ATTACHMENT I

AA SYDCOL WASTE TRANSFER FACILITY

CLOSURE PLAN
[R18-8-270.A (40 CFR 270.14(b)(13))]

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1.0 INTRODUCTION

1.1 Background

This Closure Plan (Plan) has been prepared to address closure requirements applicable to the AA Sydcol, LLC Facility (Facility) detailed in 40 CFR 264, Subparts G and financial assurance requirements detailed in 40 CFR 264, Subpart H, and A.A.C. R18-8-264.A.in support of the AA Sydcol RCRA Part B permit application. A list of all acronyms and a definition of key terms used in this Plan is provided with General Information provided in Appendix A of Attachment A of the Permit.

The Facility operates as a waste transfer station where hazardous wastes and non-hazardous wastes are separately accumulated, bulked, and transferred off site for treatment or disposal at permitted facilities. Universal wastes are also received at the Facility for bulking, treating/recycling, and transfer to a universal waste destination facility. Figure 1 illustrates the location of the Facility.

The design and planned operation of the Facility is for the storage and consolidation of solid and liquid hazardous wastes in three hazardous waste management units (HWMUs) as described in this Plan. Non-hazardous solid wastes are received at the Facility and stored and consolidated in a solid waste management unit (SWMU). A site plan illustrating the location of HWMUs and SWMUs is provided in Figure 2.

1.2 Closure Performance Standard

The intent of this Plan is to provide a clean closure to all hazardous waste operations such that all hazardous wastes and hazardous waste residues are removed from the facility without imposing restrictions on post-closure use. This Plan provides the steps necessary to close out all hazardous waste operations at the facility at any point during or at the completion of its operating life.

The objectives of Facility closure are to:

- Minimize the need for post closure maintenance
- To the extent necessary to protect human health and the environment, minimize or eliminate the post-closure escape of hazardous waste, hazardous constituents, leachate or contaminated run-off, or hazardous waste decomposition products to the environment, and,
- Comply with all applicable partial closure and final closure requirements.

All work under this Plan will be conducted in accordance with applicable local, state, and federal regulations. Partial closure of the Facility is not anticipated in this Plan.

1.3 Schedule for Final Closure of the Facility

The intended life of the Facility for hazardous waste activities is estimated to be 30 years, however the actual operational life will be dependent on the local and regional solid and hazardous waste market and not on-site constraints. Closure is therefore projected to occur in or after 2051, depending on market conditions.

Closure activities will begin by submitting notice to the ADEQ Hazardous Waste Program of intent to close hazardous waste activities at the Facility. The notice to ADEQ will be provided at least 45 days prior to the date Sydcol expects to begin final closure. A health and safety plan (HASP) will be prepared and submitted to ADEQ Hazardous Waste Program at least 30 days prior to the date Sydcol expects to begin final closure. Closure activities will begin on or prior to the final day of hazardous waste receipt at the Facility. Hazardous waste management units (HWMUs) HWMU1, HWMU2, and HWMU3 will be closed concurrently. The estimated schedule for conducting all closure activities under this Plan is as follows:

- Initial closure assessment: 5 weeks/35 days
- Inventory removal (HWMU1, 2, and 3): 6 weeks/42 days
- Facility decontamination (HWMU1, 2, and 3): 8 weeks/56 days
- Confirmation sampling: 2 weeks/14 days
- Closure certification: 2 weeks/14 days
- Total: 23 weeks/161 days

All treatment, removal and disposal of hazardous waste is anticipated to be completed within 90 days of receipt of the last shipment of waste. Decontamination of removal the Facility inventory is anticipated to be completed within 150 days of receipt of the last shipment of waste. The completion of closure on the site is expected to be completed within 180 days of the final receipt of hazardous waste at the Facility.

As closure of the Facility is anticipated to be complete within 180 days of commencing closure activities, there are no requests for extension of the closure time is anticipated in this Plan. Should additional time be required for completion of closure, a request for an extension will be made through the permit modification process with ADEQ.

2.0 HAZARDOUS WASTE MANAGEMENT UNITS

Sydcol will receive both listed and characteristic hazardous wastes, such as solvent wastes, corrosive wastes, and treated effluent wastes. Hazardous waste codes that may be handled at the Facility are listed in Table 1. All hazardous wastes will be stored in one of three HWMUs. HWMU1 is a sloped concrete pad located adjacent to the warehouse building, HWMU2 is a sloped concrete pad located adjacent to and north of HWMU1, and HWMU3 is a sloped concrete pad located north of the warehouse building. HWMU2 measures 50 feet by 100 feet, HWMU3 measures 85 feet by 100 feet, and HWMU measures 50 feet by 200 feet. Hazardous wastes that are solid and have been confirmed to be free of liquids can be stored in any of the HWMUs. Containers of liquid hazardous wastes can be stored within HWMU1, HWMU2, and on containment pallets within HWMU3. The three HWMUs are shown in Figure 2.

All HWMUs are located outside, each with a sloped 6-inch fiber mesh-reinforced concrete slab on a compacted 4-inch layer of ABC. A concrete lip berm is provided along three sides for each of the sloped HWMUs to provide secondary containment for the HWMU. HWMU1 and HWMU2 are underlain by a 60-mil HDPE geomembrane liner formed and sealed to the concrete pad to render the containment sufficiently impermeable to any spills or leaks in the HWMU. HWMU3 is underlain by a 10-mil polyethene liner but not formed and sealed to the concrete pad. Liquid hazardous waste containers stored in HWMU3 will be stored on containment pallets with adequate secondary containment for the stored containers. Any leaks or spills of hazardous waste are promptly cleaned up using absorbent (if necessary) and placed in a container for storage and off-site disposal as hazardous waste. Additional detail on the HWMUs is provided in Attachment D of the Permit (Container Management).

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3.0 CLOSURE PROCEDURES

Closure of the Facility HWMU will consist of the following steps:

1. Health and Safety Plan (pre-closure)
2. Initial Closure Assessment
3. Inventory Removal
4. Facility Decontamination
5. Confirmation Sampling
6. Demolition of Structures
7. Closure Certification

3.1 Health and Safety Plan

Sydcol will prepare a HASP to address workplace hazards associated with implementing this Plan. Personnel will be equipped with appropriate health and safety equipment as identified in the HASP. This equipment is anticipated to include, but will not be limited to, acid and solvent resistant protective clothing, head protection, and full-face respirators with organic vapor and acid gas filter cartridges or equivalent consistent with personnel protective equipment designated for OSHA Level C hazardous waste operations. Chemical neutralizers and spill control pads will be available to personnel in the event spills occur during periods of pipe drainage, disconnection, or dismantling processes. All Occupational Health and Safety Administration (OSHA) requirements for personal protection and monitoring will be adhered to at all times. The HASP will be submitted to ADEQ Hazardous Waste Program at least 30 days prior to initiating closure activities.

An estimated 60 hours for a Field Engineer, 60 hours for a Health and Safety Specialist, 40 hours of clerical time and 20 hours of a Project Manager's time are anticipated in preparing the HASP including a visit to the site by professional staff preparing the HASP.

3.2 Initial Closure Assessment

Upon initiating closure and prior to removal of inventory, Sydcol will review Facility history and operational records to identify and categorize waste types stored in the HWMUs. The Project Manager and the Field Engineer implementing the closure will perform the initial closure assessment. Sydcol's Facility Manager and/or Compliance Officer will assist in assessment. Unless the operating records indicate otherwise, it will be presumed that all waste types have been stored in each HWMU.

All HWMU areas will be inspected to look for potential hazards such as visible contamination, chemical hazards and/or physical hazards following removal of all hazardous wastes from the HWMU. A photographic log of each HWMU inspection will be maintained for a summary report of the initial closure assessment. Any potential safety hazard identified in the inspection will be addressed in the HASP before closure begins. Based on the potential wastes stored in these areas, sampling to verify areas have been decontaminated will be analyzed for a variety of parameters as identified in Section 4 of this Plan.

It is anticipated that it will take approximately 2 weeks to review operational records and prepare for the initial closure assessment, one day to inspect the condition of all HWMUs, and approximately 2 weeks to prepare an initial closure assessment report, to be included in the final closure report.

3.3 Inventory Removal

The projected inventory to be managed during the closure includes hazardous waste from operations that remains on-site. All hazardous wastes and hazardous waste containers will be removed from the Facility and transported under hazardous waste manifest for off-site treatment and disposal at a licensed recycling, treatment or disposal facility prior to closure.

For cost estimating purposes, Sydcol conservatively assumes that each HWMU will be at capacity and storing all wastes in drums. The total inventory is 600 drum-equivalents in HWMU1, 1,100 drum-equivalents in HWMU2, and 1,512 drum-equivalents in HWMU3, for a total inventory of 3,212 drum-equivalents. Hazardous wastes in inventory will be shipped to one of three disposal facilities based on the type of waste:

1. Flammable, corrosive, and reactive wastes:
Veolia North America
107 South Motor Ave.
Azusa CA 91702
Telephone: (626) 334-5117

2. Toxic wastes (metals, pesticides, VOCs, SVOCs) and F-listed wastes:
U.S. Ecology
Highway 95
11 miles south of Beatty, Nevada 89003
Telephone: (800) 239-3943

3. P/U-listed wastes:

Crosby & Overton Inc.
1610 W. 17th Street
Long Beach, CA 90813
Telephone: (562) 432-5445

For wastes being shipped to Veolia, removal crews will bulk compatible liquids into waste hauling trucks by transferring the waste from drums into the tanker truck hold at a rate estimated of 30 drums per hour. Wastes being shipped to US Ecology will be shipped in drums or totes. For waste types in drums being shipped to US Ecology, quantities in excess of 80 drums will first be consolidated into totes and shipped as totes. Waste types with less than or equal to 80 drums will be shipped as drums. Containers of P/U-listed wastes will be shipped directly to Crosby and Overton without any consolidation of contents.

Empty drums and totes will be disposed of as scrap. Sydcol estimates that it will take removal crews one week to remove containers from HWMU1, two weeks to remove containers from HWMU2, and three weeks to remove containers from HWMU3 for a total of six weeks of inventory removal. A Health and Safety Specialist has been included for oversight of the inventory removal while removal activities are being conducted at the Field Engineer level. A detailed summary of maximum waste inventory for the Facility is provided in Table 2.

3.4 Non-inventory Waste Management

Following the removal of all stored hazardous wastes from the Facility, Facility equipment will be either disposed of as bulk solid waste, bulk hazardous waste, or decontaminated by pressure washing to remove hazardous waste residues that may negatively impact their future use. Each HWMU will be decontaminated by pressure washing exposed surfaces. This section details the disposal of non-inventory items and steps necessary to decontaminate structures, equipment, and soils at the Facility as a component of Facility closure.

Non-hazardous bulk solid wastes will be disposed of in rented roll off containers. An estimated 15 tons in three 20-yard roll off containers are included for cost estimating purposes. Any hazardous wastes generated during closure, which may include washwater, rinsate, disposable clothing, contaminated tools and equipment, contaminated soils, and other miscellaneous closure wastes are included in the cost estimate as a separate item from the stored hazardous waste inventory. Wastes generated during closure will be assessed to determine if they are mixtures that include a listed hazardous waste or whether they exhibit a hazardous waste characteristic.

An estimated two tons of miscellaneous equipment (tools, tool cabinets, containers, etc.) will be disposed of as bulk hazardous waste solids. An estimated one ton of bulk hazardous waste solids

will also be generated from cleaning equipment used during the decontamination of all HWMUs (absorbent, brushes, brooms, rags, etc). For disposal of containment pallets used for receiving liquid hazardous wastes in HWMU3, this Plan conservatively accounts for up to 189 containment pallets for totes at 400 pounds each for a total of 37.8 tons of bulk solids to be disposed of as hazardous waste. A total of 40.8 tons of bulk hazardous waste solids will be generated during site closure and will require an estimated eight 20-cyd rolloffs for storage and transport to the disposal facility.

Any metal items and equipment that are destined for reuse or to be recycled as scrap metal will be cleaned within the secondary containment area of one of the HWMUs along with containment structures and other equipment described below in Facility Decontamination. An estimated 15 tons of metal tools and equipment will be cleaned and disposed of as scrap, requiring an estimated three 20-cyd rolloff containers. An estimated 14 20-cyd rolloff containers will be required to containerize bulk solids, including recyclable materials, hazardous waste and non-hazardous waste solids. An estimated 3,212 steel drums to be disposed of as scrap are assumed as the maximum drum capacity of the facility. Assuming 80 pounds per drum, an estimated 128 tons of drums will be bulk shipped to the recycling facility.

Non-hazardous solid wastes will be sent to a local or regional solid waste landfill. South Yuma County Landfill located approximately 15 miles south of the Facility was used for the purposes of this cost estimate. Recyclable scrap will be sent to a local recycling facility that will accept the type of scrap anticipated in this closure plan. The Republic Services Waste Transfer Facility located approximately 5 miles south of the Facility was used for the purposes of this cost estimate. Bulk solid wastes and recyclable scrap were both assumed to cost an estimated $30 per ton for disposal. Hazardous solid wastes will be sent to a regional hazardous waste facility permitted to accept bulk solid hazardous wastes. The US Ecology-Nevada facility located approximately 398 miles north of the Facility was used for the purposes of this cost estimate at $140 per ton to dispose of listed hazardous waste bulk solids.

3.5 Decontamination

All equipment and HWMU surfaces will be decontaminated using a high-pressure detergent wash and rinse. A commercial medium-duty pressure washer at 5 gallons per minute will be used for the pressure wash. Other decontamination equipment is anticipated to include a 5,000-gallon trailer-mounted water tank with tractor, two 50-foot long and 3-inch diameter discharge hoses, two laborers and a truck driver to operate the water tank tractor. Any operating equipment at the Facility that is intended for reuse will be thoroughly cleaned with a high-pressure wash system with detergent to remove any loose debris or surface stains prior to reuse. Decontamination of

operating equipment will be conducted within a contained HWMU, either HWMU1 or HWMU2. Pumps and transfer lines used to transfer hazardous waste are to be flushed using water from containment area and equipment decontamination.

Reusable equipment is anticipated to consist of three forklifts and six forklift attachments, six pallet jacks and 10 drum dollies, and a variety of miscellaneous tools and pumps that will be suitable for reuse. A commercial medium-duty pressure washer at 5 gallons per minute will be used to pressure wash equipment and concrete pad surfaces. Each forklift is estimated to require 10 minutes of detergent pressure washing and 2 minutes to rinse, or 36 minutes total of washing and rinsing. The forklift attachments are estimated to require a combined 10 minutes of detergent pressure washing and 2 minutes of rinsing. The remaining tools and equipment are estimated to require 30 minutes of detergent pressure washing and 10 minutes of rinsing. It is estimated that a total of 88 minutes of washing and rinsing is required which will generate approximately 440 gallons or 8 drum-equivalents of wash water will be generated in cleaning miscellaneous tools and pumps.

Concrete surfaces in all will be thoroughly cleaned using a high-pressure detergent wash system followed by a high-pressure rinse once all hazardous waste inventory has been removed from the Facility. Any areas which appear to have a buildup of material will be more aggressively cleaned using a suitable solvent or cleanser in combination with high pressure washing. Wash water from the concrete cleaning operation will be collected concurrent with the washing using a portable vacuum pump to collect waste wash water as it is being generated and stored in drums, totes, or portable containers in sufficient size and number to contain all washwater. It is estimated that rate of washing concrete pad surfaces is 200 square feet (sft) per minute. The washwater generation for decontaminating each of the HWMUs is as follows:

- HWMU1 (5,000 sft): 125 gallons or 3 drum-equivalents
- HWMU2 (8,500 sft): 213 gallons/4 drum-equivalents
- HWMU3 (10,000 sft): 250 gallons/6 drum-equivalents

The estimated total washwater generated in decontaminating equipment and structures is 1,028 gallons or 21 drum equivalents. All washwater will be stored in portable tanks, totes, or drums within HWMU1 or HWMU2 pending profiling and off-site disposal. For the purposes of this cost estimate, all washwater will be stored in drums.

All pressure washing wastewater will be profiled for off-site disposal at a licensed hazardous waste facility. Analytical data from a representative sample of the washwater from each of the HWMUs and the washwater for equipment and miscellaneous tools will be included in support of the profile. Samples will be analyzed for parameters required by the receiving facility and is anticipated to

include one sample from each HWMU and one sample from the equipment washwater for total metals, pesticides and herbicides, VOCs, SVOCs, pH and flashpoint.

All expendable items used in cleaning concrete surfaces and equipment will be treated as hazardous waste and disposed of off-site as bulk hazardous waste solids as described above in Section 3.3. An estimated 21 drum-equivalents of washwater and expendable materials will be generated following inventory removal. For the purposes of this cost estimate, all bulk hazardous waste washwater will be sent to Pacific Resource Recovery Services (PRR) located approximately 269 miles west of the Facility.

Each HWMU will be visually inspected after decontamination to ensure all surfaces are free of debris, soil and staining. Areas with sampling results indicating actionable levels of contamination will be cleaned again with additional confirmation testing or, at Sydcol's discretion, the structure will be removed and disposed at a permitted oft-site facility subject to the appropriate treatment standards.

Following decontamination, the suitability of the Facility for clean closure will be evaluated through environmental sampling consistent with Section 4 of this Plan.

3.6 Demolition of Structures

Sydcol intends to leave the existing warehouse, storage pads, and associated structures intact for post-closure operations at the site. No demolition of structures is anticipated under this Plan.

3.7 Closure Certification

To certify that final closure activities at the facility have been completed under the approved plan, Sydcol will submit a closure certification report to ADEQ documenting all closure activities and sampling results. Within 60 days of completion of closure, a closure certification report will be submitted by registered mail, verifying the facility has been closed in accordance with the specifications and procedures in the approved closure plan. This certification will be signed by Sydcol and by an independent registered professional engineer in accordance with 40 CFR 270.A 270.11(b) and (d)). The closure report will include, at a minimum, the following items:

i) Cover with Engineer's Seal affixed,
ii) Table of Contents, with Engineer's Seal affixed,
iii) Executive Summary,
iv) Deviations from the approved closure plan,

v) Closure procedures that were followed,
vi) Results and conclusions,
vii) Appendices with field notes, photographs, waste profiles, waste manifests, bills of lading, laboratory reports for all waste and site conditions characterization, and any other information necessary to fully describe the site closure.
viii) Owner/operator and engineer certification statements
ix) Figures showing the facility and where closure of hazardous waste management units occurred.

If remediation was necessary, other figures may be included showing the areas impacted by the remediation, including zones of the remediation, the support zone, areas where equipment decontamination occurred, access roads for haul trucks, location of the decontamination station of wheels and tires, wheel wells, and vehicle undercarriage, and locations where degraded soil piles were placed and imported soil piles were placed.

Forms for closure certification by the Owner and Project Engineer are included in Appendix A.

