

CONSTRUCTION QUALITY ASSURANCE PLAN PHASE I WASTE RELOCATION

AMERICAN AVENUE DISPOSAL SITE FRESNO COUNTY, CALIFORNIA

PROJECT NO. 2016.A086

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SUBMITTED TO:

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1.0 INTRODUCTION

This plan addresses the Construction Quality Assurance (CQA) Plan procedures required during the execution of the Phase I Waste Relocation project (Project) at the American Avenue Disposal Site (AADS) in Fresno County. This CQA Plan establishes procedures to verify that construction is in accordance with the approved Construction Drawings and Specifications, meets the appropriate regulatory requirements, and develops the necessary documentation for submittal to the regulatory agency.

California Code of Regulations Title 27 (27 CCR), Section 20323 requires that a CQA Plan be developed by a California Registered Civil Engineer or Certified Engineering Geologist for landfill liner system and final cover system construction projects. 27 CCR, Sections 21790 and 21800 requires a CQA Plan be developed for preliminary and final closure plans. 27 CCR Section 20324 outlines the requirements for such a plan. While this project is not necessarily defined as a liner system, cover system, or closure project, it is prudent to define a similar set of criteria for establishing whether the end product is of the specified quality and workmanship reflected in the Construction Drawings and Specifications. The CQA program presented herein consists of selected testing and observations of the final product to provide the Owner/Agencies a means to evaluate if the materials used and methods employed meet project design requirements.

A Construction Quality Control (CQC) program consists of selected tests and inspections during production that can assist the Contractor in producing the quality product that is required. While the CQC function is the sole responsibility of the Contractor, the Engineer may, at their discretion, provide information regarding the on-going CQA monitoring for the Contractor's use in implementing their CQC function. If provided, release of CQA data to the Contractor is for convenience only and in no way relieves the Contractor from their CQC function. Additionally, release of CQA information to the Contractor will not result in the CQA Team assuming any part of the Contractor's responsibility for fulfilling their CQC functions and/or any other project requirements.

This document presents the CQA Plan and observation and testing requirements for the earthwork, geosynthetics, and confirmation sampling associated with the AADS Phase I waste relocation project. This CQA Plan outlines the quality assurance tests and procedures to be implemented during project construction, and it is to be used in conjunction with the Project Construction Drawings and Specifications. This document includes CQA requirements for the samples for excavated Phase I area, intermediate soil cover placement, landfill gas collection and control system (GCCS) modifications, re-vegetation of the intermediate cover and other areas disturbed during execution of this project for erosion protection, and pavement subgrade, base rock, and hot mix asphalt (HMA) pavement. The intermediate cover consists of a 24-inch-thick soil fill derived from on-site borrow areas that will be placed over wastes relocated to the lined AADS Phase II waste management unit (WMU), and over miscellaneous AADS operational wastes that will remain on portions of the western and southern side slopes of the Phase I WMU waste relocation excavation. GCCS modifications will be completed to relocate and reconnect Phase II headers and laterals and to raise vertical landfill gas collection wells.

1.1 Project Description

The AADS is a permitted Class III landfill comprising about 440 acres of land within the Central Valley of California that is owned and operated by the County of Fresno (County). Of the permitted 440 acres of property, 367 acres are permitted for active disposal of wastes. The disposal areas at the AADS consist of one closed unlined WMU covering 30 acres identified as Phase I, a 160-acre active-composite-lined WMU identified as Phase II (consists of eight modules), and Phase III, a 250-acre composite-lined WMU consisting of active Modules 1 through 8 and future Modules 9 through 12. Figure 1 shows the site vicinity and location, and a site plan has been provided as Figure 2.

The AADS is located in the western part of Fresno County, about 17 miles southwest of the City of Fresno and about 6 miles southwest of the City of Kerman. The site is located on the north side of American Avenue. The AADS is in Sections 32 and 33, Township 14 south, Range 17 east, Mount Diablo Base and Meridian.

The AADS property address is:

18950 W. American Avenue, Kerman, CA 93668

Latitude: 36.66794

Longitude: -120.13232

The County believes the unlined Phase I poses a long-term environmental liability, and has therefore chosen to relocate waste from Phase I to lined Phase II. Additionally, Phase I occupies space that is currently allocated for future lined Phase III modules.

