Provide full access to the OWNER or the ENGINEER to perform video recording of construction activities, training sessions, start-up, trouble shooting, etc.

1.06 CORRESPONDENCE

A. The CONTRACTOR will provide a correspondence matrix identifying requirements for submitting and sharing correspondence among the parties involved with the Project.

1.07 SPECIAL CONSIDERATIONS

A. The CONTRACTOR shall be responsible for negotiations of any waivers or alternate arrangements required to enable transportation of materials to the Project site.

B. Maintain conditions of access road to site such that access is not hindered as the result of construction-related deterioration.

1.08 PROJECT PHOTOGRAPHS

A. The ENGINEER shall provide digital photographs of construction process.

1. Photographs shall be provided with nomenclature and description for easy identification of photo location and subject matter.

2. Submit photographs weekly in hard copy (2 copies) and electronic format.

1.09 FINAL WORK PLAN

A. Resubmit the Work Plan to incorporate the information discussed during the pre-construction meeting.

B. Work Plan and Schedule Revisions.

1. Revise Work Plan as necessary to reflect changes in scope of Work, but no less than once per month.

2. Show changes occurring since previous Submittal.

a. Major changes in scope.

b. Activities modified since previous Submittal.

c. Other identifiable changes.

3. Submit to the ENGINEER.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION A01400
QUALITY CONTROL

1.0 GENERAL

1.01 SUMMARY DESCRIPTION

A. This section specifies the CONTRACTOR's quality control descriptions and procedures and shall be applicable to all office, field, and shop work in the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 1 - General Requirements
B. Section 2 - Sitework

1.03 QUALITY CONTROL

A. Quality control (QC) refers to the sampling, testing and measuring of all materials used at the job site and the verification checking of the Drawings and Specifications by the CONTRACTOR to ensure that the Work conforms to the requirements of the Specification and Drawings. QC testing will comply with all pertinent codes, regulations and standards referenced within the Contract Documents.
B. Unless specifically authorized in writing, no construction shall be started until the CONTRACTOR's QC plan is approved.
C. The CONTRACTOR shall establish and continuously provide a quality control system to perform sufficient inspection and tests of all items of work, including that of subcontractors, to ensure conformance to applicable specifications and drawings with respect to the materials, workmanship, construction, finish, functional performance, and

identification. This control shall be established for all construction, except where the Technical Provisions of the contract provide for specific control inspections, tests or other means to be performed by the ENGINEER. The CONTRACTOR's control system shall specifically include the surveillance and tests required in the Technical Provisions of the Contract specifications.

D. The CONTRACTOR's quality control system is the means by which he assures himself that his construction complies with the requirements of the Contract plans and specifications. The controls shall be adequate to cover all construction operations and should be keyed to the proposed construction sequence.

E. The CONTRACTOR's job supervisory staff may be used for quality control, supplemented as necessary by additional personnel for surveillance, special technicians, or testing facilities to provide capability for the controls required by the Technical Provisions of the specifications. Prior approval is required for facilities, equipment, and personnel used by the CONTRACTOR in performing the specified tests.

1.04 SUBMITTALS

A. Submit to the OWNER and ENGINEER for approval a Quality Control Plan which shall include the procedures, instructions, and reports to be used in accordance with Section A01900.

1.05 NOTICES

A. Additional inspection and tests required due to defective work or ill-timed notices may be initiated by ENGINEER and will be at CONTRACTOR's expense.

1.06 PROJECT COOPERATION

A. Provide representatives of the OWNER and ENGINEER access to the Work at all times and at all locations where work is in progress.

B. Allow the ENGINEER, OWNER, or their representatives access and time to conduct Quality Assurance sampling or testing. Frequencies, time, and locations will follow the CQA requirements in Section A01900, but will ultimately be at the Field ENGINEER's discretion.

1.07 TESTING FREQUENCY

A. Sampling and testing frequencies shall be as assigned in each respective Section.

2.0 PRODUCTS

NOT USED

3.0 EXECUTION

NOT USED

END OF SECTION

SECTION A01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 REQUIREMENTS

A. The CONTRACTOR shall furnish, install and maintain required construction aids and barriers as required to prevent public entry, and to protect the Work, existing facilities, trees and plants from construction operations and other temporary facilities required to complete the Work.

B. The CONTRACTOR shall provide and maintain methods, equipment and temporary construction, as necessary to provide controls over environmental conditions at the construction site and related areas under the CONTRACTOR's control.

C. The CONTRACTOR shall remove all temporary facilities at completion of the Work or when no longer necessary.

D. The CONTRACTOR shall not interfere with the normal business traffic and operations of the IRCL waste tire site.

E. In addition to any other remedy available by law or equity to the OWNER, the parties expressly agree that the CONTRACTOR shall be liable for and shall pay to the OWNER the sum of five thousand dollars ($5,000.00) for each notice of violation and/or citation of a federal, state, county, city, agency, or administrative law, rule, regulation, ordinance or court order resulting from the CONTRACTOR's acts, errors, or omissions on the Project. This sum will be taken out of the CONTRACTOR's Contract with the OWNER. This sum is in addition to any penalty, fine, or fee imposed by a court of law or administrative agency related to the notice of violation and/or citation, and in addition to the CONTRACTOR's acts,

errors, or omissions on the Project. The parties expressly agree that the sum fixed above is reasonable and approximates the actual anticipated loss to the OWNER at the time and making of this agreement in the event that a notice of violation and/or citation is levied on the Project. The parties expressly acknowledge and agree to the fixed sum set forth above because of the difficulty of proving the OWNER actual damages in the event that a notice of violation and/or citation is levied on the Project.

1.02 DUST CONTROL

A. Dust control is absolutely critical on this Project. Due to businesses and institutions in close proximity to the IRCL, its operations are under public scrutiny at all times. The CONTRACTOR may need to obtain a Earthmoving Permit for this work. Dust complaints must be addressed by the CONTRACTOR as they reflect unfavorably on the Pima County.

B.

The CONTRACTOR shall be prepared to spend as much time as required to keep dust controlled in accordance with regulatory requirements. The air contaminant emission at the Work area shall not exceed 20-percent opacity during the Contract period. Local regulatory requirements may be more stringent than the maximum allowable stated above. The CONTRACTOR is responsible for identifying and complying with all applicable regulatory levels. Any dust emissions that can be seen by the naked eye, rising from the operation, and/or fugitive emissions obstructing the view of the operations, the CONTRACTOR is in violation of these Specifications. If the CONTRACTOR fails to provide the necessary dust control, to the ENGINEER'S satisfaction, the Project will be shut down, at the CONTRACTOR's expense, until the CONTRACTOR presents satisfactory evidence to the ENGINEER that he can continue Work and prevent dust as required.

C. The CONTRACTOR shall provide continuous positive methods and apply dust control measures to prevent rising dust from construction operations, and provide positive means to prevent airborne dust from dispersing into the atmosphere. Chemical dust suppressants shall be approved by the ENGINEER prior to use.

1.03 NOISE CONTROL

A. The CONTRACTOR's vehicles and equipment shall be such as to minimize noise to the greatest degree practicable. Noise levels shall conform to the latest OSHA standards and in no case will noise levels be permitted which interfere with the Work of the OWNER or others.

1.04 PEST AND RODENT CONTROL

A. Provide rodent and pest control as necessary to prevent infestation of construction or storage areas.

1. Employ methods and use materials that will not adversely affect conditions at the site or on adjoining properties.

1.05 WATER CONTROL

A. The CONTRACTOR shall provide methods to control surface water to prevent damage to the Project, the site, or adjoining properties. The CONTRACTOR shall control fill, grading and ditching to direct surface drainage away from excavations, pits, tunnels and other construction areas; and to direct drainage to proper runoff.

B. The CONTRACTOR shall provide, operate, and maintain equipment of adequate capacity to control surface erosion.

C. The CONTRACTOR shall dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas.

1.06 DEBRIS CONTROL

A. All areas under the CONTRACTOR's control shall be maintained free of extraneous debris and litter.

B. The CONTRACTOR shall initiate and maintain a specific program to prevent accumulation of debris at the Project site, storage and parking areas, or along access roads and haul routes.

1. The CONTRACTOR shall provide containers for debris deposit.
2. The CONTRACTOR shall prohibit overloading of trucks to prevent spillage on access and haul routes. Traffic areas shall be periodically inspected to enforce requirements.

C. The CONTRACTOR shall schedule periodic collection and disposal of debris. Additional collections and disposal of debris shall be provided whenever the periodic schedule is inadequate to prevent accumulation.

1.07 POLLUTION CONTROL

A. The CONTRACTOR shall provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations. If such contamination should occur, the CONTRACTOR shall immediately notify the OWNER and ENGINEER.

B. The CONTRACTOR shall provide equipment and personnel to perform emergency measures required to contain any spillage and to remove contaminated soils or liquids; and, shall excavate and dispose of any soil contaminated by the construction operations off-site, and replace with suitable compacted fill, topsoil and/or vegetation as directed by the ENGINEER.