4.0 CLOSURE SAMPLING AND ANALYSIS PLAN

The purpose of the CSAP is to verify and document clean closure of the HWMUs such that all residues from hazardous waste operations have been sufficiently removed through the process of inventory removal and decontamination to render the Facility suitable for post-closure use. All sampling will be performed by properly trained and qualified personnel at the Field Engineer level with experience collecting environmental samples. Sampling personnel will be required to have active OSHA hazardous waste operations and emergency response certification. All samples will be analyzed by an Arizona certified laboratory using certified QA/QC procedures.

This CSAP provides a sampling plan, sample collection and analytical methodologies, and data validation requirements in sufficient detail to meet sampling and analysis quality assurance requirements necessary for site closure. A preliminary Quality Assurance Project Plan (QAPP) is provided in Appendix B. The closure cost estimate includes professional time in the event a more detailed project-specific QAPP is required under federal or state project funding requirements.

Samples will be collected from 10 background locations, 10 locations within the stormwater retention basins, 2 locations along the septic line, 4 locations from the concrete slab for loading dock bays and soils underlying the slab, 38 locations for concrete from each HWMU concrete slaband soils underlying the HWMU concrete slabs, and from 22 selected locations adjacent to the HWMU concrete slabs in areas of exposed soil. Judgmental sampling based on inspections consistent with this CSAP will be used to determine sample locations unless otherwise described in this section. A total of 20 background soil samples, 52 concrete samples, 96 soil samples for detection of contamination, and 152 contingent soil samples dependent on results of detection soil samples are anticipated under this CSAP. A summary of the samples to be collected under this CSAP and their general location is provided in Table 3. Tentative sample locations for background samples and general samples, including loading dock bay, septic line, stormwater basin, and background, are shown in Figure 3. Tentative locations for sample locations within and adjacent to the HWMUs are shown in Figure 4. Specific sample locations will be determined from the Initial Closure Assessment consistent with this CSAP.

In the event the visual inspection does not identify a sufficient number of areas with suspect contamination for judgmental sampling, samples will be collected at randomly determined locations in or adjacent to the HWMU.

4.1 Inspection of Concrete Pad Areas

Clean concrete surfaces in the HWMUs will be inspected for cracks by a licensed civil or structural engineer knowledgeable about concrete and damage to concrete structures. The inspector will use the American Concrete Institute's Guide for Conduction Visual Inspections of Concrete in Service or other industry-standard method for evaluating the condition of concrete floor slabs. All areas where the floor slab meets the sidewall foundations and the locations of known saw cuts in the floor slab will be included in the inspection. Locations where significant cracking that could potentially penetrate the slab is identified will be visually examined using penetrant dyes and removing the surficial concrete layer near the crack to determine if the crack penetrates into the interior of the slab. The inspecting engineer will document the inspection with a technical memorandum report including photographic record of observations made during the inspection. Tentative locations of HWMU sample locations are shown in Figure 4.

If necessary, the civil engineer will develop a concrete integrity assessment plan using destructive or non-destructive concrete test methods to determine the location of any cracks that penetrate the entire thickness of the concrete slab. These areas will be further evaluated by coring the concrete slab for subsurface soil sampling using the sampling and analysis methods identified in this Plan.

Samples will also be collected at the low point in each of the four loading dock bays accessing the warehouse building. The approximate location of loading dock bay samples are shown in Figure 3.

4.2 Inspection of Exposed Soil Areas

All hazardous waste storage and processing at the Facility occurs on concrete surfaces to minimize the potential for contamination of soils at the Facility. Nonhazardous solid waste storage and processing occur both on concrete pads as well as in areas of exposed soil in the SWMU. A visual inspection of areas at the Facility where hazardous waste transport vehicles were known to have been present will be performed by a Field Engineer properly trained to identify areas suspected of soil contamination that may be the result of leaked or spilled hazardous waste, in addition to the sampling locations used on the known areas of hazardous waste management. The inspector will prepare a technical memorandum report with recommendations on soil sampling locations that includes a photographic record of observations made during the inspection.

In particular, exposed soils near the loading/unloading bay doors in the warehouse building and the soils adjacent to the concrete storage surfaces in HWMU1, HWMU2, and HWMU3 will be inspected for suspect contamination. Indicators of soil that may require further investigation include:

- Visible discoloration or abnormally wet soils.

- Any areas which soil exhibits a chemical odor.
- Adjacent to stained areas of the concrete pad, particularly areas where the concrete containment curb is stained.
- Areas adjacent to the concrete slab where large spills of liquid hazardous waste are known to have occurred.

The tentative location of soil samples adjacent to HWMUs is shown in Figure 4.

Any exposed soils designated for further investigation will be first screened for organic compounds consistent with the standard operating procedure for screening soils for VOCs provided in Appendix C. Screening will be conducted with a PID. The total VOC concentration above background content will be noted for each sample screened. For screening in exposed soil areas, a surface sample and a sample at one-foot depth will be collected consistent with this CSAP. If the soil to be sampled is beneath a concrete slab, the concrete will be cored and screening samples collected from the soils or aggregate base course immediately beneath the slab and at a depth of 1 foot beneath the slab. Soil immediately underneath the concrete slab will be screened for VOCs no more than 6 inches below the concrete slab.

A detection of VOCs in the screening samples will be considered indicative of soil contamination and the contingent samples will be subject to laboratory analysis consistent with this CSAP.

4.3 Stormwater Basin and Septic Line Samples

In addition to soil sample locations determined from the visible inspection, soil samples will be collected within each of the three stormwater runoff basins and near the septic line feeding the septic tank and from the primary leach field area of the septic system. Six sample locations are anticipated for detection sampling in the large linear basin along the northern perimeter of the site and two sample locations are anticipated in each of the smaller retention basins on the east and south property boundaries. Two sample locations are anticipated along the septic line. The tentative location of stormwater basin and septic line samples are shown in Figure 3.

4.4 Background Samples

Twenty background samples will be collected at 10 locations depicted in Figure 3 prior to initiating hazardous waste operations at the Facility. Locations along the perimeter of the site have been selected to minimize the potential for contamination from past site use and current solid waste operations. Background samples will be collected at the surface and at one (1) foot depth for the same constituents as soil samples collected under this CSAP. The background concentration will

be established as the upper confidence limit of the mean (UCL) with 95 percent confidence. The background distribution will be established as a tolerance interval with a 95 percent confidence and 95 percent coverage, with the upper tolerance limit (UTL) established as a screening level. The background distribution will be evaluated to determine if sufficient background samples based on a substantial difference test with the acceptable substantial difference (S) being established as 95 percent of the RSRL for each inorganic compound evaluated in background samples using EPA guidance for comparing background with chemical compounds at CERCLA sites ("EPA Guidance," EPA 540-R-01-003, OSWER 9285.7-01, Appendix A.2.4, September 2002). If the ratio of S to the standard deviation is less than or equal to three, the number of appropriate background samples will be computed using the methodology in Section 3.1 of EPA Guidance with a minimum detectable difference equal to S. If the ratio of S to the standard deviation is greater than three, the number of appropriate background samples will be computed using a minimum detectable difference of S/2. Additional background samples will be collected and analyzed as necessary to establish the minimum number of acceptable background samples.

4.5 Sampling Methodology

Samples of concrete will be collected from concrete cores produced when drilling the concrete slab with a core barrel drill. Concrete core sample locations must include expansion joins and cold joints where the slab joins the concrete containment berm for each HWMU. Each concrete sample shall be placed in a ziplock bag after coring, labelled, and stored on ice in a cooler pending transport to the analytical laboratory. A complete core of the concrete slab will be considered a representative sample of the concrete slab.

Soils underlying concrete slabs will be accessed for sampling through core holes drilled through the concrete slab. Soil samples from HWMU1 and HWMU2 areas will be collected from the and any4-inch layer of base course aggregate. Soil samples beneath the slab for HWM3 and the loading dock bays will be collected from the top 6 inches of soil beneath the concrete core as well as at depths of 1 and 5 feet below the top of native soil. Similarly, at sample locations in exposed soil areas, samples will be collected from the surface soil material and at depths of 1 and 5 feet below the ground surface. Details showing the sampling depths for various locations are provided in Figure 4.

The soil core will be examined for staining or odors being emitted. A hand auger, hollow-stem auguer, or direct-push soil sampler will be used to collect soil below the concrete and aggregate base course material. A hollow-stem auger rig is assumed for the purposes of this cost estimate.

Collected samples will be placed in laboratory-supplied containers immediately upon collection. Samples for VOCs will be collected using a field extraction sample container such as En Core® samplers or equivalent volumetric sampling device. For both soil samples underneath concrete slabs and soil samples in uncovered areas, the sample taken at the soil surface will be analyzed for all parameters listed Table 4. If analytical results for all parameters are non-detect or below RSRLs and VOCs were not detected in PID screening described in Section 4.2, no further action will be taken. If one of these parameters is above the RSRL or VOCs were detected above screening levels, additional analysis for the respective parameters will be analyzed for each of the deeper samples. A supplement to the CSAP with additional sample locations and depths to determine the extent of soils exceeding RSRLs or any GPLs developed for the site will be prepared and submitted to ADEQ for review and approval. This will be repeated until the extent of contamination has been defined. If necessary, additional samples will be collected from depths greater than 5 feet below the top of native soil.

Sampling boreholes will be backfilled with clean soil. A concrete fill patch installed to repair the concrete slab for sample locations within the HWMUs. The repair will be epoxy-sealed consistent with the concrete slab surface.

All samples will be labelled to include, at a minimum, the following information.

- Sample Identification Number
- Date
- Time
- Sampling Personnel
- Matrix

As each sample is collected, a record will be made in the field notebook which further identifies the sample. All samples will be taken to a central staging area where they will be checked and recorded on a chain-of-custody form. Chain-of-custody procedures provide documentation of the handling of each sample from the time it is collected until it is destroyed. To maintain a record of sample collection, transfer between personnel, shipment, and receipt and handling by the laboratory, a "Chain-of-Custody Record" will be included with each sample shipment. This document will record pertinent information about each sample included in that shipment. Each time the samples are transferred to another custodian, signatures of the person relinquishing the sample and receiving the sample, as well as the time and date, will document the transfer.

Chain-of-custody records will have each sample identified with the station number, date and time of collection, matrix, number of containers per station, analytical constituents, and any special

instructions for the analytical laboratory. A copy of the chain-of custody will be retained by the sampler while the original is shipped with the samples.

The Chain-of-custody record will be placed inside the shipping container. A sealable plastic bag or other sheet protector will be used to protect the chain-of-custody form during shipment. All samples will be delivered directly to or shipped by the most expedient method to the analytical laboratory. Samples will be packed to prevent container breakage. The shipping container will be sealed with evidence tape to provide evidence of any tampering with samples during transport.

Sampling personnel will be properly trained and experienced in environmental sample collection consistent with sampling methodologies. Sampling personnel will also be trained consistent with OSHA HAZWOPER requirements for work at a hazardous waste management facility with current HAZWOPER certification. The HASP will be followed by all contractors working onsite.

All sample bottle preparation, sample preservation, sample size and maximum holding times shall conform to the procedures described in the analytical method. Sample containers will be prepared by the analytical laboratory and will be used as received. The analytical laboratory will be responsible for disposing of all samples in accordance with local, state and federal regulations. Soil samples collected for VOC will be appropriately collected and either sub-sampled or field extracted in accordance with EPA Method 5035. Liquid samples will be collected directly into the sample container, collected and transferred to the sample container using a pond sampler, or collected through a peristaltic pump with Teflon tubing.

Sampling equipment will be decontaminated after each use and before reusing by the following steps:

- Detergent wash followed by a clean water rinse
- Isopropyl alcohol rinse
- Triple rinse with deionized water and air dry
- Covered to minimize open exposure

Cleaning solutions and rinses will be collected into drums, totes or a portable tank and characterized for off-site disposal at an approved disposal facility.

4.6 Analytical Methods

Heavy metals, VOCs, SVOCs, and to a lesser extent pesticides and herbicides are present in a wide variety of waste streams accepted at the Facility. The analysis procedures listed below are expected to provide a good indication of the possible contaminants that could be present at the

time of closure. Analytical procedures and detection limits of the most recent version of each of the following methods published in EPA Hazardous Waste Test Methods/SW-846 are to be used in analyzing for specific compounds in closure samples:

- Method 6010 (metals: As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Be, Ni, Tl and Zn)
- Method 8260 (VOCs)
- Method 8270 (SVOCs)
- Method 8082 (organochlorine pesticides)
- Method 8141 (organophosphorous pesticides)
- Method 8151 (chlorinated herbicides)

Soil samples will be analyzed for total concentrations for each of 12 heavy metals as identified above. The soil concentrations for total metals will be compared statistically to the background data set. Statistical comparison of mean concentration in soil samples collected from operational areas will be compared to the UCL of uncontaminated background samples using to determine if the distribution of analytical results is representative of background concentrations. Individual sample results will be compared to the background UTL to determine if specific samples are representative of the background distribution. Sydcol may propose an alternate statistical procedure with ADEQ approval of an amendment to this Plan if determined to be necessary or appropriate.

If background samples identify metals in constituents above NRSRLs or GPLs, the samples will be analyzed for underlying hazardous constituents to characterize the nature of the exceedance.

4.7 Data Validation

Analytical laboratory data will be validated by reviewing the precision and accuracy of the data. The precision, or degree of agreement between measurements, is determined by the standard deviation of a single measurement from the mean of the data set. Duplicates of the same sample will be analyzed by the laboratory as a routine precision check consistent with the laboratory's QA/QC plan. Field duplicates will be collected at a rate of ten percent (10 %) of samples for each sampling media, selected at random, to be analyzed as a check on sampling and analytical technique.

The accuracy of a sample measurement is reported as percent spike recovery which represents the percentage recovery of a known quantity of compound which is added to the original sample and

subsequently analyzed. The methods used in sample analyses will contain quality control audit standards, including sample spiking, to be implemented to ensure data reliability.

The analytical laboratory will prepare quality assurance documentation for all samples analyzed for each sampling event. The level of detail will be sufficient to document all quality assurance activities specified by the method and shall include periodic assessment of measurement data accuracy, precision, and completeness, results of performance audits, results of systems audits, and significant quality assurance problems and resolutions.

The analytical laboratory will analyze the samples using the procedures outlined in EPA guidance publication SW 846 for all analyzed compounds. All analytical reports received from the laboratory will be included in the closure certification report and will include quality assurance test results, analytical methods, detection limits and dates. Analytical data will be summarized in tabular form for ease of presentation in a certification report. Statistical analysis comparing soil sample results with background concentrations will be prepared and submitted with the report.

4.8 Data Analysis

Analytical results for samples in exposed areas of soil will be compared to UTL screening level as a preliminary indication of whether or not the results are representative of the background distribution. For samples with contaminants exceeding the UTL, additional judgment samples for the contaminants exceeding the UTL screening level will be collected on a step-out pattern of 10 feet from the sampling location where UTLs were exceeded. The step out pattern of judgment sampling will continue until the extent of contamination is characterized by an area with maximum concentration of contaminants identified.

Areas where contaminants are identified above RSLs will be evaluated in relation to Arizona health-based guidance levels designated as RSRLs and NRSRLs. In the event analytical results indicate that the soils contain contaminants above the Arizona NRSRL's, the affected soils as defined by step-out samples will be excavated and treated or disposed at a permitted site. A minimum of one additional sample will be collected and analyzed six inches below each excavation to determine whether all contaminated soils have been removed. Larger excavations may require additional samples. Should contaminated soils remain on site at levels above the RSRLs but below the NRSRLs, Sydcol will prepare a DEUR for areas where soil contamination exists above RSRLs.

In addition to comparison with Arizona health-based guidance levels, Sydcol will determine whether Arizona GPLs are warranted to for any contaminants detected in soil samples. Sydcol will use ADEQ guidance and methods for establishing GPLs for the contaminants of concern. Soils with contaminants above GPLs will be considered to not meet clean closure criteria under this Plan.

Impacted soil that does not meet the clean closure criteria will be removed and treated or disposed in an off-site permitted facility in accordance with appropriate State and Federal regulations. If the extent or location of contamination makes removal impractical based on technical or economic reasons, it may be necessary to use other methods to address the impacted area. This may include in-situ treatment or it may involve post-closure care. A plan to address soil corrective action, a site-specific risk analysis, or a Post Closure Plan, will be developed if necessary.

4.9 Additional Sampling

In the event contamination is discovered in samples collected at a depth of 5 feet bgs, additional samples will be collected at the location of the detection at a depth of 10 feet bgs and at the depth of the water table, anticipated to be approximately 15 feet bgs. A grab sample of groundwater will be collected from the top of the aquifer using a disposal or decontaminated sampling bailer. Additional soil and groundwater samples will be tested for the constituents detected in soils at a depth of 5 feet.

If additional samples are required due to any unexpected event, such as discovery of contamination or discovery of a release to the environment, the closure plan will be modified and such modification will be submitted to ADEQ for approval.

5.0 FINANCIAL ASSURANCE

5.1 Closure Cost Estimate

A closure cost estimate is presented in Appendix D. The closure cost estimate contains a summary page as Table D-1 and several supporting spreadsheets to calculate an estimated cost for each element of the Facility closure. For clarity of presentation, professional services provided throughout the closure process are calculated separately on a single spreadsheet provided in Attachment D-2. The cost of loading, transport, and disposal of all hazardous waste in the Facility's inventory at closure are presented in Table D-3, including management costs associated with inventory removal. Attachment D-4 presents costs for decontaminating the Facility and the cost for loading and removing non-inventory wastes, including waste generated in the process of decontamination. Attachment D-5 presents costs associated with confirmation sampling at the Facility to confirm clean closure, including the analysis of all contingency samples.

One of the spreadsheets assumes a diversity of waste types extrapolated to the maximum RCRA waste inventory based on past waste streams arriving at the facility. The costs of labor and equipment to remove the waste from site have also been included with the waste removal estimate.

The closure cost estimates are based on closure costs involving third parties for inventory disposal, transportation, site/equipment decontamination, labor, and administrative and engineering certifications. Where appropriate, relevant reference values were used for necessary equipment and services published in RS Means (RS Means, 2020). Published values that include contractor O&P were used in all line items to adequately account for O&P in the itemized total. Each RS Means value was adjusted for the RS Means location factor for Phoenix, Arizona, as well as for inflation to adjust prices from 2020 levels to 2021 levels. Inflation factors published by ADEQ (ADEQ, 2021) were used in the inflation adjustment. Per diem rates for crew travel were obtained from current published GSA values for Yuma, Arizona. Cost for hazardous waste disposal were obtained from third-party disposal facilities in 2020 and adjusted for inflation using ADEQ inflation factors. A current third-party laboratory quote was used as representative of analytical costs for the analytical methods anticipated under this Plan. Engineering estimates were made for the cost of PPE, vehicle fuel consumption and cost, non-hazardous waste disposal and recycling facility costs, miscellaneous sampling materials costs, and shipping costs associated with sample shipments to an analytical laboratory. Cost estimate source values are provided in Appendix E.