Waste excavation and disposal, cover soil borrow material, cover soil placement and compaction, confirmation sampling, re-vegetation operations, and pavement components will be monitored, tested as appropriate, and documented in accordance with the procedures outlined in this CQA Plan. To complete the Phase I waste relocation, the following general construction steps must be carried out:

- Site preparation including demolition and removal of the gas collection and control system (GCCS) surface piping in Phase I
- Excavate the Phase I wastes (the term “waste” in Phase I includes the soil fraction associated with typical interim cover placement and approaches 50 percent by volume) from the disposal area in three or more vertical sequences separated horizontally by several hundred feet
- During excavation activities wastes will be loaded on to haul trucks and transported to Phase II for final disposition, daily cover will be placed as needed
- Provide on-going traffic control and coordination of on-site safety among the various parties
- Perform final waste and impacted soil excavation along base and side slopes of Phase I

- Perform iterative confirmation sampling at the Phase I excavation base and side slope to confirm waste and impacted soil removal has been properly completed
- During Phase II waste placement after existing interim cover soils have been removed and the new toe berm constructed, grade relocated wastes as wedge fill on Phase II slopes and shape to 4:1 (Horizontal: Vertical) slopes (starting from the existing 5:1 (H:V) configuration) and place intermediate soil cover
- Decommission Phase I groundwater detection monitoring wells (DMW-1 through DMW-10)
- Construct a new paved customer access road across a portion of the former Phase I area that connects waste disposal traffic from the scales to the west side of Phase III
- Complete installation of erosion control BMPs and interim surface water control features
- Prepare a CQA Certification Report for submission to regulatory authorities

Note that existing vertical landfill gas (LFG) extraction wells in Phase II will be extended, a temporary above ground header pipe added with several truck crossings, and below-ground lateral pipes added prior to the waste relocation contractor mobilizing to the site.

Once Phase I wastes have been removed, only areas where fill for the new customer access road is required will be backfilled. Instead, the excavation will be graded as wastes are removed with perimeter slopes ranging from 2:1 to 2.5:1 (H:V). Concurrently with excavation, miscellaneous AADS operational wastes that are left in place on portions of the western and southern sides of the waste relocation excavation will be covered with at least 2 feet of clean intermediate cover soil in accordance with the Construction Drawings and Specifications. Once waste relocation is completed, the floor of Phase I will be graded to low spots away from areas where covered miscellaneous AADS operational waste will remain using a modest slope to reduce the potential for surface water contact with waste and leachate generation. The low spots will be lined with a geomembrane to reduce the potential for infiltration. The excavation resulting from the waste relocation is planned to remain as graded at the conclusion of the project in accordance with Construction Drawings and Specifications until modified as required for the construction of future landfill modules.

1.2 Project Requirements

All project requirements are described in the approved Construction Drawings and Specifications.

The soil cover for the AADS Phase I waste relocation project will come from the borrow stockpile located centrally at the northern end of the AADS facility or from on-site clean soils excavated from Phase I.

Landfill cover soils must be uniform, moisture conditioned, and compacted to the minimum performance criteria presented in this CQA Plan and described in the approved Construction Drawings and Specifications.

Seeds supplied and application of the seed, along with soil amendments and fertilizers, should be as required by the Construction Drawings and Specifications, and per supplier/manufacturer recommendations.

All materials used to construct the proposed intermediate soil cover must meet or exceed the criteria indicated in the Construction Drawings, Technical Specifications, and this CQA Plan. Any deviation from these criteria should be pre-approved by the Engineer.

1.3 Plan Purpose

This CQA Plan has been prepared to establish quality assurance observation, testing, and documentation procedures during the relocation of Phase I waste at the AADS. This CQA Plan describes the procedures and methods for monitoring cover soils to ensure proper materials and placement during construction, performing confirmation sampling and associated testing, and observing the placement and type of seeds placed as erosion control.

2.0 RESPONSIBLE PARTIES AND DEFINITIONS

2.1 Responsible Parties

The responsible parties for the AADS Phase I waste relocation project are:

Landfill Owner

County of Fresno – Department of Public Works and Planning
2220 Tulare Street, Suite 600
Fresno, California 93721

Design and CM/CQA Team

The Design Team is Geo-Logic Associates (as the prime Consultant) and as shown on the cover page of the AADS Phase 1 Waste Relocation Work Plan it includes:

Geo-Logic Associates, Inc. (GLA)
143E Spring Hill Drive
Grass Valley, California 95945

Blue Ridge Services, Inc.
5065 Highway 140, Suite C
Mariposa, California 95338
209.742.2398

Dr. James W. Babcock, PhD, PG
Consulting Geologist
1335 American Way
Nipomo, California 93444

The CM/CQA Team is anticipated to include construction staff from Fresno County Public Works & Planning as some of the CQA monitors, on various tasks.