C. The CONTRACTOR shall take special measures to prevent harmful substances from entering public waters; and, shall prevent disposal of wastes, effluents, chemicals, sediments, or other such substances adjacent to streams, or in sanitary or storm sewers.

D. The CONTRACTOR shall provide systems for control of atmospheric pollutants and shall:

1. Prevent toxic concentrations of chemicals and
2. Prevent harmful dispersal of pollutants into the atmosphere.

E. The CONTRACTOR shall provide adequate secondary containment structures for any above ground petroleum storage tanks and/or drums. If required based on the quantity of petroleum products stored, the CONTRACTOR shall prepare and implement a Spill Prevention, Control, and Countermeasures (SPCC) Plan, pursuant to and complying with the requirements of 40 Code of Federal Regulations, Part 112. The SPCC Plan shall be sealed by a Professional ENGINEER registered in the State of Arizona.

F. The CONTRACTOR shall obtain a construction AZPDES permit and develop a Storm Water Pollution Prevention Plan (SWPPP) for the construction phase of the Project.

1.08 EROSION CONTROL

A. General: The construction procedures outlined herein shall be implemented to assure minimum damage to the environment during construction. The CONTRACTOR shall take any and all additional measures required to conform to the requirements of applicable codes and regulations.

1. Whenever possible, access and temporary roads shall be located and constructed to avoid environmental damage. Provisions shall be made to regulate drainage, avoid erosion, and minimize damage to vegetation.
2. Where areas must be cleared for storage of materials or temporary structures, provisions shall be made for regulating drainage and controlling erosion, subject to the ENGINEER's approval.
3. Remove only those shrubs and grasses that must be removed for construction. Protect the remainder to preserve their erosion-control value.

B. Control Measures: Measures shall be applied to control erosion and to minimize the siltation of the existing waterways, and natural ponding areas. Such measures shall include, but are not limited to, the use of berms, baled straw silt barriers, gravel or crushed stone, mulch, slope drains, and other methods.

1. Install erosion and sediment control practices where shown and according to applicable standards, codes, and Specifications. The practices shall be maintained in effective working condition during construction and until the drainage area has been permanently stabilized.
2. Temporary measures shall be coordinated with the construction of permanent drainage facilities and other Work to the extent practicable to assure economical, effective, and continuous erosion and siltation control.
3. The CONTRACTOR shall provide special care in areas with steep slopes.
4. After stabilization, remove all straw bale dikes, debris, etc., from the site.

C. Dust Control: Prevent blowing and movement of dust from exposed soil surfaces and access roads to reduce on- and off-site damage and health hazards. Control may be achieved by irrigation in which the site shall be sprinkled with water until the surface is moist. The process shall be repeated as needed.

D. Failure to Comply: In the event the CONTRACTOR repeatedly fails to satisfactorily control erosion and siltation, the OWNER reserves the right to employ outside assistance or to use its own forces to provide the corrective measures indicated. The cost of such Work, plus engineering costs, will be deducted from monies due the CONTRACTOR.

E. Plan and execute construction and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
1. Hold the areas of bare soil exposed at one time to a minimum.
2. Provide temporary control measures such as berms, dikes, and drains.

F. Construct fills and waste areas by selective placement to eliminate surface silts or clays, which will erode.

G. Periodically inspect earthwork to detect any evidence of the start of erosion; apply corrective measures as required to control erosion.

PART 2 – PRODUCTS

2.01 MATERIALS, GENERAL

A. Materials shall be new and suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

2.02 CONSTRUCTION AIDS

A. The CONTRACTOR shall provide any and all construction aids, equipment and materials required to facilitate execution of the Work, including but not limited to: scaffolds, staging, ladders, stairs, signs, ramps, runways, platforms, railings, hoists, cranes, chutes and other such facilities and equipment.

PART 3 – EXECUTION

3.01 PREPARATION

A. The CONTRACTOR shall consult with the ENGINEER and review site conditions and factors which affect construction procedures and construction aids, including adjacent properties and public facilities which may be affected by execution of the Work.

3.02 GENERAL

A. Installation of facilities shall be of a neat and reasonable uniform appearance, structurally adequate for required purposes.

B. The CONTRACTOR shall maintain barriers during entire construction period.

C. The CONTRACTOR shall relocate barriers as required by progress of construction.

3.03 TREE AND PLANT PROTECTION

A. The CONTRACTOR shall preserve and protect existing trees and plants at the site and those adjacent to the site.

B. The CONTRACTOR shall consult with the ENGINEER and remove agreed-upon roots and branches which interfere with construction. The CONTRACTOR shall employ a qualified tree surgeon to remove roots and branches, and to treat cuts.

C. The CONTRACTOR shall provide temporary barriers to a height of six feet around each tree or plant or around each group of trees or plants which are in the area of the Work.

D. The CONTRACTOR shall protect root zones of trees and plants and shall perform the following in areas of protected trees and plants:

1. Not allow vehicular traffic or parking;
2. Not store materials or products;
3. Prevent dumping of refuse or chemically injurious materials or liquids; and
4. Prevent puddling or continuous running water.

E. The CONTRACTOR shall carefully supervise excavating, grading and filling, and subsequent construction operations, to prevent damage to existing vegetation, utilities, or monitoring devices.

F. The CONTRACTOR shall replace, or suitably repair, trees and plants, and irrigation systems which have been damaged or destroyed due to construction operations at the CONTRACTOR's expense.

G. Land Protection:

1. Except for any Work or storage area and access routes specifically assigned for the use of the CONTRACTOR, the land areas outside the limits of construction shall be preserved in their present condition. The CONTRACTOR shall confine his construction activities to areas defined for Work within the Specifications and the Contract Documents.
2. Manage and control all stockpile/borrow areas, Work or storage areas, access routes and embankments to prevent sediment from entering nearby water or land adjacent to the Project site.
3. Restore all disturbed areas including stockpile/borrow and haul areas and establish permanent type of locally adaptable vegetative cover.
4. Unless earthwork is immediately paved or surfaced, protect all side slopes and backslopes immediately upon completion of final grading. The

CONTRACTOR is responsible for any storm damage prior to project final acceptance.

5. Plan and execute earthwork in a manner to minimize duration of exposure of unprotected soils.
6. The CONTRACTOR shall construct fills by selective placement to eliminate surface soils that are susceptible to erosion.
7. The CONTRACTOR shall periodically inspect earthwork to detect any evidence of the start of erosion, and apply corrective measures as required to control erosion.
8. Except for areas designated by the Drawings, Specifications and the Contract Documents to be cleared and grubbed, the CONTRACTOR shall not deface, injure, or destroy trees and vegetation, nor remove, cut, or disturb them without approval of the ENGINEER. Any damage caused by the CONTRACTOR's equipment or operations shall be restored as nearly as possible to its original condition at the CONTRACTOR's expense.

3.04 REMOVAL

A. The CONTRACTOR shall completely remove temporary barriers, materials, equipment, and services:
   1. When construction needs can be met by use of permanent construction; or
   2. At completion of Project.

B. The CONTRACTOR shall clean and repair damage caused by installation or by use of temporary facilities including:
   1. Removal of foundations and underground installations for construction aids;
   2. Grading areas of site affected by temporary installations to required elevations and slopes; and
   3. Cleaning of the area.

C. The CONTRACTOR shall restore existing facilities used for temporary purposes to specified or original condition.

D. The CONTRACTOR shall restore permanent facilities, if any, used for temporary purposes to specified condition.

3.05 HISTORICAL AND ARCHAEOLOGICAL

A. If, during the course of construction, evidence of deposits of historical or archaeological interest is found, the CONTRACTOR shall cease operations affecting the find and shall notify OWNER.

1. No further disturbance of the deposits shall ensue until the CONTRACTOR has been notified by the OWNER that the CONTRACTOR may proceed.
2. OWNER will issue a notice to proceed after appropriate authorities have surveyed the find and made a determination to the OWNER.
3. The site has been previously investigated and has no known history of historical or archaeological finds.

3.06 TEMPORARY SANITARY FACILITIES

A. Toilet Facilities: The OWNER will not provide on-site toilet facilities for the CONTRACTOR's use. The CONTRACTOR shall be responsible for providing on-site toilet facilities for his/her employees. All toilet facilities shall be maintained in a neat and clean manner and shall not cause an eyesore. All toilet facilities shall follow all applicable regulations, laws, and ordinances.

B. Provide temporary sanitary toilet facilities conforming to state and local health and sanitation regulations, in sufficient number for use by the OWNER's designated Project Representatives, CONTRACTOR's and Subcontractor's employees.

C. Maintain in sanitary condition and properly supply with toilet paper.

D. No sanitary sewer pipe is located at the Project site.

1. Arrange for portable toilet units and holding tanks.
2. All wastes from trailer offices shall be piped to a holding tank.