As calculated in March, 2022, the total direct costs for the Facility closure are estimated to be $1,191,435. A contingency of 20 percent of the total direct costs was applied for an additional $238,287, and a project management cost of 10 percent of the total direct costs applied for an

additional $119,143. The total estimated costs for Facility closure financial assurance is estimated to be $1,548,865. This amount will be adjusted not less frequently than annually, and as necessary to reflect any changes that are made to the facility including the maximum quantity of wastes that may be managed, or to reflect general changes to the costs of closure.

5.2 Financial Assurance Mechanism for Closure

Sydcol will execute and provide to ADEQ a financial assurance mechanism in compliance with R18-8-264.A (40 CFR 264, Subpart H). Sydcol has elected to use a closure insurance policy as described in 40 CFR 264.143(e) as the financial assurance mechanism for closing the Facility consistent with this Plan. The closure insurance policy provides funds for closure of the existing units based on the closure cost estimates provided herein in the event Sydcol is unable to provide the financial resources needed for closure. A copy of the insurance policy endorsement is provided in Permit Attachment J.

The amount of closure insurance policy is to be adjusted annually by a new estimate of the maximum cost of closure in current dollars or by using an inflation factor derived from the most recent Implicit Price Deflator for Gross National Product published by the U.S. Department of Commerce in its Survey of Current Business. The inflation factor will be determined by dividing the latest published annual Deflator by the Deflator for the previous year.

The first adjustment is made by multiplying the closure cost estimate by the inflation factor. The result is the adjusted closure cost estimate. Subsequent adjustments are to be made by multiplying the latest adjusted closure cost estimate by the latest inflation factor.

5.3 Post Closure Care

Post closure care and subsequent funding will not be necessary at the Facility since all hazardous components and materials will be removed from the site during closure activities. If hazardous components or contaminated soils are found at the site during closure and the Facility demonstrates that not all contaminated soils can be practically removed or decontaminated, post closure care will be performed as specified in 40 CFR 264.197. A post closure plan will be prepared in accordance with all applicable post closure requirements under 40 CFR 264.117 through 264.120.

As this Plan anticipates clean closure of the Facility, a post-closure care cost estimate and post-closure care financial assurance mechanism is not applicable.

6.0 MISCELLANEOUS PROVISIONS

6.1 Notice in Deed

If contamination above the RSRLs remains after closure, Sydcol will comply with deed notice requirements in R18-8-101 (40 CFR 270.14(b) (14)).

6.2 Liability Insurance

Liability coverage for sudden and non-sudden accidental occurrences with a four million dollar ($4,000,000) per occurrence and an annual aggregate amount of eight million dollars ($8,000,000) has been secured by the Facility. Such liability coverage is demonstrated by a Hazardous Waste Certificate of Liability Insurance. A copy of the certificate of insurance for liability coverage is provided in Attachment J of the Permit.

6.3 Amending the Closure Plan

Sydcol may amend this closure plan at any time through the permit modification process during the life of the facility to incorporate any changes in operating plans, Facility design, or waste streams. If a modification is required, the request for modification will be submitted in accordance with 40 CFR 264.112 (c)(3).

6.4 Pre-Closure Corrective Action

Section 3004 (u) of the Resource Conservation and Recovery Act, 42, USC §6924, as amended by section 206 of the Hazardous and Solid Waste Amendments of 1984 (JHSWA), and 40 CFR 264.101, requires that all permits address corrective action for releases of hazardous waste or hazardous constituents from any solid waste management unit (SWMU), regardless of when waste was placed in the unit or whether the unit closed. As of this date of this Closure Plan, there have been no releases of hazardous waste or hazardous waste constituents from a SWMU or HWMU at the Facility.

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TABLES

Table 1
Estimated Annual Hazardous Waste

Waste type	RCRA Waste Codes	HWMUs	Estimated Annual Quantity (tons)	Percentage of total
Ignitables	D001	1, 2, 3*	30,000	26.46%
Corrosives	D002	1, 2, 3*	20,000	17.64%
Reactives	D003	1, 2, 3*	200	0.18%
Toxicity: Heavy metals	D004-011	1, 2, 3*	100	0.09%
Toxicity: pesticides/herbicides	D012-017, 020, 031	1, 2, 3*	100	0.09%
Toxicity: Volatile organics	D018-019, 021-022, 028-029, 035, 039-040, 043	1, 2, 3*	32,500	28.67%
Toxicity: Semi-volatile organics	D022-027, 032-034, 036-038, 041-042,	1, 2, 3*	200	0.18%
2,4-dinitrotoluene, nitrobenzene	D030, D036	1, 2, 3*	2	0.00%
Halogenated compounds: degreasing	F001	1, 2, 3*	4,000	3.53%
Halogenated compounds: solvents	F002	1, 2, 3*	4,000	3.53%
non-Halogenated compounds solvents	F003-005	1, 2, 3*	8,000	7.06%
Listed electroplating wastes	F006-009	1, 2, 3*	11,000	9.70%
Listed metal finishing wastes	F010-012, 019	1, 2, 3*	2,500	2.21%
Chlorinated aliphatic hydrocarbons	F024-026	1, 2, 3*	10	0.01%
Listed wood-preserving wastes	F032, F034-035	1, 2, 3*	10	0.01%
Refinery WW treatment sludges	F037-038	1, 2, 3*	10	0.01%
Hazardous leachates	F039	1, 2, 3*	10	0.01%
P-listed commercial chemicals	P001-P205	1, 2, 3*	100	0.09%
Commercial grade acetone	U002	1, 2, 3*	100	0.09%
Commercial grade benzene	U019	1, 2, 3*	100	0.09%
Commercial grade 1-butanol	U031	1, 2, 3*	20	0.02%
Commercial grade methanol	U154	1, 2, 3*	100	0.09%
Commercial grade methyl-ethyl ketone	U159	1, 2, 3*	100	0.09%
other U-listed commercial chemicals	U001, 003-018, 020-030, 032-153, 154-158, 160-411	1, 2, 3*	200	0.18%
Total			113,362	100%

* Containers with free liquids or listed wastes FO20, FO21, FO22, FO23, FO26, and FO27 to be placed on containment pallets in HWMU3.

Table 2
Maximum Inventory by Waste Class

Waste type	Percentage	Drum-equivalents
Ignitables	26.46%	850
Corrosives	17.64%	567
Reactives	0.18%	6
Toxicity: Heavy metals	0.09%	3
Toxicity: Pesticides	0.09%	3
Toxicity: Volatile organics	28.67%	921
Toxicity: Semi-volatile organics	0.18%	6
Listed: F	26.06%	837
Listed: P/U	0.64%	20
Totals	100%	3,212

Maximum capacity: 3212 drum-equivalents

Table 3
Sample Locations

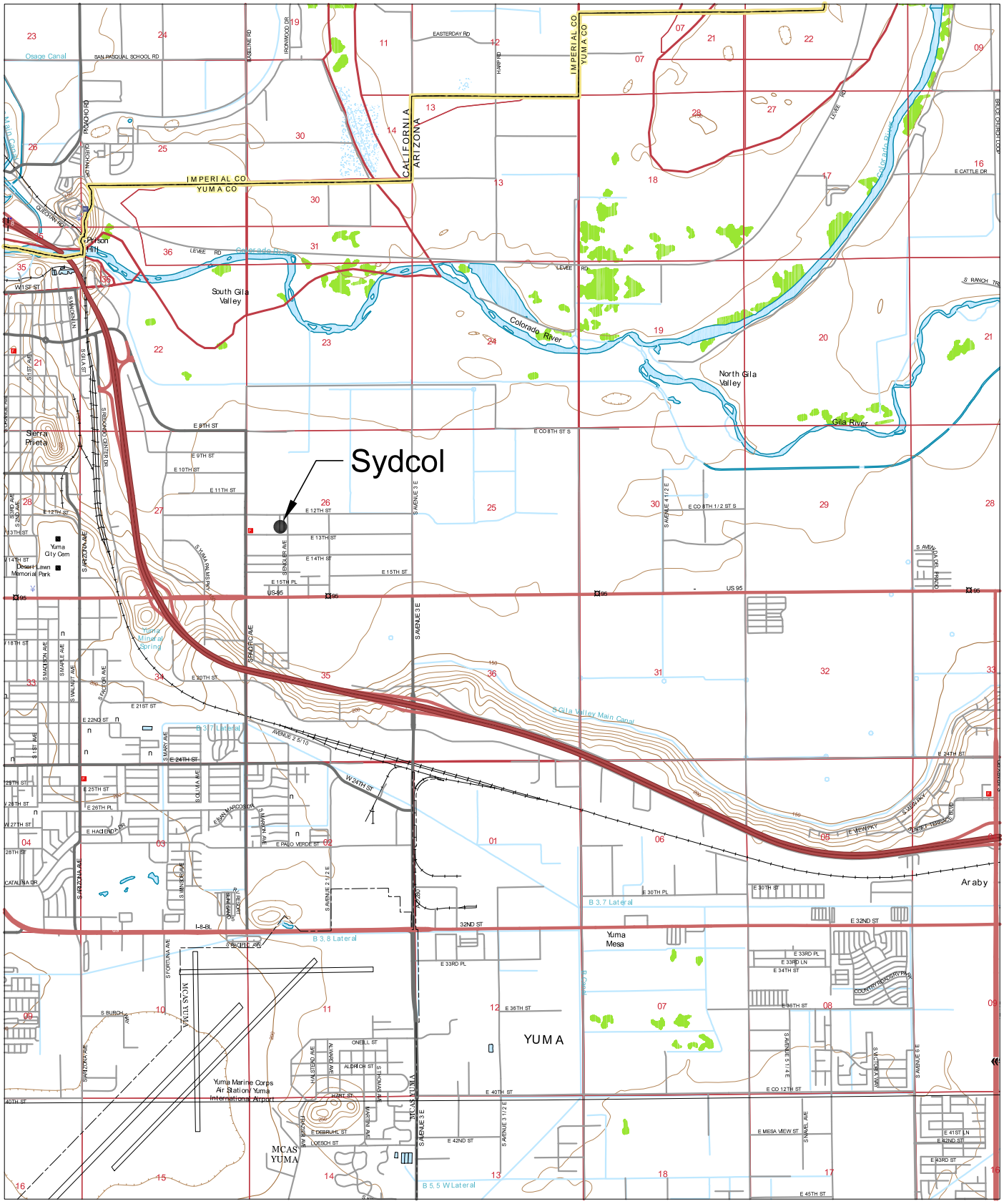
Sampling Area	Number of locations	Concrete samples	Primary Soil Samples	Contingent Soil samples	Rinsate Samples
General					
Background	10	0	20	0	0
Loading dock bays	4	4	4	8	2
Runoff retention basins	10	10	10	20	2
Septic system	2	0	2	4	0
Totals (general)	26	14	36	32	4
HWMU1					
Concrete pad area	10	10	10	20	2
Adjacent soils	6	0	6	12	0
Totals (HWMU1)	16	10	16	32	2
HWMU2					
Concrete pad area	12	12	12	24	2
Adjacent soils	8	0	8	16	0
Totals (HWMU2)	20	12	20	40	2
HWMU3					
Concrete pad area	16	16	16	32	2
Adjacent soils	8	0	8	16	0
Totals (HWMU3)	24	16	24	48	2
Totals	**86**	**52**	**96**	**152**	**10**

Total primary samples 158
Total contingency samples: 152

Table 4
Analytical Parameters

Analytical Parameters	EPA SW-846 Method	Concrete Samples	Soil Samples	Rinsate Samples
Heavy metals	6010A	X	X	X
Volatile organic compounds (VOCs)	8260B	X	X	X
Semi-volatile organic compounds (SVOCs)	8270D	X	X	X
Polychlorinated biphenols (PCBs)	8082		X	
Organochlorine pesticides	8081A		X	
Organophosphorous pesticides	8141B		X	
Chlorinated herbicides	8151A		X	

FIGURES

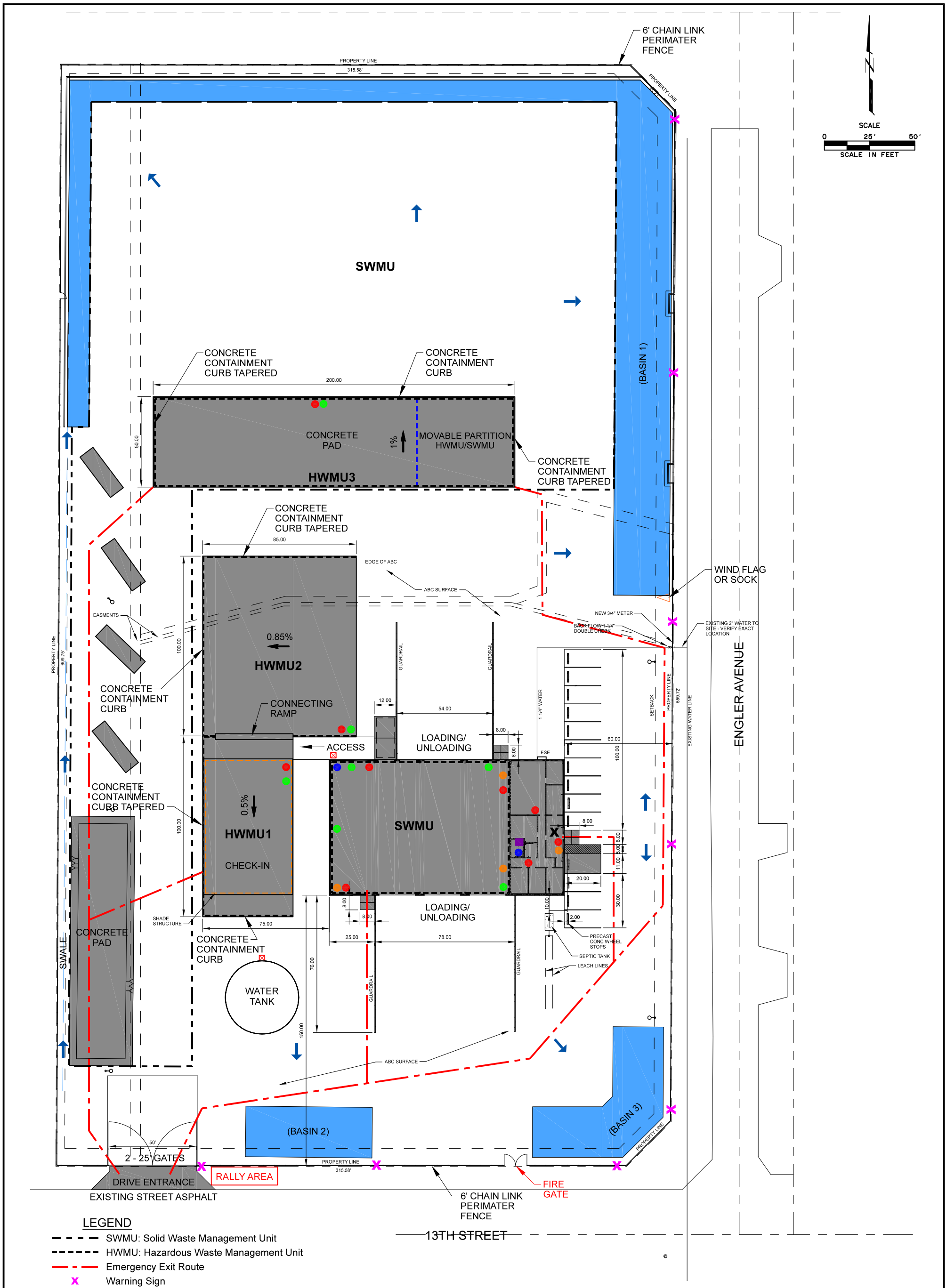


NOT TO SCALE

Figure 1
Location Map
Sydcol
2264 E. 13th St., Yuma, AZ 85365

CLIENT:	APPROVED BY: JGP
PROJECT:	PROJECT NO:
DESIGNED BY: JGP	DATE: 9/17/18
DRAWN BY: TML	DWG/FILE: JGP-SYDCOL01
REVISION:	

JGP Consulting, PLC
Environmental Compliance Services



LEGEND

- SWMU: Solid Waste Management Unit
- HWMU: Hazardous Waste Management Unit
- Emergency Exit Route
- Warning Sign
- Spill Kit
- Fire Alarm
- Fire Extinguisher (ABC)
- Eyewash
- Shower
- Facility Report
- Fire Hose Connection
- Concrete Surface
- Drainage Direction
- Drainage Basin

Figure 2

SITE PLAN

Sydcol

2264 E. 13th St.,Yuma, AZ 85365

CLIENT:	APPROVED BY: JGP
PROJECT:	PROJECT NO:
DESIGNED BY: JGP	DATE: 11/5/21
DRAWN BY: TML	DWG/FILE: SYDCOL02
REVISION:	

JGP Consulting, PLC

Environmental Compliance Services

6' CHAIN LINK PERIMATER FENCE

PROPERTY LINE

PROPERTY LINE

SCALE
0 25' 50'
SCALE IN FEET

SWMU

CONCRETE CONTAINMENT CURB TAPERED

CONCRETE CONTAINMENT CURB

200.00

50.00

CONCRETE PAD

1%

MOVABLE PARTITION HWMU/SWMU

HWMU3

CONCRETE CONTAINMENT CURB TAPERED

(BASIN 1)

CONCRETE CONTAINMENT CURB TAPERED

85.00

EDGE OF ABC

ABC SURFACE

EASMENTS

NEW 3/4" METER

BACK FLOW 1-1/4" DOUBLE CHECK

EXISTING 2" WATER TO SITE - VERIFY EXACT LOCATION

PROPERTY LINE 609.75'

100.00

0.85%

HWMU2

CONCRETE CONTAINMENT CURB

CONNECTING RAMP

GUARDRAIL

GUARDRAIL

12.00

54.00

LOADING/ UNLOADING

8.00

8.00

ACCESS

1 1/4" WATER

SETBACK

PROPERTY LINE 559.72'

EXISTING WATER LINE

ENGLER AVENUE

60.00

100.00

ESE

CONCRETE CONTAINMENT CURB TAPERED

100.00

0.5%

HWMU1

CHECK-IN

SWMU

8.00

8.00

5.00

8.00

11.00

20.00

30.00

SHADE STRUCTURE

75.00

8.00

8.00

25.00

78.00

LOADING/ UNLOADING

10.00

2.00

PRECAST CONC WHEEL STOPS

SEPTIC TANK

LEACH LINES

SWALE

CONCRETE PAD

CONCRETE CONTAINMENT CURB

WATER TANK

76.00

150.00

GUARDRAIL

GUARDRAIL

ABC SURFACE

(BASIN 3)

PROPERTY LINE

(BASIN 2)

50'

2 - 25' GATES

PROPERTY LINE
315.58'