2.2 Definitions

Chemicals of Concern (COCs) - The primary chemicals of concern are the volatile organic compounds (VOCs) tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2 dichloroethene (c-1,2-DCE), 1,1, dichloroethane (1,1-DCA) that are accepted by the Regional Water Quality Control Board (RWQCB) as driving the groundwater remediation project involving Phase 1.

Construction Drawings and Specifications - All project related Drawings and Specifications including design modifications and Record Drawings.

Construction Manager (CM) and CQA Manager - Person authorized by the County to manage and oversee the administration of the Construction Contract. The Construction Manager shall be responsible for evaluating lines and grades (survey control) for the intermediate cover system components as well as verification of payment requests, submittal acceptance, and change orders. This individual will also serve in the role of CQA Manager and shall be experienced in landfill construction monitoring including earthworks and seed planting for erosion control. The Construction Manager, On-Site Safety Manager, and the CQA Monitor may or may not be separate individuals, as determined by the County.

CM Team - Collectively, the CM, CQA Manager, Owner, and CQA Monitors.

County - The County of Fresno.

Contractor - The firm responsible for completing waste relocation construction work. In this regard, the Contractor's responsibilities include, but are not limited to: waste excavation, hauling, and disposal; preparation of subgrade and supporting surfaces for the placement of intermediate cover materials; placement of intermediate cover soils, construction of intermediate drainage, seeding, and procedures to protect stormwater control structures. The General Contractor is responsible for performing all necessary construction quality control (CQC). The Contractor is further responsible for all activities of its subcontractors.

CQA Consultant - Firm responsible for the Phase I waste relocation quality assurance observation, inspection, and testing.

CQA Engineer/Officer - A civil engineer, registered in the State of California as required by 27 CCR 20324(b)(2), who is responsible for observing, verifying, and documenting the construction and for preparing, signing, and sealing the Construction Completion Report.

CQA Monitors - The individuals working under the direction of the CQA Officer. Such personnel include Technicians, Field Engineers, and Field Geologists representing the Design Team and CQA

Consultant. CQA Monitors shall be experienced in general earthwork landfill construction monitoring including earthworks, road construction, and seed planting for erosion control.

CQA Team - The CQA Consultant, Monitors, and Officer as well as any other parties needed for the successful implementation of the CQA program.

Design Engineer - The individual or firm responsible for the design and preparation of the project Construction Drawings and Specifications.

Design Team - The firms responsible for design and preparation of the Project Construction Drawings and Technical Specifications. Acceptance for the construction of this project is the sole determination of the Owner; County of Fresno PW&P in consideration of the CQA Report.

Engineer - Director of the Department of Public Works and Planning of Fresno County, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them. The Engineer shall receive and shall be responsible for review of the contractor's submittals, review and approve the contractor's requests for information, providing interpretations and clarifications of the requirements of the construction drawings and specifications, managing the changes to the requirements of the drawings and specifications and the overall design.

Gas Collection and Control System (GCCS) Consultant/Contractor - The firm responsible for completing Phase II GCCS modifications. The GCCS Contractor will contract directly with the County. GCCS Contractor staff will be on-site prior to, during, and after Phase II waste placement operations to coordinate and oversee all activities associated with the existing, active GCCS in Phase II. The GCCS Consultant/Contractor will be responsible for CQA of GCCS components of work.

On-Site Safety Manager - The person from the CM Team with knowledge and experience in landfill site safety processes and requirements who will oversee proper implementation of appropriate safety procedures of the CM Team, Contractor, County personnel, and users of the AADS facility that use the site during the waste relocation construction activities.

Owner - The owner of the site, in this case County of Fresno – Department of Public Works and Planning.

Project Documents - All Contractor submittals, Construction Drawings, Record Drawings, "As-Built" Plans, Specifications, CQA Plan, Health and Safety Plan, and Project Schedule.

Work - All tools, equipment, supervision, labor, and materials or supplies necessary to complete the project as described herein and as shown on the Construction Drawings or required by the Specifications.

3.0 CM/CQA CONSULTANT TEAM ORGANIZATION

The CM/CQA Consultant Team will consist of design and field personnel with specific experience in construction management and the inspection and CQA monitoring of activities related to the AADS Phase I waste relocation. The CQA Project Organization, with principal functions of each of the CQA team members, is presented below. Figure 3 presents a flow chart of the Phase I Waste Relocation project organization.