E. Arrange for routine vacuuming, cleaning, and maintenance services.

F. Proper sanitary, vector, and odor control shall be required and maintained at all times.

3.07 TEMPORARY ELECTRICITY, TELEPHONE, AND DOMESTIC WATER

A. Electrical power for the CONTRACTOR's use will be provided by the OWNER. The CONTRACTOR shall pay the OWNER for whatever power they use from the OWNER's service. Monies owed to the OWNER will be deducted from the CONTRACTOR's Payment Requests. The cost will be $0.15 per kwH.

B. Provide power for all construction operations until final completion of Project.

C. Provide temporary lighting as required during construction.

D. Illumination Levels: In accordance with OSHA requirements for construction lighting.

E. Equipment and materials need not be new.

F. Temporary wiring shall be sized and fused in accordance with NEC requirements.

G. Relamp fixtures during construction period to meet requirements of the CONTRACTOR and Subcontractors, to satisfy applicable safety requirements, and as directed by the OWNER.

H. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

I. Provide and pay for suitable quality water service as needed to maintain specified conditions for construction operations.

J. Telephone and fax machines for the CONTRACTOR's use will not be provided by the OWNER.

K. Domestic water for human consumption shall be obtained by the CONTRACTOR.

L. Obtain written approval from the OWNER a minimum of 72 hours prior to disconnection or shutting off any service or utility.

3.08 TEMPORARY FIRE PROTECTION

A. The CONTRACTOR shall:

1. Provide and maintain in working order a minimum of one fire extinguisher in each trailer or as required by codes;

2. Be required to contact local fire department and meet all necessary fire codes at the Project site;
3. Make arrangements for fire department audits, 30 days after Notice to Proceed; and
4. Make roadways accessible to fire trucks.

3.09 TEMPORARY SITE AND OTHER ROADS

A. Construct and maintain temporary site roadways in drivable condition necessary to carry out construction operations.

B. Maintain the OWNER's existing roads and public roads used during construction free from accumulations of dirt, mud, and construction debris resulting from construction operations. Roads shall be considered "maintained" when material has been removed by a mechanical sweeper.

C. Paved roads damaged during routine and normal construction shall be repaired at the CONTRACTOR's expense per the Pima County paving requirements.

D. Provide photographs of road conditions before start of the Project.

E. Security will not be provided by the OWNER.

F. The CONTRACTOR shall be responsible for loss or injury to persons or property where Work is involved, and shall provide security and take precautionary measures to protect the CONTRACTOR's and OWNER's interests.

G. The CONTRACTOR shall provide insurance against loss of materials, contents of trailer(s), equipment, and other property at the Project site and Project trailer.

3.10 TEMPORARY PARKING

A. Temporary parking areas shall be provided by the CONTRACTOR at no additional cost to the OWNER.

1. The OWNER and ENGINEER will require on-site parking for at least five vehicles.

B. The CONTRACTOR shall maintain designated parking areas with 1-inch decomposed granite or other suitable material.

C. No heavy machinery shall be allowed on the OWNER's parking area.

3.11 TEMPORARY FENCING

A. Provide temporary fencing sufficient to prevent trespassing by the CONTRACTOR's employees and suppliers onto private property and by the public onto the construction site.

1. Provide fencing that is sufficiently secure against trespass of children and stray animals.

B. Materials shall be sufficiently durable to be effective for duration of construction period.

C. All temporary fencing around the Project site will be removed and replaced with permanent site fence as shown on the Drawings.

3.12 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish.

1. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe manholes, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

E. Open free-fall chutes are not permitted.

1. Terminate closed chutes into appropriate containers with lids.

3.13 PROJECT IDENTIFICATION

A. Project Identification Sign:

1. One (1) painted sign, as attached to the end of this Specification.
2. Content:
   a. Project number, title, logo, and name of the OWNER as indicated on the Contract Documents.

b. Names and titles of authorities.

c. Names and titles of the ENGINEER and Consultants.

d. Name of the CONTRACTOR and major Subcontractors.

3. Graphic design, colors, style of lettering: Designated by ENGINEER.

B. Project Informational Signs:

1. Painted informational signs of same colors and lettering as Project Identification sign, or standard products; size lettering to provide legibility at 100 foot distance.

2. Provide at each field office, storage shed, and directional signs to direct traffic into and within site. Relocate as the Work progress requires.

3. No other signs are allowed without the OWNER's permission except those required by law.

C. Design sign and structure to withstand 60 miles per hour wind velocity.

D. Sign Painter: Experienced as a professional sign painter for minimum 3 years.

E. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

F. Show content, layout, lettering, color, foundation, structure, sizes, and grades of members.

G. Sign materials:

1. Structure and framing: New wood, structurally adequate.

2. Sign surfaces: Exterior grade plywood with medium density overlay, minimum ¾ inch thick, standard large sizes to minimize joints.

3. Rough hardware: Galvanized aluminum or brass.

4. Paint and primers: Exterior quality, two coats; sign background of white color.

5. Lettering: Exterior quality paint, contrasting colors as selected.

6. Lettering: Pre-cut vinyl self-adhesive products, black

H. Installation:

1. Install Project identification sign within 15 days after date fixed by Notice to Proceed. The OWNER-CONTRACTOR Agreement.
2. Erect at location as directed by the ENGINEER.
3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
4. Install sign surface plumb and level, with butt joints. Anchor securely.
5. Paint exposed surfaces of sign, supports, and framing.

I. Maintenance: Maintain signs and supports clean, repair deterioration and damage.

J. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore the area.

3.14 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas to allow for the OWNER's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way.

C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

3.15 CONSTRUCTION WATER

A. The CONTRACTOR shall use the OWNER's designated reclaimed water supply for dust control and moisture conditioning soil. The stand pipe for reclaimed water is located on site. The CONTRACTOR is responsible for transporting reclaimed water per the Drawings and Specifications.

B. The CONTRACTOR shall not use any public fire hydrants, unless approved by the OWNER.

END OF SECTION

SECTION A01620

TRANSPORTATION, HANDLING, AND STORAGE

PART 1 – GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall make all arrangements for transportation, delivery, handling, and storage of equipment and materials required for prosecution and completion of the Work.

B. Shipments of materials to the CONTRACTOR or Subcontractor's shall be delivered to the site only during regular working hours. Shipments shall be addressed and consigned to the proper party giving name of Project, street number and city. Shipments shall not be delivered to the OWNER, except where otherwise directed.

C. Store and protect materials in accordance with Manufacturer's recommendations and requirements of Specifications.

D. Areas available on the Project site for storage of materials and equipment shall be as shown or approved by the ENGINEER.

E. If necessary to move stored materials and equipment during construction, the CONTRACTOR shall move materials and equipment without any additional compensation.

F. The CONTRACTOR shall be fully responsible for loss or damage to stored materials and equipment.

1.02 DELIVERY

A. The CONTRACTOR shall arrange, with the United States Postal Service, a special address for the Project. All deliveries shall be made to that address.

B. Arrange deliveries of products in accordance with construction schedules and in ample time to facilitate inspection prior to installation.

C. Coordinate deliveries to avoid conflict with Work and conditions at site and to accommodate the following:

1. Work of other CONTRACTORs, or OWNER.

2. Limitations of storage space.
3. Availability of equipment and personnel for handling products.
4. OWNER's use of premises.

D. Do not have products delivered to Project site until related Shop Drawings have been approved by the ENGINEER.

E. Do not have products delivered to site until required storage facilities have been provided.

F. Have products delivered to site in Manufacturer's original, unopened, labeled containers. Keep the ENGINEER informed of delivery of all equipment to be incorporated in the Work.

G. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts and to facilitate assembly.

H. Immediately on delivery, inspect shipment to ensure:
1. Product complies with requirements of the Contract Documents and reviewed Submittal;
2. Quantities are correct;
3. Containers and packages are intact, and labels are legible; and
4. Products are properly protected and undamaged.

1.03 PRODUCT HANDLING

A. Provide equipment and personnel necessary to handle products, including those provided by the OWNER, by methods to prevent soiling or damage to products or packaging.

B. Provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.

C. Handle products by methods to prevent bending or overstressing.

D. Lift heavy components only at designated lifting points.

E. Materials and equipment shall at all times be handled in a safe manner and as recommended by manufacturer or supplier so that no damage will occur to them.

Do not drop, roll or skid products off delivery vehicles. Hand carry or use suitable materials handling equipment.

F. Do not open manufacturer's containers until time of installation, unless recommended by the manufacturer or otherwise specified.

1.04 STORAGE

A. The CONTRACTOR shall make all arrangements and provisions necessary for the storage of materials and equipment. All excavated materials, construction equipment, and materials and equipment to be incorporated into the Work shall be placed so as not to injure any part of the Work or existing facilities and so that free access can be maintained at all times to all parts of the Work and to all public utility installations in the vicinity of the Work. Materials and equipment shall be kept neatly and compactly stored in locations that will cause a minimum of inconvenience to other CONTRACTORs, public travel, adjoining owners, tenants, and occupants. Arrange storage in a manner to provide easy access for inspection.