DRIVE ENTRANCE

RALLY AREA

EXISTING STREET ASPHALT

FIRE GATE

6' CHAIN LINK PERIMATER FENCE

13TH STREET

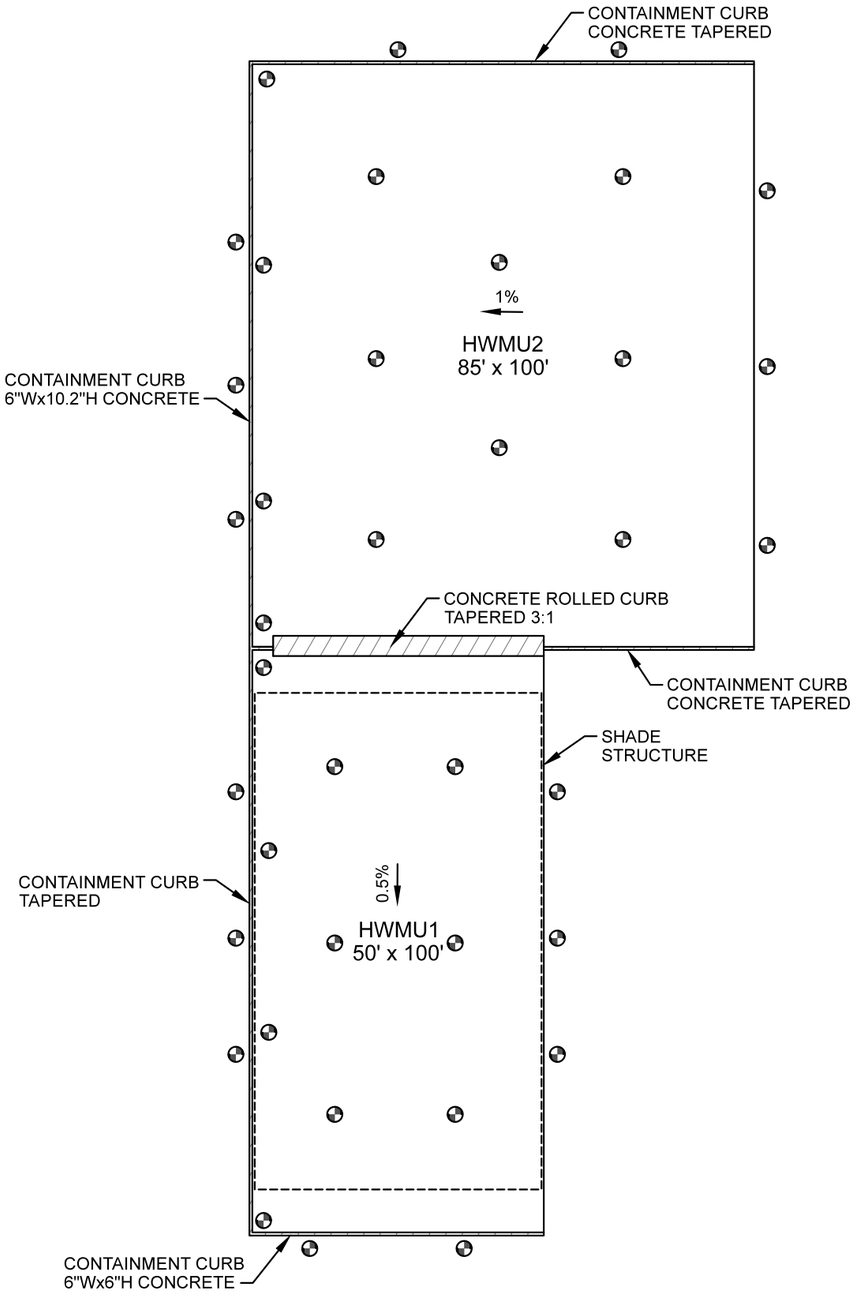
LEGEND

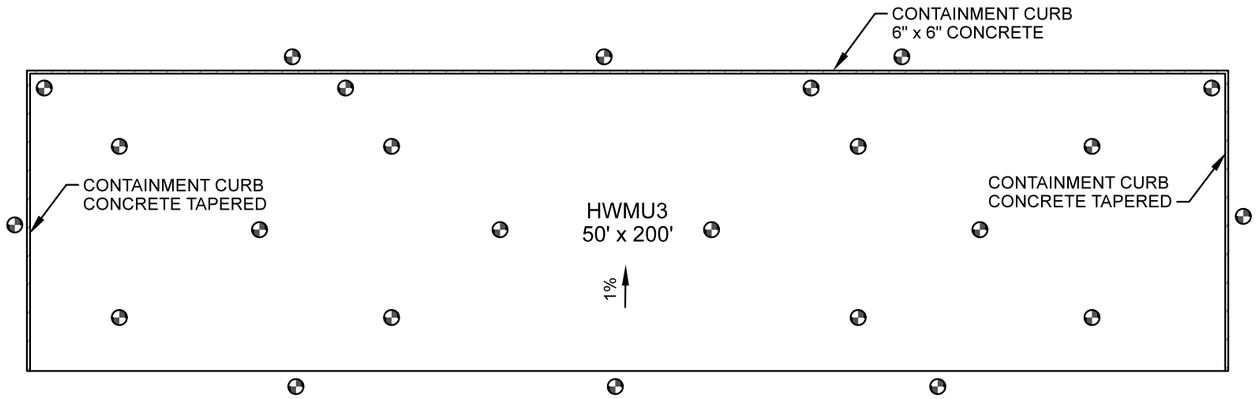
- SWMU: Solid Waste Management Unit
- Concrete Surface
- Drainage Direction
- Drainage Basin
- General Area Sample Locations
- Background Sample Locations

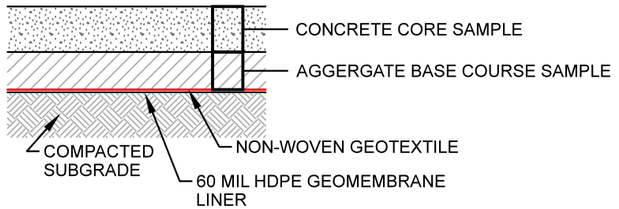
Figure 3
GENERAL AREA SAMPLING LOCATIONS
Sydcol
2264 E. 13th St.,Yuma, AZ 85365

CLIENT:	APPROVED BY: JGP
PROJECT:	PROJECT NO:
DESIGNED BY: JGP	DATE: 2/15/22
DRAWN BY: TML	DWG/FILE: SYDCOL15
REVISION:	

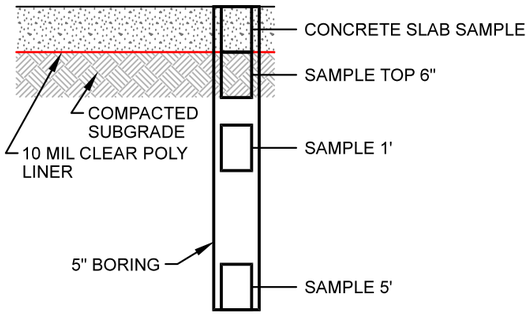
JGP Consulting, PLC
Environmental Compliance Services



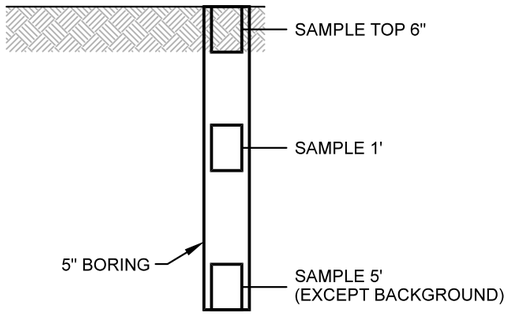




HWMU1 AND HWMU2 SAMPLING DETAIL



HWMU3 AND LOADING BAY SAMPLING DETAIL



SOIL AND BACKGROUND SAMPLING DETAIL

LEGEND

Sampling Location

Figure 4

HWMU SAMPLE LOCATIONS AND DETAILS

Sydcol
2264 E. 13th St.,Yuma, AZ 85365

CLIENT:	APPROVED BY: JGP
PROJECT:	PROJECT NO:
DESIGNED BY: JGP	DATE: 2/15/22
DRAWN BY: TML	DWG/FILE: JGP-SYDCOL16
REVISION:	

JGP Consulting, PLC
Environmental Compliance Services

APPENDICES

APPENDIX A

CLOSURE CERTIFICATIONS

PE and Owner Operator Certification Templates

FACILITY CLOSURE
OWNER OR OPERATOR CERTIFICATION

(The owner or operator must certify that the activities performed in closing the facility are in accordance with the specifications of the closure plan approved by the Arizona Department of Environmental Quality, Waste Programs Division. Accordingly, the certification will be straightforward, no matter how complex closure itself has been.[40 CFR 264.115 as adopted by A.A.C. R18-8-264.A or 40 CFR 265.115 as adopted by A.A.C. R18-8-265])

I, _____, of
Owner or Operator

_____
Name and address of hazardous waste facility

hereby state and certify that, to the best of my knowledge and belief, the above-named hazardous waste facility has been closed in accordance with specifications of the approved closure plan, and that the closure was completed on the_____ day of_____, 20___.

_____ _____
Signature *Date*

PARTIAL CLOSURE
OWNER OR OPERATOR CERTIFICATION

(The owner or operator must below certify that the activities performed in the closure of the unit(s) identified below are in accordance with the specifications of the partial closure plan approved by the Arizona Department of Environmental Quality, Waste Programs Division. Accordingly, the certification will be straightforward, no matter how complex closure itself has been.[40 CFR 264.115 as adopted by A.A.C. R18-8-264.A or 40 CFR 265.115 as adopted by A.A.C. R18-8-265])

I,_____, of
Owner or Operator

_____
Name and address of hazardous waste facility

hereby state and certify that, to the best of my knowledge and belief, the

_____
Hazardous Waste Treatment, Storage, or Disposal Unit(s)

has (have) been closed in accordance with specifications of the approved partial closure plan, and that the closure was completed on the _____ day of _____, 20___.

_____ _____
Signature *Date*

PROFESSIONAL ENGINEER CLOSURE CERTIFICATION

(An independent registered professional engineer(s) must certify that the facility has been closed in accordance with the approved closure plan. The engineer is not certifying the adequacy of the activities or the plan; he is certifying only that, in his judgement, the activities performed were in accordance with the specifications in the approved plan. At final closure the professional engineer who certifies that closure has been completed may rely in part on earlier certifications of any partial closures and in part on his inspections of the facility as a whole to ensure that those partially closed areas have been maintained.[40 CFR 264.115 as adopted by A.A.C. R18-8-264.A or 40 CFR 265.115 as adopted by A.A.C. R18-8-265])

I, _____, a registered professional engineer, hereby certify that I have verified to the best of my knowledge and belief that Professional Engineer Closure Certifications were issued for all prior closure activities at

_____

(Name and address of hazardous waste facility)

and that I have made visual inspection(s) of the aforementioned facility, and closure of the aforementioned facility has been performed in accordance with the specifications contained in the closure plan for the facility approved by the Arizona Department of Environmental Quality, Waste Programs Division.

_____ _____

Signature *Date*

Professional Seal (Pursuant to A.R.S. §32-125)
Issued by the Arizona State Board of Technical Registration

PROFESSIONAL ENGINEER PARTIAL CLOSURE CERTIFICATION

(An independent registered professional engineer(s) must certify that the facility's hazardous waste management unit(s) has been closed in accordance with a respective approved closure plan. The engineer is not certifying the adequacy of the activities or the plan; he is certifying only that, in his judgement, the activities performed were in accordance with the specifications in the approved plan.[40 CFR 264.115 as adopted by A.A.C. R18-8-264.A or 40 CFR 265.115 as adopted by A.A.C. R18-8-265])

I,_____, a registered professional engineer, hereby certify, that I have made visual inspections(s) of the hazardous waste management unit(s) as described in the plan dated _____, and designated as

_____

Partial Closure Plan Title

I also verify to the best of my knowledge and belief that all activities as required per the approved partial closure plan have been performed in accordance with the specifications contained in the closure plan for the facility approved by the Arizona Department of Environmental Quality, Waste Programs Division.

_____ _____

Signature *Date*

Professional Seal (Pursuant to A.R.S. §32-125)
Issued by the Arizona State Board of Technical Registration

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

Quality Assurance Project Plan

AA Sydcol, LLC

Sydcol Waste Transfer Facility Closure

PREPARED FOR:

AA SYDCOL, LLC

2264 E. 13TH STREET

YUMA, ARIZONA 85365

PREPARED BY:

JGP CONSULTING, PLC

3104 E. CAMELBACK RD. #1114

PHOENIX, ARIZONA 85016

TABLE OF CONTENTS

Figures

Appendices

1. INTRODUCTION

This appendix to the Closure Plan is the Quality Assurance Project Plan (QAPP) for use in closure sampling at the Sydcol Waste Transfer Facility (Facility). The context for the sampling, the site background, sampling objectives, sampling plan and implementation strategy are provided in the Closure Plan.

It is important for environmental sampling to be conducted consistent with a program with quality assurance (QA) and quality control (QC) protocols in order to produce analytical data of known quality that satisfy the Closure Plan's objectives. The QA/QC program detailed in this Quality Assurance Project Plan (QAPP) shall provide a mechanism for the control and evaluation of sample data and provide measures of data quality in terms of accuracy, precision, completeness, representativeness, and comparability to assess whether the data meet the project objectives and can be used for their intended purpose.

This QAPP describes the sampling and analysis requirements and the QA/QC measures that will be taken for samples collected and analyzed under the Closure Plan which describes the sample locations, the number and type of samples, the sampling methods, and the analytes that are to be performed on samples.

2. PROJECT ORGANIZATION

2.1 General Organization

This section identifies the individuals participating in the closure sampling and identifies their specific roles and responsibilities. The participants discussed include the Owner as the principal data user and decision maker, the Project Manager, the QA Manager, field personnel, and the laboratory Project Manager and QA Manager, An organization chart indicating the relationships and lines of communication among all project participants is included in Figure B.1.

2.2 Owner

The Owner is AA Sydcol, LLC or its successor. The Owner conducts overall direction of the scope of work to be performed for the closure. Owner will coordinate site access for all sampling activities and provide final review and approval of documents, reports, plans, schedules, and other communications submitted for site closure.

2.3 Project Manager

The Project Manager is a contractor to the Owner. The Project Manager will be responsible for conducting the closure sampling safely, on time, and within budget. The Project Manager provides technical guidance for the project and will be responsible for corrective action and response actions during the closure sampling. Ensures that all field personnel understand the scope of work including QA/QC requirements. The Project Manager will report to the Owner regarding closure sampling activities.

2.4 QA Manager

The QA Manager will plan and supervise drilling, sampling, and other field activities. The QA Manager is responsible for all data collection, quantitative analysis, and data interpretation for the purposes of the Closure Plan, ensuring that the QAPP is properly implemented.

2.5 Field Personnel

Field personnel will collect all samples consistent with the Closure Plan. Field personnel will be responsible for all field equipment inspections and calibration.

2.6 Laboratory Project Manager

The Laboratory Project Manager will monitor the provision of sample containers, sample receiving, sample analysis, and data reporting consistent with this QAPP. The Laboratory Project Manager will provide the Project Manager with information regarding laboratory schedule, capabilities, methods, sample requirements and sample containers when necessary.

2.7 Laboratory QA Manager

The Laboratory QA Manager will be responsible for ensuring that all samples received by the laboratory are handled, stored, prepared, analyzed, and reported consistent with this QAPP and internal laboratory QA/QC procedures.

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3. OBJECTIVES FOR MEASUREMENT

The objective of the closure sampling is to generate sufficient information to quantify the presence or absence of chemical contamination within the site's soils or concrete structures for the purpose of determining whether the objectives of the Closure Plan have been met. The data acquired during the sample collection phase must be defensible to meet this objective. The quality objectives for the data specify the quality criteria of the data needed to meet this objective. The objectives for the analytical data will be:

- To collect samples required by the Closure Plan;
- To collect and analyze all samples under controlled situations using validated methods; and
- To obtain usable and defensible analytical results.

The following sections discuss the steps that will be taken to ensure the validity of the data acquired during closure sampling at the Facility. The representativeness of the measurement data is a function of the sampling strategy and will be achieved by following the procedures discussed in this section. The quality of the analytical results is a function of the analytical system and will be achieved by using validated methods and the QC system discussed in this section. The basis for assessing precision, accuracy, completeness, representativeness, and comparability is discussed in the following sections of this QAPP.

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4. DEFINITION OF CRITERIA

The overall project goal is to collect data sufficient for qualitative evaluation of closure conditions. The QA objective is to have all analyses performed on an analytical system that is organized, controlled, and meets method specifications. Numerically, the goal is to have all individual results satisfy precision, accuracy, reporting, completeness, and comparability goals within QAPP objectives. Inaccurate or imprecise data will potentially invalidate results. This section defines how the analytical measurement data objectives will be assessed for the closure sampling.

4.1 Precision

Precision measures the reproducibility of repetitive measurements. It is strictly defined as the degree of mutual agreement among independent measurements as the result of the repeated application of the same process under similar conditions. Analytical precision is a measurement of the variability associated with duplicate (two) or replicate (more than two) analyses of the same sample extract in the laboratory and is determined by analysis of analytical duplicates. Total precision is a measurement of the variability associated with the entire sampling and analysis process. It is estimated by analysis of duplicate or replicate field samples and includes all possible sources of variability. Imprecision will be estimated using the relative percent difference (RPD) between the replicate samples. The frequency of collection for field duplicates is 10 percent for samples of all media (soils, concrete, and risate) as summarized in the Closure Plan.

Analytical precision goals are presented in documentation for each individual method. The duplicate precision goal is ≤ 30% RPD for field duplicates. Uncontrollable matrix effects may confound the field duplicate evaluation and will be noted where identifiable. Results of these duplicate determinations will be used to evaluate the total imprecision possible in natural matrix sample results.

4.2 Accuracy

Accuracy is a statistical measurement of correctness and includes components of random error (variability due to imprecision) and systematic error (bias). It, therefore, reflects the total error associated with a measurement. A measurement is accurate when the value reported does not differ from the true value. Analytical method accuracy is typically measured by determining the percent recovery of known target analytes that are spiked into a reagent water or soil (ongoing precision and recovery [OPR] sample) before extraction at known concentrations. Additionally, surrogate compounds are added to every sample and QC sample before extraction at known concentrations.

4.3 Reporting

Both accuracy and precision are calculated for specific sampling or analytical batches by the laboratory, and the associated sample results must be interpreted considering these specific measures. An additional consideration in applying accuracy and precision is the concentration level of the samples; a procedure capable of producing the same value within 50% would be considered precise for low level (near the detection limit) analyses of minor constituents, but would be unacceptable, and possibly useless, for major constituents at high concentrations. Accuracy goals for OPRs and surrogate compounds are presented by the laboratory for each method.

Accuracy goals will be met if individual OPR and surrogate compounds recoveries are within laboratory-derived acceptance criteria. OPR and surrogate compound recoveries outside criteria indicate the analytical system is out of control and may require samples to be reanalyzed.

4.4 Completeness

Completeness is calculated from the aggregation of data for each method for any particular sampling event. For each method and each site, the number of valid results, divided by the number of individual analyte results initially planned for, expressed as a percentage, determines the completeness for the data set. The objective for completeness is 90 percent. If there are any instances of samples that could not be analyzed for any reason (holding time violations in which resampling and reanalysis were not possible, samples spilled or broken, etc.), the numerator of this calculation becomes the number of valid results minus the number of possible results not reported.