3.1 CQA Officer

The CQA Officer shall manage all CQA personnel and activities, and shall be responsible for overall review, observation, sampling, and testing activities for earthwork, as well as re-vegetation operations. Specific duties of the CQA Officer include:

- Review of all designs, Project Construction Drawings, and Technical Specifications
- Implementation of the CQA Plan including assignment and management of all CQA personnel, and engineering review of all CQA-related issues
- Review of all approved design changes
- Familiarization of all CQA Monitors with the site and the CQA requirements for the project
- Attendance at CQA-related meetings (i.e. preconstruction, progress, and special meetings)
- Participation in the preparation of Record Drawings
- Review of all field testing, sampling, and laboratory testing procedures
- Review of all field and laboratory test results and preparation of recommendations for appropriate responses
- Preparation of CQA activity summaries
- Designation of a CQA Manager to act on his/her behalf at the site while operations are ongoing
- Reporting of any unresolved deviations from the CQA Plan to the Construction Manager
- Preparation of the final CQA certification report for all completed waste relocation construction activities
- Preparation of the Well Decommissioning Report

3.2 Construction Manager

The Construction Manager (CM) will serve as the Engineer. All CQA functions will be under their direct authority. All coordination, reporting, and issues related to non-compliance will be directed through the Construction Manager. In addition, they will participate with the Design Team in all decisions related to design issues that may arise during the course of construction. In general, the CM responsibilities include, but are not limited to:

- Perform project document review
- Coordination of construction activities, regulatory agencies, and all stakeholders
- Maintain project files
- Conduct the pre-construction and weekly meetings
- Review of construction schedule
- Coordination of operational planning to avoid conflicts and promote safety
- Volumetric analysis by survey of excavated waste for pay quantity verification
- Identification and resolution of conflicts with the Contractor
- Maintain an awareness and document health and safety requirements
- Coordination and processing of submittal reviews
- Review of Contractor invoices and pay quantities
- Review of Contractor's as-built drawings

3.3 Design Team

The Design Team will be responsible for reviewing all design issues that may arise during construction. Written approval of the Design Team will be required prior to any deviation from Design. The Design Team will have demonstrated experience with similar landfill waste excavation and relocation construction projects.

3.4 CQA Monitor

The CQA Monitor will be a representative of the CQA Consultant and will continuously observe all work operations to provide a basis for concluding that construction is carried out in conformance with the Construction Drawings and Specifications. The duties of the CQA Monitors include monitoring, observing and/or testing all earthwork, and re-vegetation operations including:

- Monitoring the preparation of the Phase I waste disposal area
- Monitoring clearing, grubbing, stripping, and site preparation in areas in Phase II to receive waste fill
- Monitoring the excavation, loading, and transport of waste materials
- Monitoring dust control activities
- Monitoring the placement, compaction, and grading of the reconsolidated waste in Phase II
- Observing borrow source material for oversize material prior to Contractor hauling for placement

- Monitoring the borrow soil processing, mixing, blending, and moisture conditioning, if any
- Noting the condition of the borrow soils to ensure proper moisture content prior to compaction
- Monitoring and testing during construction operations
- Informing the Contractor of areas that do not meet project requirements; monitoring reworking of those areas and observing and/or retesting of reworked areas
- Monitoring cover soil lift thickness
- Monitoring the final grading of the covered reconsolidated waste prism
- Monitoring and testing HMA subgrade, base course placement, thickness, relative compaction, and moisture content
- Monitoring and testing the HMA placement activities including material delivery and type, tack coat placement, material temperatures, spreading, compaction efforts, and material thickness
- Monitoring the concrete valley gutter construction for reinforcing steel type and placement, correct concrete material delivery, and concrete placement consolidation, finishing, and curing
- Monitoring construction of drainage swales
- Monitoring implementation of stormwater best management practices (BMPs)
- Monitoring re-vegetation activities including checking seed mixes and application rates

4.0 MEETINGS

To facilitate construction, close coordination between the Construction Manager, Engineer, County, Construction Contractor, Design Team, and CQA Team is essential. To this end, the following meetings are required.

4.1 Pre-Construction Meeting

A Pre-Construction Meeting will be held at the site. At a minimum, the meeting shall be attended by the Owner (or designated representative), the CM Team, relevant members of the Design Team, and the Contractor. Specific items to be considered at this meeting will include:

- Any appropriate modifications to the CQA requirements
- Review of the responsibilities of each party, including safety elements and plans
- Review of the lines of authority and communication
- Review of work area security and safety protocols
- Review of the procedures for project documentation and reporting, and distribution of documents and reports

- Review of procedures for submittals, change orders, and extra work efforts
- Review of the Contractor's proposed methods of construction (including equipment), with specific emphasis on methods of select grading, stockpiling, processing, moisture conditioning, and compaction
- Review of the procedures for field and laboratory CQA testing
- Establishment of procedures for correcting and documenting construction deficiencies
- Conducting a site inspection to discuss work areas, excavations, stockpile areas, mixing tables, processing areas, lay-down areas, access roads, haul roads, and related items
- Review and comment on the project construction schedule submitted by the Contractor

The meeting shall be documented by the CQA Team and the meeting minutes shall be distributed to all appropriate parties.