B. Do not store products in the structures being constructed, unless approved in writing by the ENGINEER.

1.05 PROTECTION

A. Equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage.

B. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted equipment surfaces, which are damaged prior to acceptance, shall be repainted in entirety to the satisfaction of the ENGINEER.

C. Electrical equipment controls, and instrumentation shall be protected against moisture, water damage, heat or dust. Space heaters provided in the equipment shall be connected and operating at all times until equipment is placed in operation.

1.06 UNCOVERED STORAGE

A. The following types of materials may be stored outdoors without cover:

1. Masonry units;
2. Reinforcing steel;
3. Structural steel;

4. Piping, except PVC;
5. Precast concrete items; and
6. Castings.

B. Store the above materials on wood blocking so there is no contact with the ground.

1.07 COVERED STORAGE

A. The following types of materials may be stored outdoors if covered with material impervious to water:
1. Rough lumber;
2. Hand railing; and
3. Piping, PVC.
4. Mechanical valves and equipment designated to be installed outdoors and not under cover.

B. Tie down covers with rope and slope to prevent accumulation of water on covers.

C. Store materials on wood blocking.

1.08 FULLY PROTECTED STORAGE

A. Pumps, motors, drives, other equipment having anti-friction or sleeve bearings, and electrical equipment (except control panels and electronic equipment) shall be stored in buildings or trailers that have a concrete or wood floor, a roof, and fully closed walls on all sides.

B. Provide heated storage space for materials that could be damaged by freezing and provide air conditioned storage space for materials that could be damaged by Arizona's severe high temperatures.

C. Protect mechanical and electrical equipment from being contaminated by dust, dirt, and moisture.

1.09 MAINTENANCE OF ON-SITE STORAGE

A. Maintain periodic system of inspection of stored products on a scheduled basis to assure that:
1. State of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on a continuing basis.
3. Products exposed to elements are not adversely affected.

B. Mechanical and electrical equipment which require long-term storage shall have complete manufacturer's instructions for servicing each item with notice of enclosed instructions shown on exterior of package.

1. Comply with manufacturer's instructions on a scheduled basis.
2. Space heaters that are part of electrical equipment shall be connected and operated continuously until equipment is placed in service.

1.10 OFF-SITE STORAGE

A. Control panels, microprocessor-based equipment and other electronic devices shall not be stored on site.

B. Storage shall be in an insured, climate-controlled warehouse within Pima County. The OWNER shall have the right to inspect the equipment during normal working hours. Placed inside each panel or device shall be a desiccant, volatile corrosion inhibitor blocks (VCI), a moisture indicator and maximum-minimum indicating thermometer. The panels and equipment shall be checked once per month. The desiccant, VCI, and moisture indicator shall be replaced as often as required or every six (6) months, whichever occurs first. A certified record of the daily maximum and minimum temperature and humidity in the warehouse shall be available for inspection by the OWNER. A certified record of the monthly inspection, noting maximum and minimum temperature for the month, condition of desiccant, VCI and moisture indicator, shall also be available for inspection by the OWNER.

C. Off-site storage shall be at no additional cost to the OWNER. Any panel or device which has been damaged by any cause or for which the storage temperature or humidity range has been exceeded shall be replaced at no additional cost to the OWNER and shall not be cause for a delay in Contract completion.

D. The panels and equipment shall not be shipped to the site until field conditions are ready for installation, including all slabs, walls, roofs, and environmental controls. The failure to have the plant site ready for installation shall not relieve the CONTRACTOR from meeting all Contract conditions.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.01 PROTECTION

A. Protect finished surfaces, including subgrade and asphalt.

3.02 REPAIRS AND REPLACEMENTS

A. In event of damage, the CONTRACTOR will promptly make replacements and repairs to the approval of the ENGINEER and at no additional cost to the OWNER.

B. Additional time required to secure replacements and to make repairs would not be considered by the ENGINEER to justify an extension in the Contract Time of Completion.

END OF SECTION

SECTION A01630

PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Refer to the Instructions to Bidders, General Conditions and the Supplementary Conditions regarding materials or equipment substitutions.

1.02 PRODUCT OPTIONS

A. For materials or equipment (hereinafter products) specified only by reference standard, select products meeting that standard, by any manufacturer, fabricator, supplier or distributor (hereinafter manufacturer). To the maximum extent possible, provide products of the same generic kind from a single source.

B. For products specified by naming several products or manufacturers, select any one of the products or manufacturers named which complies with the Specifications.

C. For products specified by naming one or more products or manufacturers and stating "or equal," submit a request for a substitution to the ENGINEER for any product or manufacturer, which is not specifically named.

D. For products specified by naming only one (1) product or manufacturer and followed by words indicating that no substitution is permitted, there is no option and no substitution will be allowed.

E. Where more than one (1) choice is available as a product option, the CONTRACTOR will select product that is compatible with other products already selected or specified.

1.03 SUBSTITIONS

A. During a period of seven (7) days after the effective date of the Agreement, the OWNER and ENGINEER will consider written requests from the CONTRACTOR for substitution of products or manufacturers, and construction methods (if specified).

1. After end of specified period, requests will be considered only in case of unavailability of product or other conditions beyond control of the CONTRACTOR.

B. Submit five (5) copies of request for substitution. Submit separate request for each substitution. In addition to requirements set forth in the General Conditions, include in request the following:

1. For products or manufacturers:

    a. Product identification, including manufacturer's name and address.

    b. Manufacturer's literature with product description, performance and test data, and reference standards.

    c. Samples, if appropriate.

    d. Name and address of similar projects, on which product was used, and date of installation.

2. For construction methods (if specified):

    a. Detailed description of proposed method.

    b. Drawings illustrating method.

3. Such other data, as the ENGINEER may require, to establish that the proposed substitution is equal to the product, manufacturer, or method specified.

C. In making request for substitution, the CONTRACTOR represents that:

1. The CONTRACTOR has investigated proposed substitution and determined that it is equal to or superior in all respects to the product, manufacturer, or method specified.

2. The CONTRACTOR will provide the same or better guarantees or warranties for proposed substitution as for product, manufacturer, or method specified.

3. The CONTRACTOR waives all claims for additional costs or extension of time related to proposed substitution that subsequently may become apparent.

D. A proposed substitution will not be accepted if:

1. Acceptance will require changes in the design concept or a substantial revision of the Contract Documents.

2. It will delay completion of the Work or the Work of other CONTRACTORs.

3. It is indicated or implied on a Shop Drawing and is not accompanied by a formal request for substitution from the CONTRACTOR.

E. If the ENGINEER determines that a proposed substitute is not equal to that specified, the CONTRACTOR shall furnish the specified product, manufacturer, or method specified, at no additional cost to the OWNER.

F. Approval of a substitution will not relieve the CONTRACTOR from the requirement for submission of Shop Drawings as set forth in the Contract Documents.

1.04 DELAYS

A. Delays in construction arising by virtue of the non-availability of a specified material and/or method will not be considered by the OWNER as justifying an extension of the agreed Time of Completion.

1.05 APPROVAL OR REJECTION

A. Written approval or rejection of substitution given by the ENGINEER.

B. The ENGINEER reserves the right to require proposed product to comply with color and pattern of specified product if necessary to secure design intent.

C. Substitutions will be rejected if:

1. Submittal is not through the CONTRACTOR with his stamp of approval.

2. Requests are not made in accordance with this Section.

3. In the ENGINEER's opinion, acceptance will require substantial revision of the original design.

4. In the ENGINEER's opinion, substitution is not equal to original product specified or will not perform adequately the function for which it was intended.

PART 2 – PRODUCTS
Not Used.

PART 3 – EXECUTION
Not Used.

END OF SECTION

SECTION A01700

CONTRACT CLOSE-OUT

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Close-out procedures.

2. Final cleaning.

3. Project record documents.

4. Spare parts, delivery tools, extra stock.

B. Related Sections include but are not necessarily limited to:

1. Section 01300 – Submittals; and

2. Section 01052 –Surveying.

1.02 CLOSE-OUT PROCEDURES

A. Submit written certification that the Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Drawings, Specifications and the Contract Documents and ready for the ENGINEER's inspection.

B. Submit documentation or lien releases from Subcontractors and suppliers documenting payment to Subcontractors and suppliers for all Work performed under this Contract.

C. Provide Submittals to the ENGINEER required by governing or other authorities.

D. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and Sum remaining due. Payment of final Project application for payment will not be made until all As-built Drawings and similar documents have been received and approved by the ENGINEER.