Valid results used to meet completeness objectives are those results that provide defensible estimates of the true concentration of an analyte in a sample. These valid results include data that is not qualified and data that QC results indicate qualification is necessary but which may still be used to meet project objectives. Invalid results are those data for which there is an indication that the prescribed sampling or analytical protocol was not followed. Completeness is calculated as the number of valid (i.e., non-R flagged) results divided by the number of possible results.

4.5 Comparability

Comparability is the confidence with which one data set can be compared to other data sets. The objectives for this QA/QC program are to produce data with the greatest degree of comparability possible. Comparability will be achieved by using validated methods for sampling and analysis, reporting data in standard units, and using standard and comprehensive reporting formats.

5. SAMPLING PROCEDURES

5.1 Sampling Protocols

Sampling protocols are provided and discussed in the Closure Plan. Prior to beginning each sampling event, the Project Manager will ensure that the field personnel understand the purpose and objectives of the event. Topics of review and discussion with the team may include sampling locations, types of samples to be collected, number of samples collected, sample numbering, preservation requirements, parameter(s) to be analyzed, sampling procedures, equipment decontamination procedures, and chain-of-custody requirements.

5.2 Sample Handling

The QA Manager is responsible for ensuring that samples are collected with properly decontaminated equipment and containerized in properly cleaned sample containers. Sample containers, volume, and preservation for each analytical method will by provided by the Laboratory QA Manager for each analytical parameter and method.

5.3 .Sampling Equipment Decontamination

Equipment decontamination is an integral part of the data collection and QA process. The implementation of proper decontamination practices and procedures will begin in the field prior to use of sample collection equipment. All field sampling equipment will be decontaminated before use and after each sample location. Wash water and other fluids generated during decontamination will be managed and disposed of consistent with the Closure Plan.

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6. SAMPLE CUSTODY

6.1 Custody Requirement

Sample possession during all sampling efforts must be traceable from the time of collection until the results are verified and reported. The sample custody procedures provide a mechanism for documentation of all information related to sample collection and handling to achieve this objective.

The QA Manager will be responsible for ensuring that the field personnel adhere to proper custody and documentation procedures for all sampling operations. Preformatted chain-of-custody (COC) forms will be used as the primary documentation mechanism to track sample custody and analyses.

6.2 Field Records

Field personnel will be required to keep accurate written records of their daily activities in a bound logbook or with field forms. All entries will be legible, written in waterproof ink, and contain accurate and inclusive documentation of the team's activities, including instrument calibration, samples collected, field data and observations, any problems encountered, and actions taken to solve problems. Entry errors or changes will be crossed out with a single line and initialed by the person making the correction. Field logbooks or field forms will be available for review by the QA Manager

6.3 Sample Labels and Identification

Each sample container will receive a sample label. All samples shall be uniquely identified, labeled, and documented in the field at the time of collection. Sample labels will identify the sample by documenting the unique sample identification number, the sample type, the analytical method, the sampler's initials, date and time collected, the analytical laboratory, and the preservation method used. Sample labels will be computer-generated or hand-written with a permanent marker and affixed to the sample container.

6.4 Chain-of-Custody Record

All sample ice chests will be accompanied by the COC record identifying the contents. The original COC will accompany the ice chest and a copy will be retained by the sampler. The COC will be included in the laboratory report prepared by the analytical laboratory following completion of sample analysis.

The person relinquishing the samples will request the signature of a representative of the receiving laboratory to acknowledge receipt of the samples. When appropriate, as in the case of overnight shipment, the custody record should contain a statement that the samples were delivered to the designated location and the date and time noted.

All ice chests will be secured with custody seals for transportation to the analytical laboratory. Custody seals must be applied to all ice chests left unattended that contain samples.

The method of shipment, courier name(s), and other pertinent information is entered in the "Remarks" section of the COC when the samples are to be shipped (i.e., Federal Express, Express Mail, etc.) instead of hand delivered.

6.5 Shipping Procedures

The objective of sample handling procedures is to ensure that samples arrive at the laboratory intact, at the proper temperature, and free of external contamination. For all samples which will be shipped to the analytical service laboratory via overnight carriers, according to Department of Transportation standards, COC procedures will be followed during transport.

Sample packaging requirements for hazardous materials requiring interstate transport is defined in the Code of Federal Regulations (CFR) 49, Chapter 1, and Part 171. These requirements outline in detail the proper classification and procedures for transportation of hazardous materials that will be used for transport of the samples. Samples are required to be stored at $\leq 4°C$. Generous amounts of ice will be packed with the samples to maintain temperature. The ice will be of sufficient volume and will be distributed in the coolers so that the proper storage temperature will be maintained until the samples reach the laboratory. When the samples are delivered to the laboratory the tempera ture of each cooler of samples will be measured and recorded on the COC form or addendum. The samples will be immediately placed in the sample control refrigerator after sample log in.

- The following procedures will be used to prevent bottle breakage and cross contamination:
- All samples will be transported inside hard plastic coolers;
- All glass bottles will be protected to prevent glass to glass contact;
- The coolers will be taped shut and sealed with custody seals to indicate unauthorized opening of the cooler; and
- Samples that are known or suspected to contain high levels of chemical constituents (based on past monitoring data or observation) will be packaged and transported separately from other samples.

A sample shipping checklist to be used for each shipment of samples is provided in Appendix A.

6.6 Laboratory Handling

The analytical service laboratory will follow internal SOPs for handling, identification, control, and COC procedures and to maintain the validity of the samples. These SOPs are based on the use of a laboratory information management system (LIMS) for tracking samples from receipt through reporting of the analytical results.

The following section describes the activities related to sample receipt, storage, and tracking by the analytical laboratory:

- Upon receipt, the sample custodian will inspect all sample containers for integrity. The presence of leaking or broken containers or custody seals will be noted on the COC form. The sample custodian will sign the COC form (with date and time of receipt), thus assuming custody of the samples.
- The information on the COC form will be compared with that on the sample tags and labels to verify sample identity. Any inconsistencies will be resolved with the project chemist (or field team member) before sample analysis proceeds.
- The temperature of incoming coolers of samples will be checked and the temperature recorded on the internal COC record.
- Preserved samples (i.e., those requiring pH adjustments) will be checked and any improperly preserved samples noted on the COC.
- Samples will be moved to a controlled sample storage refrigerator for storage prior to analysis.
- Document control will retain a legible copy of the original COC form.

Samples will be maintained in storage refrigerators at ≤ 6°C prior to sample preparation and analysis. Analytical laboratory personnel will request or check out samples for analysis from the sample custodian (if a different person).

If samples are known or suspected to be highly contaminated, laboratory sample control will be notified, so those samples can be stored separately from less contaminated samples, minimizing the potential for cross contamination.

6.7 Sample Identification

As samples are logged into the laboratory sample tracking system each sample is assigned a unique sample control number and is correlated with the field sample numbers obtained from the field COC forms, as both numbers are entered into the system for a given laboratory job. Analytical requirements for each sample are entered into the computer. A hard copy of the work order and other information is printed and filed with the received documentation. Labels are printed with sample information and secured to each sample. Data sheets and work sheets will be printed for each batch of samples and are distributed to the appropriate laboratory managers.

6.8 Sample Custody Records

Sample custody and documentation by the analytical laboratory will be organized around sample and analysis management systems specifically designed for tracking and handling the large amount of information required for the efficient management of an analytical laboratory. Following sample log in, the samples are placed in a designated secured storage area. Samples are maintained at ≤ 6º C from the time of receipt until the analyses are complete. Subsequent sample custody and all transactions are documented according to the laboratory SOP. The analyst receives the samples from sample control and completes the sample work sheets or custody sheet. After analysis, the sample is returned to the designated storage location in sample control. The sample is stored until the assigned time or written permission is given to either properly dispose of or return the sample to the client. All sample documentation is maintained in secure storage in a controlled access area.

7. ANALYTICAL PROCEDURES

7.1 Analytical Methods

The analytical laboratory will be licensed by the Arizona Department of Health Services for the following methods on soil, waste, and wastewater:

Parameter	EPA Method
Heavy metals	6010A
Volatile organic compounds (VOCs)	8260B
Semi-volatile organic compounds SVOCs)	8270D
Polychlorinated biphenols (PCBs)	8082
Organochlorine pesticides	8081A
Organophosphorous pesticides	8141B
Chlorinated herbicides	8151A

7.2 Analytical Batch Size

The analytical batch size for the project will be limited to no more than forty (40) samples. Modification of the analytical batch size may be completed during the project based on performance metrics for calibration verification, surrogate compounds, method blanks as described in this QAPP. Justification for changes to the batch size will be maintained in the project QA file.

7.3 Detection and Quantification Limits

All soil sample results must be reported as dry weight. All sample-specific method detection limits (MDLs) and method quantitation limits (MRLs) must be corrected for dry weight (if applicable), dilution factors, sample size, and any other factors applied to the field sample result.

7.4 Estimated Detection Limits

The MDL will be calculated on a per analyte and sample basis. The MDL will be extrapolated from the detection verification standard.

7.5 Method Reporting Limits

The MRL is defined by the analytical laboratory consistent with the laboratory's QA/QC Plan. All results shall be reported at or above the MDL values. For results falling between the MDL and the MRL, a "J" flag shall be applied by the laboratory to the results indicating the variability associated with the result renders the result an estimate. No results shall be reported below the MDLs.

7.6 Instrument Calibration

The compliance requirements for satisfactory instrument calibration ensure that the instrument is capable of producing acceptable quantitative data. Records of standard preparation and instrument calibration shall be maintained by the analytical laboratory. Records shall trace the preparation of standards and their use in calibration and quantitation of sample results. Calibration standards shall be traceable to standard materials. Instrument calibration for the method shall be checked using all of the target analytes, including an initial calibration to demonstrate that the instrument is performing acceptably throughout the analytical working range before project samples are analyzed and continuing calibration verification checks that document that the initial calibration is still valid and that satisfactory maintenance and day-to-day adjustment of the instrument have been achieved.

The initial calibration will be performed for all target analytes. Changes in the instrumental set-up or responses outside of acceptance criteria will require a recalibration. A QC check sample containing all target analytes and at a concentration in the midpoint of the calibration curve must be analyzed to verify initial calibration. Instrumentation will be recalibrated with each new lot of calibration standards.

With each batch of samples a Calibration Verification Standard (CVS) will be analyzed by using a mid-range calibration standard. A quantification of the samples in the associated set will only be performed if this CVS is within the acceptance criteria.

7.7 Laboratory Quality Control

The laboratory will maintain a QC program provides a mechanism for ongoing control and evaluation of data quality measurements. Laboratory QC samples (e.g., blanks and OPRs) shall be included in the preparation batch with the field samples. A preparation batch is a number of samples (not to exceed 40 environmental samples plus the associated laboratory QC samples) that are similar in composition (matrix) and that are extracted at the same time and with the same lot of reagents. The identity of each preparation and analytical batch shall be reported with the analyses so that a reviewer can identify the QC samples and the associated samples.

4.4.1 Ongoing Precision and Recovery (OPR) Sample

The laboratory will use an ongoing precision and recovery (OPR) sample consisting of an analyte-free sand or soil spiked with target analytes for the method. Each analyte in the OPR sample shall be spiked at a level approximately equal to the midpoint of the calibration curve for each analyte. The OPR sample shall be carried through the complete sample preparation and analysis procedure. The OPR is used to evaluate each batch and to determine if the method is in control. The OPR sample cannot be used as the CVS.

One OPR sample shall be included in every preparation batch. If more than one OPR sample is analyzed in a batch, results from all OPR samples analyzed shall be reported. Laboratory acceptance criteria will be used and checked annually. Data will be rejected if these values are not met. A QC failure of an analyte in any of the OPR samples shall require appropriate corrective action, including qualification of the failed analyte in all of the associated samples. If an OPR fails, an attempt must be made to determine the source of error and find a solution. All of the analytes that were subject to corrective action in the OPR and all of the samples in the batch be reprepared and reanalyzed. The corrective action applied shall be based on professional judgment in the review of other QC measures. If an analyte falls outside the OPR acceptance criteria a second time or if there is not sufficient sample material available to be reanalyzed, then all the results in the associated batch for that analyte must be flagged. The recoveries of those analytes subject to corrective action must be documented in the case narrative.

7.8 Surrogate Compounds

Surrogate compounds will be added into each sample and QC sample before extraction. They are used to assess method performance on the sample matrix. Corrective action shall be performed by the analytical laboratory when a surrogate compound result is outside of the acceptance limits. A check for system problems will be made and any identified problems corrected. Data with matrix problems shown in the surrogate data will be flagged.

7.9 Method Blank

A method blank (MB) is an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. It shall be carried through the complete sample preparation and analytical procedure and is used to document contamination resulting from the analytical process. A MB shall be included in every preparation batch.

The presence of analytes in a MB at concentrations equal to or greater than the MRL indicates a need for corrective action. Corrective action shall be performed to eliminate the source of contamination. No analytical data shall be corrected for the presence of analytes in blanks. When

an analyte is detected in the MB and in the associated samples and corrective actions are not performed or are ineffective, the appropriate validation flag shall be applied to the sample results.

8. DATA MANAGEMENT

8.1 Primary Data Management Activities

The primary data management activities will include:

- Data transfer from field and laboratory activities to a project filing system;
- Data management to ensure that data are stored and output in a manner that continues the COC;
- Requirements of review to ensure that plans for data collection were fulfilled;
- Analytical data validation which will report data to be used for interpretation activities; and
- Reporting functions may include outputting data for report tables, statistical analysis, interpretation, and electronic transfer.

The laboratory is responsible for generating hard copies and electronic files for the analytical results. Both the hardcopy analytical reports and electronic data files are transferred to the project QA Manager.

8.2 Data Reduction

The laboratory QA Manager is responsible for the reduction of raw data generated at the laboratory bench. The data interpretation that is required to calculate sample concentrations follows the methodology described in the laboratory's specific analytical SOP. After all analyses have been completed and reported, the Laboratory Project Manager reviews the raw data and verifies that the analyses were properly performed and reported. All non-detected results must be reported as < MRL. A value that is reported below the MRL must be flagged ("J") by the laboratory to indicate that the number is an estimate. Blank results below the MRLs cannot be controlled by the laboratory. The laboratory manager may then transfer the raw data to the document control area, where the raw data are filed if needed for a subsequent QC review. Raw data, together with all supporting documentation, are stored in confidential files by document control.

After all analyses for a report are complete, the data are entered into the laboratory reporting system and a preliminary report is generated for review by the Laboratory Project Manager. This review is followed by a quality check carried out by the document control group to verify that the QC meets the specifications of the method. Data qualifiers shall be added or, if applied by a software package, reviewed by the laboratory manager. A case narrative shall be included with each data report package to explain any nonconformance or other issues.

8.3 Data Outliers

Identification of outliers is also a part of the data review. An outlier is an unusually large (or small) value in a set of observations. There are many possible reasons for outliers including:

- Faulty instruments or component parts;
- Inaccurate reading of a record, dialing error, etc;
- Errors in transcribing data; and
- Calculation errors.

Sometimes analysts or operators can identify outliers by noting the above types of occurrences when they record the observations. In these instances, the errors are corrected, or if correction is not possible, the suspect observations may be removed from the data before calculations are performed. If no such information exists, the statistical evaluation techniques are used to test suspected outliers at the five percent significance level if there are three or more points in the data set containing the outlier. Outliers identified by this method may be removed from the data before further processing.

Laboratory concentration data will be reported using three significant figures for statistical calculations. Remedial decisions and external reports will be made using two significant figures

8.4 Data Quality Assessment

Validation of the laboratory reports and sample custody documentation will be performed by the QA Manager to ensure all samples were analyzed as requested. The laboratory reports are reviewed for the following:

- Sample hold times;
- Target analyte list;
- Reporting limits;
- Reporting units;
- Laboratory blanks;
- Field duplicates;
- OPR results; and
- Other applicable QC results.

The data validation task that will be performed will consist of reviewing three areas of data quality. (1) the QC checks used to assess measurement precision are field duplicate samples, (2) the QC checks used for the assessment of measurement accuracy are OPRs and surrogate spikes, and (3) the results for field and laboratory (i.e., method) blanks. A data quality assessment checklist to be used in documenting data validation is provided in Appendix B.

8.5 Data Validation and Reporting

The Project QA Manager will review and summarize all QC sample results to evaluate the sampling and analytical performance. Blank results will be evaluated to identify any systematic contamination; spike and duplicate results will be compared to the QA objectives presented in Section 4, and the results used to calculate precision and accuracy for the data set. This process will identify analytical methods and analytes for which the QA objectives are not satisfied and corresponding sample data will be qualified with a "flag" indicating the problem. Samples collected on the same day, or analyzed in the same run or batch, or individual samples may be flagged, depending on the type of problem that has been identified. Reanalysis or resampling may be recommended as a corrective action at this time if data are determined to be unacceptable for the intended application.

A data validation report will be submitted by the QA Manager the result of the data quality assessment. The measurement data will be discussed and qualified as appropriate based on the QC results. Data validation flags will be assigned to the data.