4.2 Daily Tailgate Safety and Progress Meetings

During the Phase I waste relocation project, Daily Progress Meetings will be conducted at the start of the work day. At a minimum, these meetings shall be attended by the onsite CM Team and the Contractor. The purpose of these meetings is to:

- Discuss safety issues or concerns
- Review and coordinate scheduled work activities between the CQA Monitor, the construction crews, and County operations staff
- Discuss problem areas or necessary re-work
- Review test data
- Discuss the Contractor or subcontractor's personnel and equipment assignments for the day
- Review the previous day's activities, accomplishments, and/or deficiencies

4.3 GCCS Coordination Meetings

During the filling of Phase II, coordination of waste and soil fill efforts with those of the County's GCCS contractor will be of utmost importance to facilitate the completion of work affecting both the waste relocation and GCCS Contractor. As such regular meetings shall be held to discuss project schedules and interconnected work elements. The CQA Manager will record the minutes and action items discussed during the meetings and issue final minutes to the attending parties no later than 24 hours after the meeting.

4.4 Work Deficiency Meetings

As needed, meetings shall be held to discuss specific problems or deficiencies that occur during construction that can not be easily resolved. Work deficiency meetings shall be attended by the

Construction Manager, CQA Monitor, CQA Officer, the Owner, and the Contractor. The purpose of these meetings is:

1. Identify the nature and extent of the problem
2. Discuss the means necessary to correct the deficiency or problem
3. Provide a solution to the problem and detail how the corrective action shall be implemented

Any changes or modifications to the design shall be approved in writing by the Design Engineer. This meeting shall be documented by the CQA Monitor on a construction problem and solution data sheet form and copies distributed to all parties.

5.0 CQA MONITORING FOR EARTH MATERIALS

Section 5.11 is a standalone environment compliance subsection for Phase 1 waste confirmation sampling using analytical sampling numbering and other requirements separate from soil sampling requirements specifically in Section 5.2 and general geotechnical discussions in Section 5.1 through 5.10

5.1 General

This section outlines the requirements for earthwork operations for the construction of the Phase I waste relocation. The Contractor shall excavate and compact soils and prepare the subgrades as necessary to achieve the grades set forth within the Drawings and Specifications. Earthwork includes but is not limited to:

- Earthfill
- Trench backfill
- Intermediate Soil Cover
- HDPE pipe installation
- Drop inlet structure installation
- Rock slope protection
- Subgrade preparation
- Class 2 Aggregate base

Construction of the intermediate soil cover includes use of on-site borrow soil materials that shall be routinely observed by the CQA Monitor for the conformance with the requirements described within this CQA Plan.

The CQA Monitor shall observe that the Contractor has conducted all surveying and as-built drawing preparation as required by the Specifications.

5.2 Soil Sampling

5.2.1 Sample Processing

The CQA Monitor is responsible for the timely processing and testing of soil samples. The CQA Officer must determine which samples will be tested on-site and which will be tested off-site. This determination will be made based on available manpower, available equipment, complexity of test, and time available to determine results. For expediency, samples tested off-site must be shipped the same day as they are obtained.

As test data is obtained from the on-site and off-site laboratories it must be summarized in the form it will appear in the CQA report.

5.2.2 Sample Numbering and Logging

The CQA Monitor must maintain a sample numbering system for all soil samples obtained for the project. These samples include those obtained prior to construction for conformance or slope stability testing, and samples obtained during construction such as samples obtained for moisture-density relationship testing.

Documentation of soil sampling must be summarized in the form it will appear in the CQA report, and be maintained throughout the project. The log must include soil sample numbers beginning with (0001) and proceeding sequentially. No sample number can be repeated, and re-tests of a sample that does not meet specified requirements must be given the original number with a letter suffix (i.e. re-tests for a sample 0021 not meeting specified requirements would be 0021A, 0021B, etc.). Information contained in the master soil sample log must include:

- Sample number
- Test(s) being performed
- Date the sample was obtained
- Name of CQA Monitor that obtained the sample
- Location that the sample was obtained, such as a stockpile, a fill, a borrow area, etc.
- Location testing will take place (on-site vs. off-site)
- Date sample sent off-site
- Date test results were completed on-site or received from off-site
- Name of CQA Monitor that performed the on-site testing
- Comments about the test results, such as pass / fail information