E. The OWNER will occupy all portions of the facility.

1.03 FINAL CLEANING

A. Public roadways in the vicinity of the project shall receive a final cleaning of dirt and litter.

1.04 PROJECT RECORD DOCUMENTS

A. Maintain on site, one set of the following record documents; record actual revisions to the Work.

1. Contract Drawings.

2. Specifications.

3. Addenda.

4. Stormwater Pollution Prevention Plan (SWPPP).

5. Change Orders and other Modifications to the Contract.

6. Reviewed Shop Drawings, product data, and samples.

B. Store Record Documents separate from documents used for construction.

C. Record As-built information concurrent with construction progress, and in accordance with Section 01052.

D. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured locations of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of the Work.

2. Field changes of dimension, detail, or materials.

3. Details not shown on original Contract Drawings.

1.05 SPARE PARTS, DELIVER TOOLS AND EXTRA STOCK

A. Provide spare parts, delivery tools and extra stock as specified in individual Specification Sections.

1.06 DOCUMENT SUBMITTAL

A. Complete close-out procedures, final cleaning, and submit Project Record Documents before applying for final payment.

B. Final payment will be withheld until Work of this Section is complete and accepted by the ENGINEER.

1.07 MAINTENANCE MANUALS

A. Organize operating and maintenance data into suitable sets of manageable size. See Section 01300 for specific O&M manual requirements.

B. Mark appropriate identification on front and spine of each binder. Include the following types of information:

1. Emergency instructions.

2. Spare parts list.

3. Copies of warranties.

4. Wiring diagrams.

5. Recommended "turn around" cycles.

6. Inspection procedures.

7. Shop Drawings and product data.

8. Fixture lamping schedule.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 CLOSE-OUT PROCEDURES

A. Operating and Maintenance Instructions:

1. Arrange for each installer of equipment that requires regular maintenance to meet with the OWNER's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:

a. Maintenance Manuals.

b. Record Documents.

c. Spare parts and materials.

d. Tools.

e. Lubricants.

f. Fuels.

g. Identification systems.

h. Control sequences.

i. Hazards.

j. Cleaning.

k. Warranties and bonds.

l. Maintenance agreements and similar continuing commitments.

2. As part of instruction for operating equipment, demonstrate the following procedures:

a. Start-up.

b. Shut-down.

c. Emergency operations.

d. Noise and vibration adjustments.

e. Safety procedures.

f. Economy and efficiency adjustments.

END OF SECTION

SECTION A01810

DRAWINGS

PART 1 - GENERAL

1.01 DESCRIPTION

The Construction Drawings, showing the scope, extent and character of the Work to be furnished and performed by the CONTRACTOR are provided under separate cover and are included as part of the Specifications and Contract Documents. The Drawings are listed as follows:

INDEX OF DRAWINGS

INA ROAD CONSTRUCTION DEBRIS LANDFILL CLOSURE DRAWINGS – Phase 1

1. TITLE SHEET
2. CURRENT TOPOGRAPHY
3. EXISTING GRADE TO SUBGRADE CUT AND FILL PLAN
4. EXISTING GRADE TO SUBGRADE CUT AND FILL PLAN
5. EXISTING GRADE TO SUBGRADE CUT AND FILL PLAN
6. CROSS SECTIONS A & B
7. CROSS SECTIONS C, D, E & F
8. CROSS SECTION G
9. CROSS SECTIONS H, I & J
10. CROSS SECTIONS K, L & M
11. CROSS SECTIONS N, O & P
12. CROSS SECTIONS Q, R & S
13. CROSS SECTIONS T, U & V
14. DETAILS
15. DETAILS
16. DETAILS

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION A01900
CONTRACTOR QUALITY CONTROL

1.0 GENERAL

1.01 SUMMARY DESCRIPTION

A. A construction quality assurance (CQA) manual for the installation of the earthwork and related components of the final cover system will be prepared by the CQA ENGINEER. This CQA Manual will stress careful documentation during the construction process, from the selection of materials through installation.

B. The overall goal of the CQA manual is to assure that proper construction techniques and procedures are used, and the project is built in accordance with the project plans and specifications. The CQA manual is intended to identify and define problems that may occur during construction and to verify that these problems are corrected before construction is complete.

C. All parties involved in construction of the final cover system should be thoroughly familiar with the CQA manual, the project construction drawings and specifications. Where there is a testing conflict between this document and other project documents, the document with the more stringent requirements governs.

1.02 REFERENCES

A. Technical specifications related to the U.S. EPA's "Technical Guidance Document Quality Assurance and Quality Control for Waste Containment Facilities", and EPA Guidance Document EPA/530-SW-86-031. Inspection Methods Used during the Construction of Final Cover Systems, are summarized within this section.

1.03 DEFINITIONS

A. Construction Quality Assurance CQA ENGINEER - Also referred to as the "ENGINEER" or "CQA ENGINEER". The person or company or OWNER representative responsible for performing tasks outlined in these specifications. The Lead CQA ENGINEER shall have monitored the installation of an infiltration control layer on at least five different projects. The CQA ENGINEER's duties include the following:

- Reviewing CONTRACTOR submittals.
- Observing material hauling, processing, placement, and compaction.
- Sampling materials for laboratory testing.
- Observing re-compaction of areas that failed during initial testing.

2.0 PRODUCTS

Not used.

3.0 EXECUTION

3.01 GENERAL

A. Construction shall be conducted in accordance with the project construction drawings and specifications.

B. All of the CONTRACTOR'S quality control testing shall be conducted in accordance with this quality control plan, and with the project construction drawings and specifications. All quality control documentation (forms, records and drawings) shall be provided by the CONTRACTOR in a format approved by the CQA ENGINEER.

Where there is a discrepancy, the document that requires the most frequent number of tests or the more stringent test requirement will govern unless otherwise specified by the OWNER. All field testing will be observed by the CQA ENGINEER. Documentation shall meet the requirements of the CQA manual.

3.02 GENERAL

A. In order to facilitate construction, and to clearly define construction goals and activities close coordination between the OWNER, CQA ENGINEER, and CONTRACTOR is essential. To meet this objective, the following meetings will be held.

1. Preconstruction Meeting. A preconstruction meeting will be held at the site within 2 weeks of the start of construction. The purpose of this meeting, which the CONTRACTOR, CQA ENGINEER, and other designated by the OWNER will attend, is to:

   - Review the construction drawings, specifications, CQA plan, work area security, safety procedures, and related issues.
   - Provide all parties with relevant documents.
   - Review the project construction drawings, specifications, and CQA plan.
   - Review and assign responsibilities for each party.
   - Define lines of communications and authority.
   - Establish reporting and documenting procedures.
   - Review testing equipment and procedures.
   - Establish testing protocols and procedures for correcting and documenting construction deficiencies.
   - Conduct a site inspection to discuss work areas, stockpile areas, laydown areas, access roads, haul roads, and related items.

- Review the project schedule.
- Develop addenda to the project documents.

The meeting shall be documented by the CQA ENGINEER. Copies of the minutes and relevant documents shall be provided to all parties.

2. Progress Meetings. A progress meeting will be held weekly after the start of work. At a minimum, this meeting will be attended by the CQA ENGINEER and CONTRACTOR. The purpose of this meeting is to:

   - Review scheduled work activities.
   - Discuss problems.
   - Review test data.
   - Discuss the CONTRACTOR's personnel and equipment assignments.
   - Review the previous week's activities and accomplishments.

   This meeting will be documented by the CQA ENGINEER and copies distributed to all parties.

3. Deficiency Meetings. As required, special meetings will be held to discuss problems or deficiencies. At a minimum, these meetings will be attended by the CQA ENGINEER and CONTRACTOR. If the problem requires a design modification, the OWNER and ENGINEER should also be present. The purpose of this meeting is to:

   - Define and discuss the problem or deficiency.
   - Review possible solutions.
   - Implement an action plan to resolve the problem or deficiency.

   The meeting shall be documented by the CQA ENGINEER and a copy provided to the OWNER.

4. Coordinate meetings under provisions of Section 01106.

3.03 FOUNDATION LAYER

A. The CONTRACTOR shall perform testing on foundation layer surfaces at frequencies as shown in the table below:

TESTS AND OBSERVATIONS

ON FOUNDATION LAYER

Parameter	Test Method	Minimum Testing Frequency
Percent Compaction (Note 1)	ASTM D 2922	1 per acre (Note 2)
Compaction Curve	ASTM D 1557	1 per 15 acres, 1 minimum
Preparation of Previously Compacted Lift	Observation	Part Time

1. Percent compaction is defined as the dry density of the compacted soil divided by the maximum dry density measured in the laboratory with a specified method of compaction. The test methods listed are for measurement of the dry density of the compacted soil.
2. In addition, at least one test should be performed each day the construction personnel prepare the foundation layer by compaction.