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FIGURE

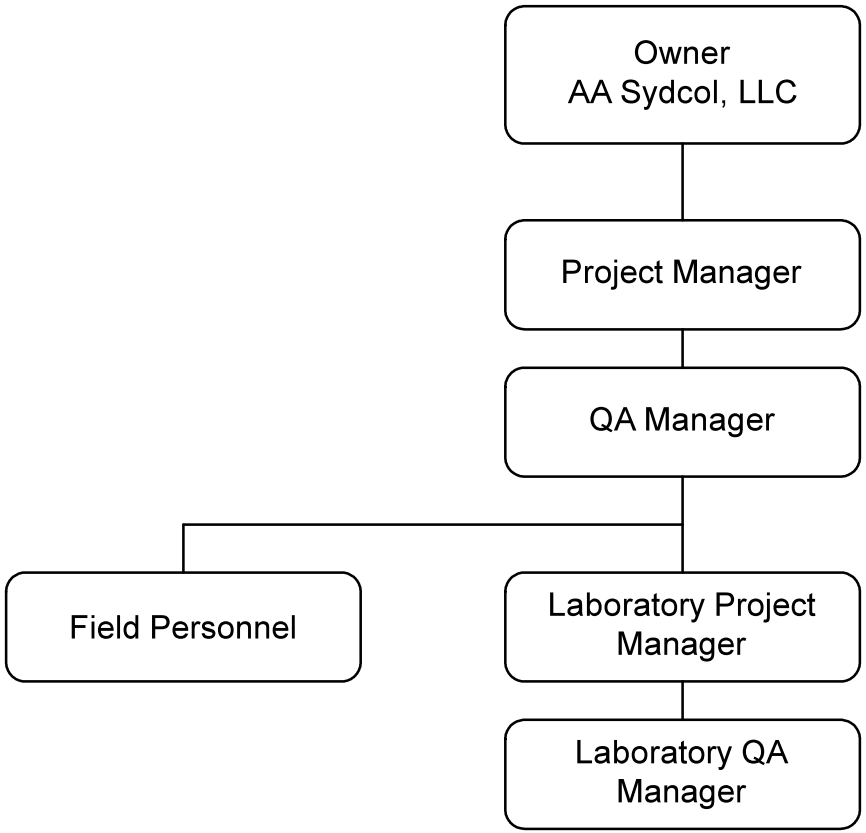

Figure B.1
QAPP ORGANIZATIONAL CHART
Sydcol
2264 E. 13th St., Yuma, AZ 85365

CLIENT:	APPROVED BY: JGP
PROJECT:	PROJECT NO:
DESIGNED BY: JGP	DATE: 2/20/22
DRAWN BY: TML	DWG/FILE: JGP-SYDCOL17
REVISION:	

JGP Consulting, PLC
Environmental Compliance Services

APPENDIX A

SAMPLE SHIPPING CHECKLIST

APPENDIX A
Sample Shipping Checklist

Sample Handling Checklist	Yes	No	Not Applicable
Sample bottles are free of defects and in their original packaging:			
Field Duplicate samples named with unrecognizable IDs and actual locations recorded in field logbook			
Samples labeled with:			
Sample Name/Date			
Analyses Required			
Sample Matrix			
Filtered or Unfiltered			
Sampler's Initials			
Preservative			
COC filled out with:			
Project Name, required signatures, dates, and times			
Analytical Suite required			
Date and time of sampling, sample IDs, sample matrix			
Number of containers submitted			
QA Sample IDs, matrices, date and time of sampling			
Samples stored on sufficient ice to remain at 4ºC until arrival at lab			
Sample package will not leak during shipment			
Sign COC to relinquish sample custody, remove pink slip, and enclose original in sample shipment			
Samples shipped within 48 hours of collection			

Notes:

COC = Chain-of-Custody
ID = Sample Identification
ºC = degrees Celsius
QA = Quality Assurance

APPENDIX B

DATA QUALITY ASSESSMENT CHECKLIST

APPENDIX B
Data Quality Assessment Checklist

Data	Yes	No	Not Applicable
Data Compilation			
Field Data			
Field Logbook Entries Current			
Field Sampling Forms Completed			
Anomalous Data Entries Resolved			
Chain-of-Custody Forms Completed			
Correct Analyses Requested			
Laboratory Data			
Hard Copy Reports Received			
Electronic Reports Received			
Case Narrative and QC Summaries Included in Report			

Data Review and Verification			
Field Data			
Samples Collected at Correct Locations and Depths			
Field Equipment Calibration Requirements Met			
Sampling Equipment Decontaminated Before Uses			
QC Samples Taken at Appropriate Frequency			
Laboratory data			
All Required Analyses Performed			
Holding Times and Temperatures Met			
Laboratory QC Samples Within Acceptable Limits			
Field QC Samples Within Acceptable Limits			

Final Data Quality Assessment Checklist:	**Yes**	**No**	**Not Applicable**
Data Entry Checked Against Original			
Time-Series of Analytical and Field Data Checked for Anomalies			
QA Issues Resolved and Documented			
Corrective Action Taken and Documented			

Notes:

QC = Quality Control

MDLs = Method Detection Limits

APPENDIX C

STANDARD OPERATING PROCEDURE FOR SCREENING SOILS FOR VOCS

AA Sydcol, Inc.

Sydcol Waste Transfer Facility

Standard Operating Procedure for Field Screening of Soil Samples Utilizing Photoionization Detectors

Revision 1.0

February 15, 2022

1. Introduction.

The following is a procedure to screen shallow soils for volatile organic compounds (VOCs) contamination at the Sydcol Waste Transfer Facility (Facility) upon closure consistent with the approved Closure Plan. Under the closure plan a number of primary and contingent soil samples are collected from a soil boring, with VOC screening used to determine whether or not to analyze contingent samples. To perform the VOC screening, a subsample of the soil samples will be placed in a polyethylene zip-lock bag and the volatile hydrocarbons allowed to come to equilibrium with the bag's headspace. The headspace hydrocarbon concentration is then measured with a calibrated photo-ionization detection (PID) instrument as detailed in this procedure.

2. Equipment Required.

A. Metal spoon;

B. 1-quart, Zip-Lock® type polyethylene bags;

C. Photoionization (PID) instrument, RAE Systems MiniRAE 3000+ portable handheld VOC monitor;

D. Calibration equipment for PID instrument; and

E. Decontamination equipment including soapy water and clean distilled water in squirt bottles or pressurized canisters.

3. Instrument Calibration

A. The PID instrument should be calibrated at the beginning of each day of use.

B. Calibration will be performed using certified calibration standards containing isobutylene as a calibration gas at concentrations sufficient to calibrate the PID to read VOC concentrations ranging from 0 to 1000 ppm.

C. Instrument calibration is to be performed consistent with manufacturer's instructions.

4. Analytical Procedure.

A. Measure a subsample of approximately 250 grams of soil from samples collected from soil borings. Place the subsample in a polyethylene bag using a clean or decontaminated spoon. In so far

possible, samples should be mineral soil free of vegetation and stones larger than 1/2" in diameter. Seal the samples immediately in the bag by zipping the closure. Sufficient air should be left in the bag so that the instrument can withdraw an adequate headspace sample.

B. knead the material in the bag until the contents are uniform.

C. Allow at least 15 minutes but not more than 1 hour for soil hydrocarbons to reach equilibrium with the headspace.

D. If samples are to be taken for laboratory analysis, they should be collected and preserved per laboratory protocols at this time. Preferably, these samples should bracket a wide range of hydrocarbon concentrations including the highest and lowest concentration at the site.

E. Warm up and calibrate the PID instrument to be used to the calibration set point determined by the manufacturer for the make of instrument in use.

F. Knead the bags again for thirty (30) seconds.

G. Measure the samples' headspace concentration. Insert the probe through the bag opening while squeezing the bag's opening seal tight around the probe. Record the highest reading that remains

H. Repeat all steps for each sample.

ATTACHMENT A

MINIRAE 3000+ INSTRUMENT DATA SHEET

MINIRAE® 3000 +

Portable Handheld VOC Monitor

The MiniRAE 3000 + is a comprehensive handheld VOC (Volatile Organic Compound) monitor that uses a third-generation patented PID technology to accurately measure one of the highest levels of ionizable chemicals available on the market.

It provides full-range measurement from 0 to 15,000 ppm of VOCs. The MiniRAE 3000 + has a built-in wireless modem that allows realtime data connectivity with the command center located up to 2 miles (3 km) away through a Bluetooth connection to a RAELink 3* portable modem or optionally via Mesh Network.

Workers can quickly measure VOCs and wirelessly transmit data

- Highly accurate VOC measurements
- Reflex PID Technology™
- Low maintenance — easy access to lamp and sensor
- Low cost of ownership
- 3-year 10.6eV lamp warranty
- BLE module & dedicated APP for Enhanced Datalogging capability

APPLICATIONS

- Oil and Gas
- HazMat
- Industrial Safety
- Civil Defense
- Environmental and Indoor Air Quality

FEATURES AND BENEFITS

- Third-generation patented PID technology
- Reflex PID Technology™
- VOC detection range from 0 to 15,000 ppm
- 3-second response time
- Humidity compensation with built-in humidity and temperature sensors
- Six-month datalogging
- Highly connectivity capability through multiple wireless module options
- Large graphic display with integrated flashlight
- Multi-language support with 10 languages encoded
- IP- 67 waterproof design

Honeywell

Minirae® 3000 + Technical Specifications

INSTRUMENT SPECIFICATIONS	
Size	10" L x 3.0" W x 2.5" H (25.5 cm x 7.6 cm x 6.4 cm)
Weight	26 oz (738 g)
Sensors	Photoionization sensor with standard 10.6 eV or optional 9.8 eV or 11.7 eV lamp
Battery	• Rechargeable, external field-replaceable Lithium-Ion battery pack • Alkaline battery adapter
Running time	16 hours of operation (12 hours with alkaline battery adapter)
Display Graphic	4 lines, 28 x 43 mm, with LED backlight for enhanced display readability
Keypad	1 operation and 2 programming keys, 1 flashlight on/off
Direct Readout	Instantaneous reading • VOCs as ppm by volume (mg/m³) • High values • STEL and TWA • Battery and shutdown voltage • Date, time, temperature
Alarms	95dB at 12" (30 cm) buzzer and flashing red LED to indicate exceeded preset limits • High: 3 beeps and flashes per second • Low: 2 beeps and flashes per second • STEL and TWA: 1 beep and flash per second • Alarms latching with manual override or automatic reset • Additional diagnostic alarm and display message for low battery and pump stall
EMC/RFI	Compliant with EMC directive (2004/108/EC) EMI and ESD test: 100MHz to 1GHz 30V/m, no alarm Contact: ±4kV Air: ±8kV, no alarm
IP Rating	• IP-67 unit off and without flexible probe • IP-65 unit running
Datalogging	Standard 6 months at one-minute intervals
Calibration	Two-point or three-point calibration for zero and span. Reflex PID Technology™ Calibration memory for 8 calibration gases, alarm limits, span values and calibrationdates
Sampling Pump	• Internal, integrated flow rate at 500 cc/mn • Sample from 100' (30m) horizontally or vertically
Low Flow Alarm	Auto pump shutoff at low-flow condition
Communication & Data Download	• Download data and upload instrument set-up from PC through charging cradle or using BLE module and dedicated APP • Wireless data transmission through built-in RF modem
Wireless Network	Mesh RAE Systems Dedicated Wireless Network
Wireless Range (Typical)	Up to 15ft (5m) for BLE EchoView Host: LOS > 660 ft (200 m) ProRAE Guardian & RAEMesh Reader: LOS > 660 ft (200 m) ProRAE Guardian & RAELink3 Mesh: LOS > 330 ft (100 m)
Safety Certifications	**US and Canada:** CSA, Classified as Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, D **Europe:** ATEX II 2G EEx ia IIC T4
Temperature	-4° to 122° F (-20° to 50° C)
Humidity	0% to 95% relative humidity (non-condensing)
Attachments	Durable bright yellow rubber boot
Warranty	3 years for 10.6 eV lamp, 1 year for pump, battery, sensor and instrument
Wireless Frequency	ISM license-free band. IEEE 802.15.4 Sub 1GHz
Wireless Approvals	FCC Part 15, CE R&TTE, Others[1]
Radio Module	Supports BLE or Bluetooth or RM900

[1] Contact RAE Systems for country-specific wireless approvals and certificates.
Specifications are subject to change.

SENSOR SPECIFICATIONS			
Gas Monitor	Range	Resolution	Response Time T90
VOCs	0 to 999.9 ppm 1,000 to 15,000 ppm	0.1 ppm 1 ppm	< 3 s < 3 s

MONITOR ONLY INCLUDES:

- MiniRAE 3000 + Monitor, Model PGM-7320
- Wireless communication module built in, as specified
- Datalogging with ProRAE Studio II Package
- Charging/download adapter
- RAE UV lamp, as specified
- Flex-I-Probe™
- External filter
- Rubber boot
- Alkaline battery adapter
- Lamp-cleaning kit
- Tool kit
- Soft leather case

OPTIONAL CALIBRATION KIT ADDS:

- 100 ppm isobutylene calibration gas, 34L
- Calibration regulator and flow controller

OPTIONAL GUARANTEED COST-OF-OWNERSHIP PROGRAM:

- 4-year repair and replacement warranty
- Annual maintenance service

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APPENDIX D

CLOSURE COST ESTIMATE

Table D-1
AA Sydcol Waste Transfer Station
Summary of Closure Costs

Closure Activity	Estimated Cost	Supporting information
Health and Safety Plan	$9,831	Table A-2
Initial closure assessment	$10,123	Table A-2
Inventory removal	$806,268	Table A-3
Waste/recycling disposal and decontamination	$71,388	Table A-4
Confirmation sampling	$276,275	Table A-5
Closure sampling report	$10,289	Table A-2
Closure Certification	$7,260	Table A-2
Total Direct Cost	$1,191,435	
Contingency (20%)	$238,287	
Project management (10%)	$119,143	
Total Project Cost	**$1,548,865**	

Table D-2
AA Sydcol Waste Transfer Station
Closure Costs for Services

Service Item	Health and Safety Plan	Initial Closure Assessment	Sampling Report	Closure Certification
Labor costs				
Project Manager: Weeks	0.5	1	1	1
Project Manager w/O&P (01-31-13.20 0220): Rate ($/wk)	3,876	3,876	3,876	3,876
Project Manager total:	$1,938	$3,876	$3,876	$3,876
Field Engineer: Weeks	1	2	2	1
Field Engineer w/O&P (01-31-13.20 0120): Rate ($/wk)	2,487	2,487	2,487	2,487
Field Engineer total:	$2,487	$4,973	$4,973	$2,487
Safety Specialist: Weeks	1	0	0.2	0
Safety Specialist w/O&P (01-31-13.20 0280): Rate ($/wk)	3,607	3,840	3,840	3,840
Safety Specialist total:	$3,607	$0	$768	$0
Clerical support: Weeks	1	1	1	1
Clerical w/O&P (01 31 13.20 0020): Rate ($/Wk)	672	672	672	672
Clerical support total:	$672	$672	$672	$672
Total labor cost	$8,703	$9,521	$10,289	$7,034
Expenses				
Expenses: Per diem lodging (GSA): ($96/day)	$96	$96	$96	$96
Expenses: Per diem meals (GSA) ($55/day)	$55	$55	$55	$55
Expenses: PPE (engineering estimate) ($75 /day)	$225	$150	$0	$75
Travel: person-days	3	2	0	1
Total expenses	$1,128	$602	$0	$226
Project Totals				
Total cost (labor and expenses)	$9,831	$10,123	$10,289	$7,260
	$37,504			

Notes:

All RS Means costs adjusted for location and inflation.

RS Means location factor index (Phoenix):	0.886
Inflation factor (2020-2021):	1.01139

Table D-3
Sydcol Waste Transfer Station
Closure Costs for Inventory Removal

Inventory Removal Safety Oversight

Item	RSMeans or Item	Rate	Units	Quantity	Cost
Safety Specialist	01-31-13.20 0280	3,607	week	6	$21,641
Vehicle (pickup)	01-54-33.40 7100	497	Month	1.5	$746
Fuel	Engineering estimate	30	Day	10	$300
PPE	Engineering estimate	75	Person-day	30	$2,250
Per diem lodging	GSA 2021	96	Person-day	30	$2,880
Per diem meals	GSA 2021	55	Person-day	30	$1,650
Totals:					**$29,467**

Loading, Transport, and Disposal Costs

Facility capacity: 3212 Drum-eq

Inventory Description	Quantity (Drum-eq)	Loading cost[1]	Loads (80 dr, 15 totes, or 5000 g)	Disposal Facility	Distance (miles)	Transport Cost[2]	Disposal Cost[3]	Total Cost
Ignitables	850	4572	10	Veolia	258	22575.00	$59,493	$86,640
Corrosives	567	3048	7	Veolia	258	15802.50	$133,150	$152,001
Reactives	6	31	1	Veolia	258	2257.50	$1,359	$3,647
Toxicity: Metals	3	16	1	US Ecology	398	2925.30	$347	$3,288
Toxicity: Pesticides	3	16	1	Crosby	274	2013.90	$2,529	$4,559
Toxicity: VOCs	921	4954	11	PRR	269	21748.65	$232,062	$258,765
Toxicity: SVOCs	6	31	1	PRR	269	1977.15	$1,457	$3,465
Listed: F	837	4505	10	PRR	269	19771.50	211017	$235,293
Listed: P/U	21	112	1	Crosby	274	2013.90	18268.25	$20,394
Totals (2020):	3,213	17,286	43			91,085	659,682	768,053
Totals (2021):								**$776,801**

Total cost for task: **$806,268**

Notes:

1. Loading costs: EPA's CostPro unit rate, $4.38/drum (2012), $5.38/drum inflation-adjusted to 2020.
2. Transport costs: RS Means 02 81 20.10 1270 and 3400 ($8.75/mile/bulk load, $7.35/mile/trailer)
3. Independent price quote from disposal facility (2020)
   Veolia: $0.99/gallon bulk flammable liquid
   US Ecology: $140/drum or $340/tote haz WWT
   Crosby: $875/drum for acute hazardous waste (P-list)
   PRR: $252/drum for chlorinated solvints

RS Means location factor index: 0.886 Phoenix
Inflation factor (2020-2021): 1.01139

Table D-4
AA Sydcol Waste Transfer Station
Closure Costs for Non-inventory Waste Removal and Decontamination

A-4.1 Non-inventory waste loading

Description	RSMeans	Units	Quantity	Unit Cost	Total Cost
Rolloffs for bulk solids, haz/non-haz (20 cyd)	02 41 19.19 0725	week	14	625	$8,750
Rolloff loading (0-50' wheeled)	02 41 19.19 2005	cyd	120	27.5	$3,300
Listed HW: bulk solids	02 81 20.10 1130	ton	41	210	$8,610
Listed HW: washwater	02 81 20.10 1100	drum	24	655	$15,720
Total:					$36,380

A.4-2 Non-inventory waste disposal

Description (non-inventory Wastes)	RSMeans	Units	Quantity	Disposal Facility	Transport Cost ($/unit-mile)[1]	Disposal ($/unit)[2]	Total Cost
Nonhazardous bulk solids	02 81 20.10 1270	tons	15	MSWLF (15 miles)	0.40	30	$539
Scrap recycling	02 81 20.10 1270	tons	143	Republic (5 miles)	0.40	30	$4,574
Listed: Bulk solids	02 81 20.10 1270	tons	41	US Ecology (398 mi)	0.40	142	$12,288
Listed: Washwater	02 81 20.10 1270	Drum-eq	21	PRR (269 mi)	0.09	255	$5,857
Total:							**$18,145**

A.4-3 Decontamination costs

Description	RSMeans	Units	Quantity	Unit Cost	Total Cost
Pressure wash crew and equipment (Crew B-9B)	Crew B-9B	Day	5	2221	$11,103
Fuel	Engineering est.	Week	1	700	$700
PPE[3]	Engineering est.	Man-Day	15	75	$1,125
Waste profiling	3rd-party	Sample	4	795	$3,180
Expenses: Per diem lodging (GSA)	GSA	Day	5	96	$480
Expenses: Per diem meals (GSA)	GSA	Day	5	55	$275
					$16,863

Total for non-inventory waste removal and decontamination: $71,388

Notes:

1. Transport costs: RS Means 02 81 20.10 1270 ($7.98/mile/ load, 80 drums or 18 tons per load) adjusted for location (Phoenix) and inflation.
2. Engineering estimate for solid wastes and recycling. Independent price quote from disposal facility for hazardous wastes (2020, adjusted to 2021)
3. Engineering estimate for PPE costs include tyvek cover, disposable respirator cartridges, and latex boot covers

Location factor index for all RSMeans costs (Phoenix): 0.886
Inflation factor (2020-2021): 1.01139