5.2.3 Sample Tagging

The CQA Monitor must maintain the identification of all geotechnical samples obtained throughout the project from the time the sample is obtained to the time testing is completed. The monitor must place an identifying tag on the sample or mark the sample container with the sample number immediately upon sampling. The tag or identifying container must remain with the sample throughout processing, testing and storage. The tag or container must have the following information:

- Sample number
- Soil material type
- Project name and project number
- Name of CQA Monitor that obtained the sample
- The date the sample was obtained

5.3 Conformance and Construction Phase Testing

Tables 1 and 2 establish test frequencies for earthwork CQA testing. They include material evaluation and conformance tests that must be performed prior to soil installation to assure soil materials meet quality standards established in the Technical Specifications. In addition, Table 2 outlines post-construction testing to assure installed materials meet specified requirements.

The test frequencies listed establish the minimum number and intervals of required tests. Additional testing must be conducted whenever work or materials are suspect, marginal, or of poor quality. Extra testing may also be performed to provide additional data for engineering evaluation. Any re-tests performed as a result of a failing test cannot contribute to the total number of tests performed in satisfying the minimum test frequency.

5.4 Intermediate Soil Cover

5.4.1 Intermediate Soil Cover Thickness Verification

Thickness verification for the intermediate soil cover will be conducted by installing and surveying thickness verifications devices. Thickness verifications devices shall be installed at a minimum frequency of 5 per acre and consist of a 2-inch PVC with base plate or as approved by the Engineer. Thickness verification will be conducted by the CM and the CQA Monitor. Contractor will be responsible for verifying the thickness, including.

If, at the sole discretion of the CQA Manager and/or CQA Monitor, the lift thickness observed does not satisfy the project requirements for such, it shall be re-worked to the satisfaction of the CQA Manager and/or CQA Monitor so the resulting product meets or exceeds the requirements of the Specifications.

5.4.2 Intermediate Soil Cover Observations

5.4.2.1 Observation Frequency

Intermediate soil cover materials are required to have a no particles larger than 3 inches. Care shall be exercised to keep oversize materials out of fill, and to keep allowable larger-sized particles from nesting. The CQA Monitor will periodically inspect these materials so as to minimize the inclusion of oversize particles within the placed and compacted intermediate soil cover. The Contractor will continuously observe the placement of intermediate soil cover and will work to limit the inclusion of oversize material.

Intermediate soil cover shall be sufficiently moistened to improve the bonding and compaction characteristics of the soils installed as intermediate soil cover as established by the CQA Monitor. The CQA Monitor will periodically observe the moisture condition of soils imported and placed as intermediate soil cover. The Contractor shall work with the CQA Monitor to gain an understanding of the required moisture condition of the intermediate cover soils. The Contractor will then continuously observe the soils being placed and work to maintain the appropriate moisture condition.

5.4.2.2 Acceptance Criteria

The CQA Manager and/or CQA Monitor will observe the construction of the intermediate soil cover for conformance to the performance criteria presented below for in-place moisture and density and grain size. If the observed performance criteria, at the sole discretion of the CQA Manager and/or CQA Monitor, indicate that the observed density/moisture content and/or maximum size particle of the material being placed does not satisfy the project Specifications for such, that particular portion shall be re-worked, or replaced to the satisfaction of the CQA Manager and/or CQA Monitor so the resulting product meets or exceeds the requirements of this CQA Plan.

No additional fill shall be placed over an area until the CQA Manager and/or CQA Monitor has observed the underlying ground condition to confirm it meets the Specifications of this document. Areas to be reworked will be verified by survey if, at the sole discretion of the CQA Officer, conditions warrant this amount of detail.

In-Place Moisture Content and Density:

In-place moisture and density observations will be periodically made by the CQA Manager and/or Monitor to establish the characteristics of the soils placed and compacted to establish if they meet the following performance criteria:

- The density of the soil shall be such that the surface of the intermediate cover does not have excessive deflection under the loading of tracked construction equipment used to place such soils. The CQA Manager and/or CQA Monitor may establish if the yielding nature of soil is the result of the underlying refuse prism deflecting under load. If the CQA Manager and/or CQA Monitor establish that it is yielding waste and not soils, the condition may be

accepted at their sole discretion for specific areas.

- The moisture condition of the soils should be sufficient to improve the bonding and compaction characteristics of the soils as established by the CQA Monitor. This can typically be established in the field by firmly compressing a handful of soil within the palm of the hand. The resulting ball of soil should not be friable nor should it have free moisture on the surface. Additionally, the ball should be able to be pulled apart without crumbling or falling apart.