3.04 INFILTRATION CONTROL LAYER

A. Field Test Methods During Construction performed by the CONTRACTOR

1. The field testing frequency of low permeability soil layer after construction shall be as shown in the table below:

CONSTRUCTION TESTING FOR THE INFILTRATION CONTROL LAYER

Parameter	Test Method	Minimum Testing Frequency
Water Content	ASTM D 3017	1/acre/lift and at least 1 per 10,000 yd^3
Density	ASTM D 2922	1/acre/lift and at least 1 per 10,000 yd^3
Construction Oversight	Observation	Part-Time

2. Every tenth sample tested with ASTM D3017 should be tested by ASTM D4643.

3.05 DEFICIENCIES

A. When deficiencies (items that do not meet specified values) are discovered, the CQA ENGINEER shall immediately determine the nature and extent of the problem, notify the CONTRACTOR, and complete required documentation. In all cases, the CQA ENGINEER will notify the CONTRACTOR within ½ hour of discovering the deficiency. If the deficiency will cause construction delays of more than 1 hour or will necessitate substantial rework, the CQA ENGINEER shall also notify the OWNER.

B. The CONTRACTOR shall correct the deficiency to the satisfaction of the CQA ENGINEER or OWNER. If the CONTRACTOR is unable to correct the problem, the CQA ENGINEER will develop and present to the OWNER suggested solutions for his approval. The corrected deficiency shall be retested before additional work is performed by the CONTRACTOR. All retests and the steps taken to correct the problem shall be

documented by the CQA ENGINEER.

3.06 AS-BUILT DRAWINGS

The CONTRACTOR shall submit as-built drawings to the CQA ENGINEER. The as-built drawings shall accurately locate all construction items, including the location of piping, anchor trenches, etc. All surveying and base maps required for the development of the as-built drawings shall be prepared by a registered surveyor.

END OF SECTION

SECTION B

SITE WORK

SECTION B02110
SITE CLEARING AND GRUBBING

1.0 GENERAL

1.01 SUMMARY DESCRIPTION

A. This work shall consist of clearing, grubbing, removing and disposing of all vegetation and debris within the project limits of the IRCL Final Cover Project.
B. Clearing and grubbing shall also be conducted at the borrow site.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02211 - Grading
B. Section 02222 - Excavation

1.03 REGULATORY REQUIREMENTS

A. Conform to applicable State codes for disposal of debris. Burning debris on site will not be permitted. All other work shall conform to ADEQ and EPA regulations.
B. Coordinate work with utility companies, and the OWNER of the Wastewater Treatment Plant.
C. Obtain a Town of Marina Business license, and/or any other State and Local permits necessary to work at the site.

1.04 DEFINITIONS

A. Construction clearing includes the removal and disposal of trees, snags, stumps, shrubs, brush, limbs, and other vegetative growth, debris and obstructions in Work areas.

B. Grubbing includes the removal and disposal of surface organic materials, humus, wood, stumps, root matter, and logs at or below the ground surface, construction debris and other objectionable material remaining after construction clearing. Grub stumps, trunks, and roots to a depth of at least 30 inches below the ground surface. If stumps, trunks, roots or organic matter are present below a depth of 30 inches, extend grubbing as required by OWNER/Operator in order to remove more deeply embedded organic material. All subsurface roots larger than 1-1/2 inches shall be removed. Clean and remove debris and material, with the exception of vegetated soil cover, from the site.

C. Stockpile borrow excavation strippings at locations designated by OWNER/Operator.

1.05 SEQUENCING AND SCHEDULING

A. Schedule construction clearing, grubbing and the stockpiling of vegetated soil cover before excavation or construction. Submit schedule to the OWNER.

B. Schedule all clearing to minimize surface erosion within the borrow and project area.

2.0 PRODUCTS

2.01 MATERIALS

A. Preserve and/or relocate protected plants that are so designated and marked in the field by OWNER.

B. Save and protect from construction damage, vegetative materials (trees, shrubbery, and plants) beyond the limits of required clearing and grubbing. Areas beyond Work area which are damaged by CONTRACTOR shall be returned to their natural state or setting by CONTRACTOR.

C. Protect the environmental resources outside the limits of permanent structures during the construction period. Do not remove, cut, deface, injure, or destroy such resources or property including trees, shrubs, vines, grasses, vegetated soil cover and land forms.

D. Protect private property outside Work area from construction activities. Prior to construction, mark the areas within Work area that do not require Work to be performed under this Contract. Restrict access to these areas. Stake and flag isolated areas within the Work area which are to be saved and protected.

E. Protect monuments and markers before Work commences. If construction operations are to be conducted during darkness, the markers shall be illuminated so as to be visible in the dark. Communicate to personnel the purpose of marking and protection of necessary objects.

3.0 EXECUTION

3.01 CONSTRUCTION CLEARING

A. Clear areas to be occupied by Work. Keep clearing to the minimum amount possible. Clearing shall be limited to 5 feet outside the work area unless directed by the OWNER. No encroachment upon wetlands or other designated areas will be allowed.

B. Do not clear beyond property limits, or other areas marked on site.

3.02 CLEARING

A. Cut, trim and stockpile all marketable wood products as directed by OWNER.

B. Remove trees and vegetation matter within marked areas as indicated. Excavate stumps, root balls and root systems as noted above.

C. Clear vegetation without disturbing subsoil.

3.03 GRUBBING

A. Grub construction clearing areas and other areas as required by ENGINEER.

B. Fill surface depressions left by grubbing with fill material as directed by ENGINEER.

3.04 SITE SOIL LAYER

A. Strip the vegetated soil layer to a depth of at least 6 inches within the limits of the required excavation and store in designated stockpile areas.
B. If organic vegetated soil layer is present deeper than 6 inches, extend stripping as directed by ENGINEER.
C. Place vegetated soil layer in stockpiles that are separate and protected from other excess soil stockpiles. Coordinate the location of vegetated soil layer stockpiles with OWNER/Operator prior to stripping of the vegetated soil layer. Stockpiled vegetated soil layer shall be utilized to reclaim designated areas and areas that are disturbed during construction. Protect stockpiles to avoid erosion and loss of material.

3.05 DEMOLITION AND DISPOSAL

A. Dispose of debris resulting from clearing, grubbing and demolition operations in accordance with applicable laws and regulations and as approved by OWNER/ENGINEER. CONTRACTOR shall be responsible for, obtain, and pay for necessary permits. Submit permits to the OWNER/ENGINEER.
B. Burning of cleared debris shall not be permitted. Vegetation disposal shall be the responsibility of CONTRACTOR.

3.06 DAMAGED VEGETATION

A. Repair or replace protected trees or plants (landscaping) that are damaged during Work whether on-site or on adjacent property. CONTRACTOR shall:

1. Neatly trim torn limbs, trunk or severed roots using carpenter's saw or other appropriate tools.
2. Apply wood paint to above-ground wounds larger than 1 inch.
3. Remove vegetation damaged extensively and not capable of survival, as required in writing by OWNER/ENGINEER, and provide replacement acceptable to OWNER/ENGINEER.

END OF SECTION

SECTION B02211
GRADING

1.0 GENERAL

1.01 SUMMARY DESCRIPTION

A. Work consists of general fine grading (filling and excavation) required to establish a final site grade for the final cover system over the entire existing waste footprint, and the stormwater drainage channels as designated on the drawings.

B. After installation of the final cover system is complete, the CONTRACTOR shall perform general fine grading of all borrow sites used by the CONTRACTOR.

C. Stockpile spoil material and boulders for reuse later.

D. Grade, cut, fill, and contour adjacent areas or washes in the immediate vicinity work zone as required to dress or slope to drain.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02110 - Clearing and Grubbing.

B. Section 02215 - Closure - Cap Placement and Grading

C. Section 02222 – Borrow Excavation.

D. Section 02223 - Backfilling

1.03 PROTECTION

A. Protect bench marks, any existing structures, fences, and roads.

B. Protect above or below grade utilities and wells which are to remain.

C. Repair damage to any facilities disturbed as directed by the OWNER.

2.0 PRODUCTS

NOT USED

3.0 EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours, and datum.
B. Identify known below-grade utilities. Stake and flag locations.
C. Identify and flag above grade utilities.
D. Maintain and protect existing utilities remaining which pass through work area.
E. Notify appropriate utility agencies to remove and relocate utilities.
F. Upon discovery of unknown utility or concealed conditions, discontinue affected work notify OWNER.

3.04 ROCK EXCAVATION

A. Excavate rock, boulders and concrete blocks from areas to be graded and stockpile in area(s) designated by the OWNER or ENGINEER.
B. Pothole with backhoe/excavator as necessary to remove rock, boulders and concrete blocks protruding beyond the final cover system subgrade elevation.

3.05 GRADING

A. Cut and fill areas to contours or elevations as shown on plans.
B. Place and compact materials in continuous layers in conformance to Section B02223.
C. Maintain optimum moisture content of fill materials to attain required compaction density.
D. Make grade changes gradual. Blend slope into level areas.
E. Remove excess soil, unsuitable material, and boulders from the work area during rough and final grading and stockpile onsite at a stockpile area designated by the OWNER.