Table D-5
AA Sydcol Waste Transfer Station
Closure Costs for Sampling

Description	RSMeans[2] or source	Units	Quantity	Unit Cost	Total Cost
Field Engineer	01 31 13.20 0200	Week	1	2487	$2,487
Concrete coring	03 82 13.10 0300	Hole	42	73	$3,067
Drill rig and crew	02 32 13.10 1400	Day	5	2599	$12,993
PPE[1]	Eng. Estimate	Person-day	15	75	$1,125
Sample analytical costs (concrete)	3rd-party quote	Sample	52	350	$18,200
Sample analytical costs (soils)	3rd-party quote	Sample	258	795	$205,110
Sample analytical costs (rinsate)	3rd-party quote	Sample	8	350	$2,800
Sample duplicate analytical costs	3rd-party quote	Sample	32	795	$25,281
Sampling materials	Eng. Estimate	Lump	1	2000	$2,000
Sample shipping	Eng. Estimate	Lump	1	400	$400
Vehicle (pickup)	01 54 33.40 7100	Day	5	99	$497
Fuel	Eng. Estimate	Day	5	10	$50
Expenses: Per diem lodging (GSA)	GSA	Day	15	96	$1,440
Expenses: Per diem meals (GSA)	GSA	Day	15	55	$825
Samplig total					$276,275

Notes:

1. Estimated PPE costs include tyvek cover, dispoal respirator cartridges, and latex boot covers
2. Costs from RS Means are adjusted for location (Phoenix) and inflation (2020-2021)
   Location factor index for all RSMeans costs (Phoenix): 0.886
   Inflation factor (2020-2021): 1.01139

APPENDIX E

COST ESTIMATE REFERENCES

GORDIAN®

Building Construction Costs

with RSMeans data

2020

78th annual edition

Building Construction Costs with RSMeans data

Robert Mewis, Senior Editor

GORDIAN®

2020

78th annual edition

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01 21 Allowances

01 21 55 – Job Conditions Allowance

01 21 55.50 Job Conditions

		Crew	Daily Output	Labor-Hours	Unit	Material	2020 Bare Costs Labor	Equipment	Total	Total Incl O&P
0600	Inexperienced, add				Project				10%	10%
0700	Labor availability, surplus, deduct								1%	1%
0800	Shortage, add								10%	10%
0900	Material storage area, available, deduct								1%	1%
1000	Not available, add								2%	2%
1100	Subcontractor availability, surplus, deduct								5%	5%
1200	Shortage, add								12%	12%
1300	Work space, available, deduct								2%	2%
1400	Not available, add								5%	5%

01 21 57 – Overtime Allowance

01 21 57.50 Overtime

0010	**OVERTIME** for early completion of projects or where	R012909-90								
0020	labor shortages exist, add to usual labor, up to				Costs		100%			

01 21 63 – Taxes

01 21 63.10 Taxes

0010	**TAXES**	R012909-80								
0020	Sales tax, State, average				%	5.08%				
0050	Maximum	R012909-85				7.50%				
0200	Social Security, on first $118,500 of wages						7.65%			
0300	Unemployment, combined Federal and State, minimum	R012909-86					.60%			
0350	Average						9.60%			
0400	Maximum						12%			

01 31 Project Management and Coordination

01 31 13 – Project Coordination

01 31 13.20 Field Personnel

0010	**FIELD PERSONNEL**									
0020	Clerk, average				Week		495		495	750
0100	Field engineer, junior engineer						1,241		1,241	1,877
0120	Engineer						1,825		1,825	2,775
0140	Senior engineer						2,400		2,400	3,625
0160	General purpose laborer, average	1 Clab	.20	40			1,675		1,675	2,525
0180	Project manager, minimum						2,175		2,175	3,300
0200	Average						2,500		2,500	3,800
0220	Maximum						2,850		2,850	4,325
0240	Superintendent, minimum						2,125		2,125	3,225
0260	Average						2,325		2,325	3,525
0280	Maximum						2,650		2,650	4,025
0290	Timekeeper, average						1,350		1,350	2,050

01 31 13.30 Insurance

0010	**INSURANCE**	R013113-40								
0020	Builders risk, standard, minimum				Job				.24%	.24%
0050	Maximum	R013113-50							.64%	.64%
0200	All risk type, minimum								.25%	.25%
0250	Maximum	R013113-60							.62%	.62%
0400	Contractor's equipment floater, minimum				Value				.50%	.50%
0450	Maximum				"				1.50%	1.50%
0600	Public liability, average				Job				2.02%	2.02%
0800	Workers' compensation & employer's liability, average									
0850	by trade, carpentry, general				Payroll		11.97%			

02 21 Surveys

02 21 13 – Site Surveys

02 21 13.09 Topographical Surveys

		Crew	Daily Output	Labor-Hours	Unit	2020 Bare Costs Material	Labor	Equipment	Total	Total Incl O&P
0010	**TOPOGRAPHICAL SURVEYS**									
0020	Topographical surveying, conventional, minimum	A-7	3.30	7.273	Acre	23.50	415	9.30	447.80	660
0100	Maximum	A-8	60	53.333	"	68	2,975	51	3,089	4,600

02 21 13.13 Boundary and Survey Markers

0010	**BOUNDARY AND SURVEY MARKERS**									
0300	Lot location and lines, large quantities, minimum	A-7	2	12	Acre	36	690	15.35	741.35	1,075
0320	Average	"	1.25	19.200		63.50	1,100	24.50	1,188	1,750
0400	Small quantities, maximum	A-8	1	32		76.50	1,775	30.50	1,882	2,800
0600	Monuments, 3' long	A-7	10	2.400	Ea.	35.50	138	3.07	176.57	249
0800	Property lines, perimeter, cleared land	"	1000	.024	L.F.	.08	1.38	.03	1.49	2.19
0900	Wooded land	A-8	875	.037	"	.10	2.04	.04	2.18	3.21

02 21 13.16 Aerial Surveys

0010	**AERIAL SURVEYS**									
1500	Aerial surveying, including ground control, minimum fee, 10 acres				Total				4,700	4,700
1510	100 acres								9,400	9,400
1550	From existing photography, deduct								1,625	1,625
1600	2' contours, 10 acres				Acre				470	470
1850	100 acres								94	94
2000	1000 acres								90	90
2050	10,000 acres								85	85

02 32 Geotechnical Investigations

02 32 13 – Subsurface Drilling and Sampling

02 32 13.10 Boring and Exploratory Drilling

0010	**BORING AND EXPLORATORY DRILLING**									
0020	Borings, initial field stake out & determination of elevations	A-6	1	16	Day		845	31	876	1,300
0100	Drawings showing boring details				Total		335		335	425
0200	Report and recommendations from P.E.						775		775	970
0300	Mobilization and demobilization	B-55	4	6			263	305	568	730
0350	For over 100 miles, per added mile		450	.053	Mile		2.34	2.69	5.03	6.45
0600	Auger holes in earth, no samples, 2-1/2" diameter		78.60	.305	L.F.		13.40	15.40	28.80	37
0650	4" diameter		67.50	.356			15.60	17.95	33.55	43.50
0800	Cased borings in earth, with samples, 2-1/2" diameter		55.50	.432		20.50	18.95	22	61.45	75
0850	4" diameter		32.60	.736		29	32.50	37	98.50	122
1000	Drilling in rock, "BX" core, no sampling	B-56	34.90	.458		22	43.50		65.50	80.50
1050	With casing & sampling		31.70	.505		20.50	24	48	92.50	111
1200	"NX" core, no sampling		25.92	.617			29.50	58.50	88	109
1250	With casing and sampling		25	.640		21	30.50	60.50	112	136
1400	Borings, earth, drill rig and crew with truck mounted auger	B-55	1	24	Day		1,050	1,200	2,250	2,900
1450	Rock using crawler type drill	B-56	1	16	"		760	1,525	2,285	2,825
1500	For inner city borings, add, minimum								10%	10%
1510	Maximum								20%	20%

02 32 19 – Exploratory Excavations

02 32 19.10 Test Pits

0010	**TEST PITS**									
0020	Hand digging, light soil	1 Clab	4.50	1.778	C.Y.		75		75	112
0100	Heavy soil	"	2.50	3.200			135		135	202
0120	Loader-backhoe, light soil	B-11M	28	.571			28.50	8.30	36.80	51.50
0130	Heavy soil	"	20	.800			39.50	11.60	51.10	72
1000	Subsurface exploration, mobilization				Mile				6.75	8.40

02 41 19.18 Selective Demolition, Disposal Only

		Crew	Daily Output	Labor-Hours	Unit	2020 Bare Costs Material	Labor	Equipment	Total	Total Incl O&P
0010	**SELECTIVE DEMOLITION, DISPOSAL ONLY** R024119-10									
0015	Urban bldg w/salvage value allowed									
0020	Including loading and 5 mile haul to dump									
0200	Steel frame	B-3	480	.112	C.Y.		5.25	5.40	10.65	13.80
0300	Concrete frame		365	.132			6.20	6.35	12.55	16.30
0400	Masonry construction		445	.108			5.10	5.20	10.30	13.35
0500	Wood frame		247	.194			9.15	9.35	18.50	24

02 41 19.19 Selective Demolition

0010	**SELECTIVE DEMOLITION** Rubbish Handling R024119-10									
0020	The following are to be added to the demolition prices									
0050	The following are components for a complete chute system									
0100	Top chute circular steel 4' long, 18" diameter R024119-30	B-1C	15	1.600	Ea.	285	68.50	20.50	374	440
0102	23" diameter		15	1.600		310	68.50	20.50	399	465
0104	27" diameter		15	1.600		330	68.50	20.50	419	490
0106	30" diameter		15	1.600		355	68.50	20.50	444	515
0108	33" diameter		15	1.600		380	68.50	20.50	469	545
0110	36" diameter		15	1.600		405	68.50	20.50	494	570
0112	Regular chute 18" diameter		15	1.600		214	68.50	20.50	303	360
0114	23" diameter		15	1.600		238	68.50	20.50	327	390
0116	27" diameter		15	1.600		262	68.50	20.50	351	415
0118	30" diameter		15	1.600		268	68.50	20.50	357	420
0120	33" diameter		15	1.600		310	68.50	20.50	399	465
0122	36" diameter		15	1.600		330	68.50	20.50	419	490
0124	Control door chute, 18" diameter		15	1.600		405	68.50	20.50	494	570
0126	23" diameter		15	1.600		430	68.50	20.50	519	595
0128	27" diameter		15	1.600		450	68.50	20.50	539	620
0130	30" diameter		15	1.600		475	68.50	20.50	564	650
0132	33" diameter		15	1.600		500	68.50	20.50	589	675
0134	36" diameter		15	1.600		520	68.50	20.50	609	700
0136	Chute liners, 14 ga., 18"-30" diameter		15	1.600		228	68.50	20.50	317	375
0138	33"-36" diameter		15	1.600		284	68.50	20.50	373	440
0140	17% thinner chute, 30" diameter		15	1.600		233	68.50	20.50	322	385
0142	33% thinner chute, 30" diameter		15	1.600		176	68.50	20.50	265	320
0144	Top chute cover	1 Clab	24	.333		155	14.05		169.05	192
0146	Door chute cover	"	24	.333		155	14.05		169.05	192
0148	Top chute trough	2 Clab	12	1.333		530	56		586	665
0150	Bolt down frame & counter weights, 250 lb.	B-1	4	6		4,325	257		4,582	5,125
0152	500 lb.		4	6		6,375	257		6,632	7,375
0154	750 lb.		4	6		11,100	257		11,357	12,600
0156	1000 lb.		2.67	8.989		12,000	385		12,385	13,800
0158	1500 lb.		2.67	8.989		14,000	385		14,385	16,000
0160	Chute warning light system, 5 stories	B-1C	4	6		8,525	257	77.50	8,859.50	9,850
0162	10 stories	"	2	12		14,800	515	155	15,470	17,200
0164	Dust control device for dumpsters	1 Clab	8	1		158	42		200	238
0166	Install or replace breakaway cord		8	1		28	42		70	94
0168	Install or replace warning sign		16	.500		11.10	21		32.10	43.50
0600	Dumpster, weekly rental, 1 dump/week, 6 C.Y. capacity (2 tons)				Week	415			415	455
0700	10 C.Y. capacity (3 tons)					480			480	530
0725	20 C.Y. capacity (5 tons) R024119-20					565			565	625
0800	30 C.Y. capacity (7 tons)					730			730	800
0840	40 C.Y. capacity (10 tons)					775			775	850
2000	Load, haul, dump and return, 0'-50' haul, hand carried	2 Clab	24	.667	C.Y.		28		28	42

	02 41 19.19 Selective Demolition	Crew	Daily Output	Labor-Hours	Unit	Material	2020 Bare Costs Labor	Equipment	Total	Total Incl O&P
2005	Wheeled	2 Clab	37	.432	C.Y.		18.20		18.20	27.5
2040	0'-100' haul, hand carried		16.50	.970			41		41	61.5
2045	Wheeled		25	.640			27		27	40.5
2050	Forklift	A-3R	25	.320			16.95	10.25	27.20	37
2080	Haul and return, add per each extra 100' haul, hand carried	2 Clab	35.50	.451			18.95		18.95	28.5
2085	Wheeled		54	.296			12.45		12.45	18.7
2120	For travel in elevators, up to 10 floors, add		140	.114			4.81		4.81	7.2
2130	0'-50' haul, incl. up to 5 riser stairs, hand carried		23	.696			29.50		29.50	44
2135	Wheeled		35	.457			19.25		19.25	29
2140	6-10 riser stairs, hand carried		22	.727			30.50		30.50	46
2145	Wheeled		34	.471			19.80		19.80	30
2150	11-20 riser stairs, hand carried		20	.800			33.50		33.50	50.5
2155	Wheeled		31	.516			21.50		21.50	32.5
2160	21-40 riser stairs, hand carried		16	1			42		42	63.5
2165	Wheeled		24	.667			28		28	42
2170	0'-100' haul, incl. 5 riser stairs, hand carried		15	1.067			45		45	67.5
2175	Wheeled		23	.696			29.50		29.50	44
2180	6-10 riser stairs, hand carried		14	1.143			48		48	72.5
2185	Wheeled		21	.762			32		32	48
2190	11-20 riser stairs, hand carried		12	1.333			56		56	84.5
2195	Wheeled		18	.889			37.50		37.50	56
2200	21-40 riser stairs, hand carried		8	2			84		84	127
2205	Wheeled		12	1.333			56		56	84.5
2210	Haul and return, add per each extra 100' haul, hand carried		35.50	.451			18.95		18.95	28.5
2215	Wheeled		54	.296			12.45		12.45	18.7
2220	For each additional flight of stairs, up to 5 risers, add		550	.029	Flight		1.22		1.22	1.8
2225	6-10 risers, add		275	.058			2.45		2.45	3.6
2230	11-20 risers, add		138	.116			4.88		4.88	7.3
2235	21-40 risers, add		69	.232			9.75		9.75	14.6
3000	Loading & trucking, including 2 mile haul, chute loaded	B-16	45	.711	C.Y.		31.50	12.75	44.25	61.5
3040	Hand loading truck, 50' haul	"	48	.667			29.50	11.95	41.45	57.5
3080	Machine loading truck	B-17	120	.267			12.40	5.35	17.75	24.5
5000	Haul, per mile, up to 8 C.Y. truck	B-34B	1165	.007			.34	.49	.83	1.0
5100	Over 8 C.Y. truck	"	1550	.005			.25	.37	.62	.7

02 41 19.20 Selective Demolition, Dump Charges

0010	**SELECTIVE DEMOLITION, DUMP CHARGES** R024119-10									
0020	Dump charges, typical urban city, tipping fees only									
0100	Building construction materials				Ton		74		74	81
0200	Trees, brush, lumber						63		63	69.5
0300	Rubbish only					63			63	69.5
0500	Reclamation station, usual charge					74			74	81

02 41 19.21 Selective Demolition, Gutting

0010	**SELECTIVE DEMOLITION, GUTTING** R024119-10									
0020	Building interior, including disposal, dumpster fees not included									
0500	Residential building									
0560	Minimum	B-16	400	.080	SF Flr.		3.54	1.43	4.97	6.9
0580	Maximum	"	360	.089	"		3.94	1.59	5.53	7.6
0900	Commercial building									
1000	Minimum	B-16	350	.091	SF Flr.		4.05	1.64	5.69	7.9
1020	Maximum	"	250	.128	"		5.65	2.29	7.94	11

02 65 Underground Storage Tank Removal

02 65 10 – Underground Tank and Contaminated Soil Removal

02 65 10.30 Removal of Underground Storage Tanks

			Crew	Daily Output	Labor-Hours	Unit	2020 Bare Costs Material	Labor	Equipment	Total	Total Incl O&P
0401	For cleaning/transporting tanks (1.5 lb./100 gal. cap)	G	1 Clab	500	.016	Lb.	1.22	.67		1.89	2.35
0503	Disconnect and remove piping	G	1 Plum	160	.050	L.F.		3.22		3.22	4.82
0603	Transfer liquids, 10% of volume	G		1600	.005	Gal.		.32		.32	.48
0703	Cut accessway into underground storage tank	G	1 Clab	5.33	1.501	Ea.		63		63	95
0813	Remove sludge, wash and wipe tank, 500 gal.	G	1 Plum	8	1	"		64.50		64.50	96.50
0823	3,000 gal.	G	"	6.67	1.199	"		77.50		77.50	116
0833	5,000 gal.	G		6.15	1.301			84		84	125
0843	8,000 gal.	G		5.33	1.501			96.50		96.50	145
0853	10,000 gal.	G		4.57	1.751			113		113	169
0863	12,000 gal.	G		4.21	1.900			122		122	183
1020	Haul tank to certified salvage dump, 100 miles round trip										
1023	3,000 gal. to 5,000 gal. tank					Ea.				760	830
1026	6,000 gal. to 8,000 gal. tank									880	960
1029	9,000 gal. to 12,000 gal. tank									1,050	1,150
1100	Disposal of contaminated soil to landfill										
1110	Minimum					C.Y.				145	160
1111	Maximum					"				400	440
1120	Disposal of contaminated soil to										
1121	bituminous concrete batch plant										
1130	Minimum					C.Y.				80	88
1131	Maximum									115	125
1203	Excavate, pull, & load tank, backfill hole, 8,000 gal. +	G	B-12G	50	.32	Ea.		1,625	1,900	3,525	4,525
1213	Haul tank to certified dump, 100 miles rt, 8,000 gal. +	G	B-34K	1	8			390	855	1,245	1,525
1223	Excavate, pull, & load tank, backfill hole, 500 gal.	G	B-11C	1	16			790	214	1,004	1,400
1233	Excavate, pull, & load tank, backfill hole, 3,000-5,000 gal.	G	B-11M	.50	32			1,575	465	2,040	2,875
1243	Haul tank to certified dump, 100 miles rt, 500 gal.	G	B-34L	1	8			425	196	621	850
1253	Haul tank to certified dump, 100 miles rt, 3,000-5,000 gal.	G	B-34M	1	8			425	820	1,245	1,525
2010	Decontamination of soil on site, incl. poly tarp on top/bottom										
2011	Soil containment berm and chemical treatment										
2020	Minimum	G	B-11C	100	.160	C.Y.	7.65	7.90	2.14	17.69	22.50
2021	Maximum	G	"	100	.160		9.90	7.90	2.14	19.94	25
2050	Disposal of decontaminated soil, minimum									135	150
2055	Maximum									400	440