The Contractor shall repair or replace any soil not meeting these density or moisture performance criteria as established by the CQA Manager and/or CQA Monitor. Repairs and rework shall be to the satisfaction of the CQA Manager and/or CQA Monitor.

Grain Size Distribution:

The stockpile and placement of intermediate soil cover will be observed by the CQA Manager and/or CQA Monitor to establish if oversize (> 3 inches) rocks, rock fragments, clods, or soil aggregates are present. Additionally, intermediate cover placement and compaction will be observed to verify that no rock nesting develops within the cover and no rock pockets (groupings of rock with little to no sand and/or fines) are observed at the surface.

The Contractor shall actively work to keep the identified materials out of fill, and upon notification by the CQA Manager and/or CQA Monitor of their presence, shall correct the condition to the satisfaction of the CQA Manager and/or CQA Monitor.

5.5 Earthfill

The CQA Monitor shall observe that the earthfill are placed to the lines and grades shown on the Construction Drawings. This work also includes the construction of all berms, drainage structures, roads, the soil wedge buttress fill, and other engineered fills within the construction area.

Prior to fill placement, the CQA Monitor shall verify that all demolition, clearing, grubbing, and stripping has been performed by the Contractor in accordance with the appropriate sections of the project Specifications, this includes verifying that existing slopes over 5 feet tall with inclinations greater than 5:1 (H:V) have been properly benched and fill keys have been prepared. The CQA Monitor shall observe fill placement and perform the necessary field and laboratory testing to ensure that materials are compacted at the specified moisture content and to the minimum density specified. The CQA Monitor shall observe the placement of engineered fill material in loose lifts not exceeding the thickness stated in the Specifications. The CQA Monitor shall observe that each lift of engineered fill receives an adequate number of passes by compaction equipment. Tests to be performed and their frequency are provided in Tables 1 and 2.

5.6 Geosynthetic Subgrade Preparation

Prior to geosynthetic subgrade preparation, the CQA Monitor shall verify removal of large or sharp materials and verify that surface is suitable for liner subgrade. Liner subgrade proof-rolling, smooth-drum compaction, and other preparation activities shall be observed by the CQA Monitor as required by the Specifications and this Plan. The CQA Monitor shall observe the subgrade compaction and perform the necessary field and laboratory testing to ensure that materials are compacted at the specified moisture content and to the minimum density specified and that this condition is maintained. The completed liner subgrade for the synthetic liner shall be inspected and tested by the CQA Monitor, Contractor, and/or Geosynthetics Installer (Installer) to ensure that it will provide a firm and relatively smooth base for construction of the lining system in accordance with the Construction Drawings and Specifications. Any areas observed to be excessively soft or having excessive moisture during proof-rolling shall be excavated and reworked or removed and suitable materials placed by the Contractor in accordance with the project Specifications. At the conclusion of the liner subgrade preparation, the CQA Monitor shall record on an appropriate form that the subgrade is acceptable to the Installer for placement of the overlying geosynthetic materials.

5.7 HDPE Pipe Installation

CQA for the pipe installation will be performed to verify that the HDPE pipes and fittings are installed in accordance with the Drawings and Specifications. Corrugated HDPE pipe will be utilized to construct stormwater drainage structures.

Construction must be conducted in accordance with the project Drawings and Specifications. To monitor compliance, the CQA program will: (1) review the Contractor's quality control submittals; and (2) monitor installation.

5.7.1 Delivery, Handling and Storage

- Observe that chains, end hooks, cable slings, or any other devices that may scar the pipe are not used to handle pipe. Wide nylon web slings are recommended to handle the pipe.
- Observe that the pipe is not damaged during handling or earthworks, and that damaged pipe is separated from accepted pipe.
- Observe that pipe out-of-roundness (ring deflection) will not occur due to excessive stacking heights when the pipe is stored at the site.
- Observe that the pipe is not damaged by sharp rocks or excessive abrasion when the pipe is installed or during earthworks.

5.7.2 Placement

- Observe that the trench has been excavated to the dimensions and grades as shown on the Drawings.

- Observe that the piping is placed on the bedding material in accordance with the Drawings and Specifications.
- Confirm that the proper pipe grades have been achieved by review of record surveying.
- Observe that the piping and anchoring have been installed in accordance with the Drawings and Specifications.
- Observe that the pipe connections and fittings have been installed in accordance with the Drawings and Specifications.

5.7.3 Trenching and Backfilling

The CQA Monitor shall observe and document that all HDPE culverts, conveyance pipes, trenches, and backfill materials are installed in general accordance with the Drawings, Specifications and Manufacturer's guidelines.