3.06 TOLERANCES

A. Rough grade surface of subgrade to within ± 0.5 feet of final grade.
B. Fine grade drainage channels and erosion control layer to plus or minus 0.1 feet, and must achieve the total design thickness as specified in accordance with Section B02250.
C. After installation of the final cover system is complete, the CONTRACTOR shall perform general fine grading of site with the intent of making the site safe for a public end use.

3.07 FIELD QUALITY CONTROL

A. CQA field inspection and testing will be performed under provisions of Section A01900.

B. The CONTRACTOR's tests and analysis of fill material shall be performed in accordance with ASTM D1557.

C. The CONTRACTOR's compaction testing shall be performed in accordance with ASTM D5195.

D. The CONTRACTOR is responsible for quality control measures and corrective actions in accordance with Section A01400 and results of the CQA testing.

D. If tests indicate work does not meet specified requirements, rework or remove work, replace and retest at no cost to OWNER.

END OF SECTION

SECTION B02222

DETENTION BASIN EXCAVATION

1.0 GENERAL

1.01 LOCAL BORROW

A. Local borrow shall consist of soil material gathered and excavated from the Stormwater Detention Basins. This material will be suitable for only detention basin berm construction and foundation layer construction.

B. The CONTRACTOR is to review the design drawings to determine the approximate amount of material that may be required for Detention Basin construction.

2.0 PRODUCTS

NOT USED

3.0 EXECUTION

3.01 DETENTION BASIN BERM CONSTRUCTION

A. Place material in a continuous manner within the limits of coverage, fine grade to provide uniform surface and depth. Place layers not exceeding 8 inch loose condition depth.

B. Erosion control layer materials are to be compacted to at least 90 percent compaction as specified by ASTM D 1557 unless otherwise specified or directed by the ENGINEER.

C. Moisture content shall be maintained uniform throughout and within the limits of ±2 percent of optimum moisture content.

3.02 PAYMENT

Payment will be made for excavation of the detention basin berms on a cubic yard of material excavated basis. The cost of constructing the detention basins, as shown on the Drawings, to the lines and grades indicated, shall be included as a separate bid item. This cost shall include excavation and construction of the detention basins, berms, and all other necessary items to complete the basins.

END OF SECTION

SECTION 02223

BACKFILLING

1.0 GENERAL

1.01 SUMMARY DESCRIPTION

A. This section describes the general requirements for structural fill, backfill placement, subgrade and foundation preparation, and foundation layer placement.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section B02211 - Grading
B. Section B02222 – Detention Basin Excavation
C. Section B02720 – Drainage Facilities

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. D 422 Method for Particle-Size Analysis for Soils
2. D 854 Test Method for Specific Gravity of Soils
3. D 1556Test Method for Density of Soil in Place by the Sand-Cone Method
4. D 1557Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10-lb (4.54 kg) Rammer and 30-in. (457 mm) Drop
5. D 3034Standard Test Method for Permeability of Granular Soils (Constant Head)
6. D 2850Test Methods for Unconsolidated, Undrained Compressive Strength of Cohesive Soils in Triaxial Compression
7. D 3087Classifications of Soils for Engineering Purposes

8. D 2922Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
9. D 2937Test Methods for Density of Soil in Place by the Drive-Cylinder Method
10. D 3017 Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.
11. D 4330 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
12. D 4643 Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method

B. United States Environmental Protection Agency (USEPA):

1. USEPA Test Method 9100

1.04 GENERAL REQUIREMENTS

A. CONTRACTOR shall be solely responsible for the safety of temporary cuts and fills.

B. Except as otherwise required by ENGINEER or Specifications, maintain the finished surface or subgrade adjacent to or forming the foundation for structures within normal industry tolerance for the specific work.

C. Use equipment, tools, and machines to perform Work in accordance with the requirements covered by Specifications. CONTRACTOR shall maintain equipment, tools and machines in satisfactory working condition. Compaction equipment shall be suitable for the soils to be compacted so as to consistently produce the required strengths throughout the compacted soil mass as required by Specifications.

D. Use excavated materials for the various types of fill to the greatest practical extent.

E. Grade and restore areas disturbed in any manner not required for completion of the Work, during construction. Restore disturbed areas to their original grade and profile, if possible.

F. Conduct work to reduce erosion/sedimentation to as little as possible. Provide temporary and permanent erosion control as needed.

G. The CONTRACTOR is responsible for the quality control measures for conducting work and corrective actions required from CQA testing and inspection.

1.05 QUALITY CONTROL

A. General

1. CQA observation, sampling and testing will be performed by ENGINEER to confirm that the materials and construction are in compliance with the requirements of the Contract Documents in accordance with Section 01900.
2. The CONTRACTOR shall implement the necessary quality control measures for earthwork preparation, excavation, backfill, and compaction of structural fill.

1.06 SUBMITTALS

A. As requested by ENGINEER, CONTRACTOR shall furnish samples of material available on-site or from CONTRACTOR'S source or supplier. Samples may be requested at the initiation of work, change in the material and periodically as the work progresses.

B. Submit for the ENGINEER'S review, specifications of equipment proposed for compaction and fill placement and its application at least 10 days before commencing each application.

C. Verification shall also be made that the equipment used is the same or similar to that used in the approved test pad.

1.07 STRUCTURAL FILL AREAS

A. Areas of shall be defined as those areas over which the foundation layer will be constructed, and any other areas so designated by the ENGINEER.

1.08 STRUCTURES

A. Structures shall be defined as improvements such as the landfill's foundation layer and earthen drainage structures.

2.0 PRODUCTS

2.01 DRAINAGE STRUCTURE RIP-RAP

A. The CONTRACTOR shall provide drainage structure rip-rap that is durable, free of deleterious material, and angular. This material shall be placed to the lines and grades as indicated on the drawings for all transverse collection and perimeter ditches, as indicated on the Drawings. The CONTRACTOR shall obtain rip-rap from a local source that has been approved by the ENGINEER.

2.02 FOUNDATION LAYER

A. The CONTRACTOR shall provide foundation layer material that is durable, well graded, and obtained from on-site borrow areas, detention basin excavations or a

location approved by the ENGINEER. Foundation layer thickness shall vary, depending on the existing field conditions, but shall provide foundation layer fill a minimum of 12 inches thick. All on-site materials are suitable for the Foundation Layer.

2.03 WASTE LAYER

A. The CONTRACTOR shall provide structural fill consisting of a layer soil over the relocated waste and/or construction debris, with the intent of achieving a uniform surface on which to construction the foundation layer. Relocated waste and/or construction debris may contain organic material or other deleterious substances and large objects. Large objects must be buried within the waste mass. Structural fill thickness over the relocated waste shall vary, depending on the existing field conditions, but shall provide a minimum of 12 inches of soil layer. The maximum particle size contained in the structural fill shall not exceed 8 inches in diameter.

2.04 EQUIPMENT

A. Furnish necessary personnel and equipment to satisfactorily perform Work described in this Section.

3.0 EXECUTION

3.01 PREPARATION FOR FILL PLACEMENT

A. Before placing structural fill materials, prepare the area by clearing existing obstructions, vegetation, and debris. Unsuitable material shall be incorporated into the waste mass.

B. Maintain and operate proper and adequate surface drainage to the satisfaction of ENGINEER in order to keep the site dry and in such conditions that placement and compaction of fill may proceed unhindered by saturation of the area.

C. The surfaces shall be proof rolled in the presence of the ENGINEER prior to fill placement. Proof rolling shall be performed with available heavy construction equipment of not less than 10 ton wheel load. Soft or yielding areas shall be removed and recompacted as directed by the ENGINEER. Waste and/or construction debris exposed during grading shall receive 6 inches of structural fill at the end of each day, or as directed by the ENGINEER.

D. Except as noted on Drawings or as required by ENGINEER, sloped ground surfaces steeper than one vertical to three horizontal, on which the structural fill or the foundation layer is constructed, shall be cut to form benches as shown on the drawings (or as directed by the ENGINEER) as the work is brought up in layers.

3.02 FILL FROM BORROW AREAS

A. Materials for foundation layer construction shall be from on-site sources.

B. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

C. After removing materials from borrow areas, leave the area in a clean and neat condition. Grade site surface to prevent free standing or ponded surface water.

3.03 GENERAL REQUIREMENTS FOR BACKFILLS

A. All materials shall be suitable for the foundation layer and will be free of organic material.

B. Do not operate heavy equipment over pipes and buried structures until at least 1.5 feet of fill material has been placed and compacted over the top in conformance with the requirements specified herein, or as directed by ENGINEER. Select and operate compaction equipment so that structures are not damaged nor over stressed during compaction operations. Use hand-operated mechanical tampers for compaction of fill material adjacent to structures where rolling equipment is impracticable for use in compaction.

C. Place in horizontal layers not exceeding the allowable lift thickness and which, after compaction, meet or exceed established compaction requirements. Place material containing stones in a manner to prevent segregation of the material and to prevent the formation of rock nests and voids in the fill.