02 81 Transportation and Disposal of Hazardous Materials

02 81 20 – Hazardous Waste Handling

02 81 20.10 Hazardous Waste Cleanup/Pickup/Disposal

0010	**HAZARDOUS WASTE CLEANUP/PICKUP/DISPOSAL**										
0100	For contractor rental equipment, i.e., dozer,										
0110	front end loader, dump truck, etc., see 01 54 33 Reference Section										
1000	Solid pickup										
1100	55 gal. drums					Ea.				240	265
1120	Bulk material, minimum					Ton				190	210
1130	Maximum					"				595	655
1200	Transportation to disposal site										
1220	Truckload = 80 drums or 25 C.Y. or 18 tons										
1260	Minimum					Mile				3.95	4.45
1270	Maximum					"				7.25	7.98
3000	Liquid pickup, vacuum truck, stainless steel tank										
3100	Minimum charge, 4 hours					Hr.				140	155
3110	1 compartment, 2200 gallon										

03 81 Concrete Cutting

03 81 13 – Flat Concrete Sawing

	03 81 13.75 Concrete Saw Blades	Crew	Daily Output	Labor-Hours	Unit	2020 Bare Costs Material	Labor	Equipment	Total	Total Incl O&P
3200	42" diameter				Ea.	2,450			2,450	2,700

03 81 16 – Track Mounted Concrete Wall Sawing

03 81 16.50 Concrete Wall Cutting

0010	**CONCRETE WALL CUTTING**									
0750	Includes blade cost, layout and set-up time									
0800	Concrete walls, hydraulic saw, plain, per inch of depth	B-89B	250	.064	L.F.	.04	3.21	.6	9.25	11.45
0820	Rod reinforcing, per inch of depth	"	150	.107	"	.06	5.35	10.05	15.46	19.10

03 82 Concrete Boring

03 82 13 – Concrete Core Drilling

03 82 13.10 Core Drilling

0010	**CORE DRILLING**									
0015	Includes bit cost, layout and set-up time									
0020	Reinforced concrete slab, up to 6" thick									
0100	1" diameter core	B-89A	17	.941	Ea.	.20	45.50	6.70	52.40	76.50
0150	For each additional inch of slab thickness in same hole, add		1440	.011		.03	.54	.08	.65	.94
0200	2" diameter core		16.50	.970		.26	47	6.90	54.16	79
0250	For each additional inch of slab thickness in same hole, add		1080	.015		.04	.72	.11	.87	1.25
0300	3" diameter core		16	1		.40	48.50	7.15	56.05	81.50
0350	For each additional inch of slab thickness in same hole, add		720	.022		.07	1.08	.16	1.31	1.86
0500	4" diameter core		15	1.067		.45	51.50	7.60	59.55	87
0550	For each additional inch of slab thickness in same hole, add		480	.033		.07	1.62	.24	1.93	2.78
0700	6" diameter core		14	1.143		.65	55.50	8.15	64.30	93
0750	For each additional inch of slab thickness in same hole, add		360	.044		.11	2.15	.32	2.58	3.72
0900	8" diameter core		13	1.231		1.07	59.50	8.80	69.37	101
0950	For each additional inch of slab thickness in same hole, add		288	.056		.18	2.69	.40	3.27	4.70
1100	10" diameter core		12	1.333		1.20	64.50	9.50	75.20	109
1150	For each additional inch of slab thickness in same hole, add		240	.067		.20	3.23	.48	3.91	5.60
1300	12" diameter core		11	1.455		1.84	70.50	10.40	82.74	119
1350	For each additional inch of slab thickness in same hole, add		206	.078		.31	3.77	.55	4.63	6.65
1500	14" diameter core		10	1.600		1.84	77.50	11.40	90.74	132
1550	For each additional inch of slab thickness in same hole, add		180	.089		.31	4.31	.63	5.25	7.55
1700	18" diameter core		9	1.778		3.06	86	12.70	101.76	147
1750	For each additional inch of slab thickness in same hole, add		144	.111		.51	5.40	.79	6.70	9.55
1754	24" diameter core		8	2		4.15	97	14.30	115.45	166
1756	For each additional inch of slab thickness in same hole, add		120	.133		.69	6.45	.95	8.09	11.55
1760	For horizontal holes, add to above						20%	20%		
1770	Prestressed hollow core plank, 8" thick									
1780	1" diameter core	B-89A	17.50	.914	Ea.	.27	44.50	6.55	51.32	74.50
1790	For each additional inch of plank thickness in same hole, add		3840	.004		.03	.20	.03	.26	.37
1794	2" diameter core		17.25	.928		.35	45	6.60	51.95	75.50
1796	For each additional inch of plank thickness in same hole, add		2880	.006		.04	.27	.04	.35	.50
1800	3" diameter core		17	.941		.53	45.50	6.70	52.73	77
1810	For each additional inch of plank thickness in same hole, add		1920	.008		.07	.40	.06	.53	.75
1820	4" diameter core		16.50	.970		.60	47	6.90	54.50	79.50
1830	For each additional inch of plank thickness in same hole, add		1280	.013		.07	.61	.09	.77	1.09
1840	6" diameter core		15.50	1.032		.87	50	7.35	58.22	84.50
1850	For each additional inch of plank thickness in same hole, add		960	.017		.11	.81	.12	1.04	1.47
1860	8" diameter core		15	1.067		1.43	51.50	7.60	60.53	88
1870	For each additional inch of plank thickness in same hole, add		768	.021		.18	1.01	.15	1.34	1.88

01 54 33 | Equipment Rental

		UNIT	HOURLY OPER. COST	RENT PER DAY	RENT PER WEEK	RENT PER MONTH	EQUIPMENT COST/DAY
6830	Cable pulling rig	Ea.	73.77	28.50	85	255	607.15
6850	Portable cable/wire puller, 8000 lb max pulling capacity		3.70	120	360	1,075	101.60
6900	Water tank trailer, engine driven discharge, 5000 gallons		7.16	158	475.09	1,425	152.25
6925	10,000 gallons		9.75	215	645.50	1,925	207.10
6950	Water truck, off highway, 6000 gallons		71.75	835	2,504.54	7,525	1,075
7010	Tram car for high voltage line work, powered, 2 conductor		6.88	28.50	85	255	72.05
7020	Transit (builder's level) with tripod		.10	17.55	52.67	158	11.30
7030	Trench box, 3000 lb., 6' x 8'		.56	96.50	290.22	870	62.50
7040	7200 lb., 6' x 20'		.72	187	560	1,675	117.75
7050	8000 lb., 8' x 16'		1.08	186	557.71	1,675	120.15
7060	9500 lb., 8' x 20'		1.20	232	697.14	2,100	149.05
7065	11,000 lb., 8' x 24'		1.26	219	655.83	1,975	141.25
7070	12,000 lb., 10' x 20'		1.49	263	790.09	2,375	169.95
7100	Truck, pickup, 3/4 ton, 2 wheel drive		9.24	61.50	184.87	555	110.85
7200	4 wheel drive		9.48	167	500	1,500	175.85
7250	Crew carrier, 9 passenger		12.66	108	325	975	166.25
7290	Flat bed truck, 20,000 lb. GVW		15.26	133	397.63	1,200	201.60
7300	Tractor, 4 x 2, 220 H.P.		22.25	215	645.50	1,925	307.10
7410	330 H.P.		32.33	294	883.04	2,650	435.25
7500	6 x 4, 380 H.P.		36.09	340	1,022.47	3,075	493.25
7600	450 H.P.		44.23	415	1,239.36	3,725	601.75
7610	Tractor, with A frame, boom and winch, 225 H.P.		24.74	293	877.88	2,625	373.50
7620	Vacuum truck, hazardous material, 2500 gallons		12.79	310	929.52	2,800	288.25
7625	5,000 gallons		13.02	440	1,316.82	3,950	367.55
7650	Vacuum, HEPA, 16 gallon, wet/dry		.85	122	365	1,100	79.80
7655	55 gallon, wet/dry		.78	25.50	76.50	230	21.50
7660	Water tank, portable		.73	160	480.25	1,450	101.90
7690	Sewer/catch basin vacuum, 14 C.Y., 1500 gallons		17.31	665	1,988.14	5,975	536.15
7700	Welder, electric, 200 amp		3.81	33.50	100	300	50.50
7800	300 amp		5.55	103	310	930	106.40
7900	Gas engine, 200 amp		8.95	58.50	175	525	106.55
8000	300 amp		10.13	110	330	990	147
8100	Wheelbarrow, any size		.06	11.15	33.50	101	7.20
8200	Wrecking ball, 4000 lb.		2.50	60	180	540	56
0010	**HIGHWAY EQUIPMENT RENTAL** without operators R015433-10						
0050	Asphalt batch plant, portable drum mixer, 100 ton/hr.	Ea.	88.41	1,550	4,621.78	13,900	1,632
0060	200 ton/hr.		101.99	1,650	4,931.62	14,800	1,802
0070	300 ton/hr.		119.86	1,925	5,783.68	17,400	2,116
0100	Backhoe attachment, long stick, up to 185 H.P., 10.5' long		.37	25.50	76.43	229	18.25
0140	Up to 250 H.P., 12' long		.41	28.50	85.72	257	20.45
0180	Over 250 H.P., 15' long		.56	39	116.71	350	27.85
0200	Special dipper arm, up to 100 H.P., 32' long		1.16	79.50	238.58	715	56.95
0240	Over 100 H.P., 33' long		1.44	100	299.51	900	71.45
0280	Catch basin/sewer cleaning truck, 3 ton, 9 C.Y., 1000 gal.		35.39	420	1,265.18	3,800	536.15
0300	Concrete batch plant, portable, electric, 200 C.Y./hr.		24.18	560	1,678.30	5,025	529.15
0520	Grader/dozer attachment, ripper/scarifier, rear mounted, up to 135 H.P.		3.15	63.50	190.04	570	63.20
0540	Up to 180 H.P.		4.13	95.50	287.12	860	90.50
0580	Up to 250 H.P.		5.85	153	459.60	1,375	138.75
0700	Pvmt. removal bucket, for hyd. excavator, up to 90 H.P.		2.16	58	174.54	525	52.20
0740	Up to 200 H.P.		2.31	74.50	223.08	670	63.05
0780	Over 200 H.P.		2.52	91	273.69	820	74.90
0900	Aggregate spreader, self-propelled, 187 H.P.		50.60	740	2,220.52	6,650	848.90
1000	Chemical spreader, 3 C.Y.		3.17	96.50	290	870	83.35
1900	Hammermill, traveling, 250 H.P.		67.35	515	1,550	4,650	848.80
2000	Horizontal borer, 3" diameter, 13 H.P. gas driven		5.42	232	695	2,075	182.35
2150	Horizontal directional drill, 20,000 lb. thrust, 78 H.P. diesel		27.58	530	1,590	4,775	538.65
2160	30,000 lb. thrust, 115 H.P.		33.90	615	1,850	5,550	641.20
2170	50,000 lb. thrust, 170 H.P.		48.60	710	2,135	6,400	815.80

Crew No.	Bare Costs		Incl. Subs O&P		Cost Per Labor-Hour	
Crew B-6C	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
2 Labor Foremen (outside)	$44.10	$705.60	$66.25	$1060.00	$42.77	$64.25
4 Laborers	42.10	1347.20	63.25	2024.00		
1 S.P. Crane, 4x4, 12 Ton		428.30		471.13		
1 Flatbed Truck, Gas, 3 Ton		820.40		902.44		
1 Butt Fusion Mach., 8"-24" diam.		1076.00		1183.60	48.43	53.27
48 L.H., Daily Totals		$4377.50		$5641.17	$91.20	$117.52
Crew B-6D	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
0.5 Labor Foreman (outside)	$44.10	$176.40	$66.25	$265.00	$48.36	$72.49
1 Laborer	42.10	336.80	63.25	506.00		
1 Equip. Oper. (medium)	56.75	454.00	84.85	678.80		
1 Hydro Excavator, 12 C.Y.		1262.00		1388.20	63.10	69.41
20 L.H., Daily Totals		$2229.20		$2838.00	$111.46	$141.90
Crew B-7	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
1 Labor Foreman (outside)	$44.10	$352.80	$66.25	$530.00	$44.88	$67.35
4 Laborers	42.10	1347.20	63.25	2024.00		
1 Equip. Oper. (medium)	56.75	454.00	84.85	678.80		
1 Brush Chipper, 12", 130 H.P.		392.80		432.08		
1 Crawler Loader, 3 C.Y.		1169.00		1285.90		
2 Chain Saws, Gas, 36" Long		82.50		90.75	34.26	37.68
48 L.H., Daily Totals		$3798.30		$5041.53	$79.13	$105.03
Crew B-7A	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
2 Laborers	$42.10	$673.60	$63.25	$1012.00	$45.73	$68.57
1 Equip. Oper. (light)	53.00	424.00	79.20	633.60		
1 Rake w/Tractor		339.45		373.39		
2 Chain Saws, Gas, 18"		104.00		114.40	18.48	20.32
24 L.H., Daily Totals		$1541.05		$2133.40	$64.21	$88.89
Crew B-7B	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
1 Labor Foreman (outside)	$44.10	$352.80	$66.25	$530.00	$45.46	$68.21
4 Laborers	42.10	1347.20	63.25	2024.00		
1 Equip. Oper. (medium)	56.75	454.00	84.85	678.80		
1 Truck Driver (heavy)	48.95	391.60	73.35	586.80		
1 Brush Chipper, 12", 130 H.P.		392.80		432.08		
1 Crawler Loader, 3 C.Y.		1169.00		1285.90		
2 Chain Saws, Gas, 36" Long		82.50		90.75		
1 Dump Truck, 8 C.Y., 220 H.P.		428.05		470.86	37.01	40.71
56 L.H., Daily Totals		$4617.95		$6099.19	$82.46	$108.91
Crew B-7C	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
1 Labor Foreman (outside)	$44.10	$352.80	$66.25	$530.00	$45.46	$68.21
4 Laborers	42.10	1347.20	63.25	2024.00		
1 Equip. Oper. (medium)	56.75	454.00	84.85	678.80		
1 Truck Driver (heavy)	48.95	391.60	73.35	586.80		
1 Brush Chipper, 12", 130 H.P.		392.80		432.08		
1 Crawler Loader, 3 C.Y.		1169.00		1285.90		
2 Chain Saws, Gas, 36" Long		82.50		90.75		
1 Dump Truck, 12 C.Y., 400 H.P.		572.90		630.19	39.59	43.55
56 L.H., Daily Totals		$4762.80		$6258.52	$85.05	$111.76

Crew No.	Bare Costs		Incl. Subs O&P		Cost Per Labor-Hour	
Crew B-8	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
1 Labor Foreman (outside)	$44.10	$352.80	$66.25	$530.00	$48.78	$73.09
2 Laborers	42.10	673.60	63.25	1012.00		
2 Equip. Oper. (medium)	56.75	908.00	84.85	1357.60		
1 Equip. Oper. (oiler)	50.55	404.40	75.55	604.40		
2 Truck Drivers (heavy)	48.95	783.20	73.35	1173.60		
1 Hyd. Crane, 25 Ton		580.85		638.93		
1 Crawler Loader, 3 C.Y.		1169.00		1285.90		
2 Dump Trucks, 12 C.Y., 400 H.P.		1145.80		1260.38	45.24	49.77
64 L.H., Daily Totals		$6017.65		$7862.81	$94.03	$122.86
Crew B-9	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
1 Labor Foreman (outside)	$44.10	$352.80	$66.25	$530.00	$42.50	$63.85
4 Laborers	42.10	1347.20	63.25	2024.00		
1 Air Compressor, 250 cfm		201.50		221.65		
2 Breakers, Pavement, 60 lb.		107.00		117.70		
2 -50' Air Hoses, 1.5"		48.50		53.35	8.93	9.82
40 L.H., Daily Totals		$2057.00		$2946.70	$51.42	$73.67
Crew B-9A	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
2 Laborers	$42.10	$673.60	$63.25	$1012.00	$44.38	$66.62
1 Truck Driver (heavy)	48.95	391.60	73.35	586.80		
1 Water Tank Trailer, 5000 Gal.		152.25		167.47		
1 Truck Tractor, 220 H.P.		307.10		337.81		
2 -50' Discharge Hoses, 3"		9.00		9.90	19.51	21.47
24 L.H., Daily Totals		$1533.55		$2113.99	$63.90	$88.08
Crew B-9B	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
2 Laborers	$42.10	$673.60	$63.25	$1012.00	$44.38	$66.62
1 Truck Driver (heavy)	48.95	391.60	73.35	586.80		
2 -50' Discharge Hoses, 3"		9.00		9.90		
1 Water Tank Trailer, 5000 Gal.		152.25		167.47		
1 Truck Tractor, 220 H.P.		307.10		337.81		
1 Pressure Washer		96.95		106.65	23.55	25.91
24 L.H., Daily Totals		$1630.50		$2220.63	$67.94	$92.53
Crew B-9D	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
1 Labor Foreman (outside)	$44.10	$352.80	$66.25	$530.00	$42.50	$63.85
4 Common Laborers	42.10	1347.20	63.25	2024.00		
1 Air Compressor, 250 cfm		201.50		221.65		
2 -50' Air Hoses, 1.5"		48.50		53.35		
2 Air Powered Tampers		67.70		74.47	7.94	8.74
40 L.H., Daily Totals		$2017.70		$2903.47	$50.44	$72.59
Crew B-9E	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
1 Cement Finisher	$49.95	$399.60	$73.45	$587.60	$46.02	$68.35
1 Laborer	42.10	336.80	63.25	506.00		
1 Chip. Hammers, 12 Lb., Elec.		32.40		35.64	2.02	2.23
16 L.H., Daily Totals		$768.80		$1129.24	$48.05	$70.58
Crew B-10	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
1 Equip. Oper. (medium)	$56.75	$454.00	$84.85	$678.80	$51.87	$77.65
.5 Laborer	42.10	168.40	63.25	253.00		
12 L.H., Daily Totals		$622.40		$931.80	$51.87	$77.65
Crew B-10A	**Hr.**	**Daily**	**Hr.**	**Daily**	**Bare Costs**	**Incl. O&P**
1 Equip. Oper. (medium)	$56.75	$454.00	$84.85	$678.80	$51.87	$77.65
.5 Laborer	42.10	168.40	63.25	253.00		
1 Roller, 2-Drum, W.B., 7.5 H.P.		166.10		182.71	13.84	15.23
12 L.H., Daily Totals		$788.50		$1114.51	$65.71	$92.88