D. Place and compact fill materials near their optimum water content.

E. Provide structural fill to the lines, grades, and elevations as shown on Drawings or as required in writing by the ENGINEER.

F. Place material in continuous layers not exceeding the required loose condition depth unless otherwise directed or approved. The cross fall shall not exceed one foot in 10 feet.

G. Backfill systematically and do not backfill over porous, wet, or spongy subgrade surfaces.

H. Make gradual changes in grade. Blend slopes into existing grades.

I. Any surplus backfill materials are not to be removed from site.

J. Compact each layer with a sufficient number of passes of the soil compactor. The number of passes shall be determined such that in the opinion of ENGINEER, sufficient compaction has been obtained.

K. Soils which cannot be placed and compacted to the criteria indicated above due to excessive moisture content should be air dried for a sufficient amount of time

such that they can be placed and compacted to meet the criteria or remove and replace.

L. In the event of a failing test, supplemental testing will be performed prior to placing any additional fill in order to define the area that has been inadequately compacted. The area shall be reworked and or removed and replaced, then retested prior to subsequent material being placed over the area.

3.04 WASTE LAYER

A. Grade the relocated waste to produce a uniform surface that is ready to receive the structural fill or the foundation layer.

B. Structural fill materials are to be compacted to at least 85 percent compaction as specified by ASTM D 1557 unless otherwise specified or directed by the ENGINEER.

B. Compaction shall be performed with appropriate equipment capable of providing compactive forces commensurate with the densities required.

C. Final waste surfaces are to be firm and unyielding.

D. Moisture content shall be maintained at a level to prevent the production of dust.

E. Verify that the compacted waste is ready to receive structural fill or the foundation layer material. Obtain approval from the ENGINEER prior to foundation layer placement.

3.05 FOUNDATION LAYER

A. Provide structural fill to the lines, grades and elevations as shown on the Drawings and as approved by the ENGINEER.

B. Place fill in continuous layers not exceeding 8 inches loose condition depth.

C. Compaction shall be performed with appropriate equipment capable of providing

compactive forces commensurate with the densities required.

D. Foundation layer materials are to be compacted to at least 85 percent compaction as specified by ASTM D 1557 unless otherwise specified or directed by the ENGINEER.

E. Moisture content shall be maintained uniform throughout and within the limits of ±2 percent of optimum moisture content.

3.06 UNSUITABLE MATERIALS

A. Unsuitable material encountered below the natural ground surface in fill areas or below the grading plane in excavation areas shall be excavated and buried within the waste layer, or disposed of as directed by the ENGINEER. Unsuitable material is defined as material the ENGINEER determines to be one of the following:

   1. Of such unstable nature as to be incapable of being compacted to specified density using ordinary methods at optimum moisture content.
   2. Too wet be properly compacted and circumstances prevent suitable in-place drying prior to incorporation into the work.
   3. Any material that is decomposable or organic is unsuitable for the planned use.

   The presence of excessive moisture in a material is not, by itself, sufficient cause for determining that the material is unsuitable.

B. When unsuitable material is removed and buried within the waste layer, the resulting space shall be filled with material suitable for the planned use. Such suitable material shall be placed and compacted in layers as hereinafter specified for constructing embankments.

C. Dispose of foreign materials, rubble, abandoned construction waste, and material that is unacceptable to the ENGINEER for fill in accordance with local regulations.

3.07 TEMPORARY DRAINAGE

A. The CONTRACTOR is responsible to construct, operate and maintain temporary drainage systems while construction occurs before the permanent drainage system is constructed and operational. Temporary drainage systems will be required to handle existing drainage and the revised drainage patterns as they occur during construction. Temporary drainage systems shall not impact the ability to construct permanent drainage systems.

3.08 PAYMENT

Payment for construction of the final cover will be made on a per acre completed basis. The cost shall include excavation, transportation, vehicles, labor, and all other necessary items.

END OF SECTION

SECTION B02720

DRAINAGE FACILITIES

1.0 GENERAL

1.01 DESCRIPTION

1. The work specified in this section shall include earthwork for drainage facilities, as shown on the Drawings. The drainage facility shall also include construction of a detention basins in accordance to the Contract Drawings.

2. The CONTRACTOR shall submit data regarding rip-rap gradation and quality of materials (only for Basin B exterior berms), and apparent specific gravity, absorption, and durability of gravel bedding material.

1.02 MATERIAL

1. The CONTRACTOR shall use material as specified in the Contract Documents and provided herein.

2. Drainage facilities and backfill materials:

   - Grading: As provided in Drawings.

   - Quality: The drainage facilities backfill material shall be from on-site sources.

3. Rip-Rap:

   - Grading: As provided in Drawings.

   - Quality: The rocks shall be durable and angular. Rip-rap shall be obtained from the off-site stockpile of material. The CONTRACTOR shall be responsible to load and transport the rip-rap to the landfill.

1.03 CONSTRUCTION

1. CONTRACTOR shall compact all fill material and subgrade soils in cut areas along the drainage channel to a minimum of 90 percent relative density, in accordance with ASTM D1557.
2. The placement and construction procedure for rip-rap placement shall be performed in accordance with this Section.

1.04 QUALITY ASSURANCE

The ENGINEER shall observe, field test, and document the construction of Drainage Facilities for verification of compliance with the Specifications.

2.0 PRODUCTS

2.01 DRAINAGE DITCH RIP-RAP

A. The CONTRACTOR shall not provide drainage ditch rip-rap for this phase of the project.

3.0 EXECUTION

3.01 MEASUREMENT AND PAYMENT

1. The payment for construction of the downdrains and drainage channels shall be paid based on a lineal feet completed and in place. Payment shall be made on the basis of unit price in the bid proposal. The payment shall include excavating, loading, transportation, backfilling, subgrade preparation, grading and hand placement, as necessary.
2. The payment for Basin B rip-rap bank protection shall be on a square yard basis, completed and in place.

END OF SECTION

SECTION B02725

WASTE AND SOIL RELOCATION

1.0 GENERAL

1.01 DESCRIPTION

1. The work specified in this section shall include earthwork for the excavation and relocation of the existing waste, soil, and construction debris from the landfill side slopes to the top deck of the landfill as delineated on the Contract Drawings.

2. The CONTRACTOR shall excavate and transport waste materials to the top deck of the IRCL for re-compaction to achieve design sub-grade elevations.

3. The CONTRACTOR is also responsible for burying oversize material in the top deck that was excavated from the side slopes. The CONTRACTOR shall backfill any depressions resulting from the over excavation of waste on the side slopes.

1.02 MATERIAL

1. The CONTRACTOR shall use best efforts to segregate waste from clean soil. The existing on-site areas with deep soil should be used to cover the waste. Suitable soil for backfilling shall be as specified in Section B02223. However, all on-site soil is suitable for the foundation layer.

1.03 CONSTRUCTION

1. CONTRACTOR shall compact all structural fill and subgrade soils in fill to a minimum of 85 percent relative density, in accordance with ASTM D1557.

2. The CONTRACTOR shall cover any exposed waste at the end of each work day with six inches of soil. However, waste consisting of inert material such as soil mixed with asphalt, brick or concrete need not be covered with soil.

TESTS AND OBSERVATIONS
ON SUBGRADE PREPARATION

Parameter	Test Method	Minimum Testing Frequency
Percent Compaction (Note 1)	ASTM D 2922	1 per acre (Note 2)
Compaction Curve	ASTM D 1557	1 per 15 acres, 1 minimum
Preparation of Previously Compacted Lift	Observation	Part Time

1. Percent compaction is defined as the dry density of the compacted soil divided by the maximum dry density measured in the laboratory with a specified method of compaction. The test methods listed are for measurement of the dry density of the compacted soil.
2. In addition, at least one test should be performed each day the construction personnel prepare subgrade by compaction.

1.04 FOUNDATION LAYER

1. .CONTRACTOR shall compact the 12 inch foundation layer to a minimum of 85 percent relative density, in accordance with ASTM D1557. The foundation layer shall be constructed over the relocated waste, soil, and construction debris.

1.05 QUALITY ASSURANCE

1. The ENGINEER shall observe and document the removal of waste to verify compliance with the Specifications.

2.0 PRODUCTS

NOT USED

3.0 EXECUTION

3.01 WASTE RELOCATION

1. The CONTRACTOR shall be responsible for transporting waste materials on site (by truck or dozer push). The CONTRACTOR shall pay all the costs involved, including transportation and re-compaction of waste. Alternatively, the CONTRACTOR may use a dozer to push waste to the top deck for compaction. If the CONTRACTOR elects to use a dozer, all usable soil cover shall be removed and segregated from the waste prior to pushing waste up to the top deck.

3.02 MEASUREMENT AND PAYMENT

1. The payment for the relocation of the waste materials shall be made per acre brought to subgrade elevation and graded.

END OF SECTION