The CQA Monitor shall:

- Observe that trenches are excavated in accordance with the dimensional cross-sections and design elevations shown on the Drawings.
- Review profile surveys conducted by the Contractor during trenching operations.
- Perform classification testing to verify that pipe backfill materials comply with material gradation requirements provided in the Specifications.
- Observe that compaction of backfill materials is completed under pipe haunches as described in the Specifications.
- Perform testing on the backfill materials in accordance with Table 2.

5.8 Drop Inlet Structures

The CQA Monitor shall observe and document that all drop inlets, excavations, and backfill materials are installed in general accordance with the Construction Drawings, Specifications, and Manufacturer's guidelines.

Pipe bedding sand and pipe zone backfill around inlet structures shall be observed and tested in accordance with the frequencies and requirements for earthfill, as specified in Tables 1 and 2 in the CQA Plan and in the Specifications.

The CQA Monitor shall review approved submittals and provide visual observation and documentation that the concrete is placed in accordance with the Construction Drawings and Specifications. The CQA Monitor shall observe that the subgrade is prepared to accept the concrete and that the specified reinforcing material is used.

5.9 Stormwater Channel

The CQA Monitor shall observe and verify that construction of stormwater channels are in accordance with the Construction Drawings and Specifications. The CQA Monitor shall observe that ditches are constructed to the alignments, slopes, flow line elevations, and dimensional cross-sections shown on the Construction Drawings. Any fills necessary for the construction of the stormwater channels shall be observed and tested by the CQA Monitor in accordance with the frequencies and requirements for earthfill, as specified in Table 2 and in the Specifications.

The CQA Monitor shall review product submittals and provide visual observation and documentation that the rock slope protection products are in accordance with the thickness and gradation requirements outlined in the Construction Drawings and Specifications. The CQA Monitor shall observe that the separator geotextile is installed on the graded subgrade in accordance with the Construction Drawings and Specifications. Once the geotextile has been installed, the CQA Monitor shall verify that the rip rap materials are placed to the approximate lines and grades shown on the Construction Drawings.

5.9.1 Geotextile

5.9.1.1 Delivery

During delivery of geotextiles the CQA Monitor will:

- Verify that equipment used to unload the rolls does not damage the geotextile.
- Verify that rolls are wrapped in impermeable and opaque protective covers.
- Verify that care is used to unload the rolls.
- Verify that all documentation required by the Specifications has been received.
- Verify that each roll is marked or tagged with the following information: manufacturer's name; project identification; lot number; roll number; roll dimensions. Log this information on the geosynthetic receipt form.
- Verify that the geosynthetic receipt form is completed.
- Verify that materials are stored in a location that will protect the rolls from ultraviolet light exposure, precipitation, mud, dirt, dust, puncture, cutting, or any other damaging or deleterious conditions.

Any damaged rolls may be rejected. Verify that rejected material is removed from the site and stored at a location separate from accepted rolls. Geotextile rolls which do not have proper Manufacturer's documentation must also be stored at a separate location, until all documentation has been received and approved.

5.9.1.2 *Conformance Testing*

After delivery, the CQA Monitor will obtain geotextile conformance test samples for every 100,000 square feet of material delivered to the site. The CQA Monitor will forward the samples to the testing laboratory for the following conformance tests:

- Mass Per unit area (ASTM D5261)
- Grab Tensile (ASTM D4632)
- Elongation (ASTM D4632)
- Puncture Resistance (ASTM D6241)
- Trapeziodal Tear (ASTM D4533)
- Permittivity (ASTM D4491)
- AOS (ASTM D4751)
- UV Resistance (ASTM D4355)
 - Conformance testing is not required for UV resistance, CQA Officer shall verify manufacturer quality control data meets project requirements identified in the Specifications

The CQA Manager will review all test results and report any non-conformance to the construction manager.

Samples will be obtained across the entire roll width and will be 3-feet long. Samplers must mark the manufacturer's roll identification number, and the machine direction, on the sample. Samplers will also assign a conformance test number to the sample and mark the sample with that number.

5.9.1.3 *Geotextile Installation*

Before geotextile installation, the CQA Monitor will:

- Verify that all lines and grades have been verified by the Contractor.
- Verify that the subgrade has been prepared in accordance with the earthwork specifications, and, if placed over a geomembrane, the geomembrane installation, and all associated documentation, has been completed.
- Verify that soil or geomembrane surfaces do not contain stones that could damage the geotextile, or any overlying geomembrane.
- Verify that there are no excessively soft areas in soil surfaces that could damage that geotextile, or any overlying geomembrane.
- All construction stakes have been removed.

During geotextile placement and seaming operations, the CQA Monitor will:

- Observe the geotextile as it is deployed and record all defects and defect corrective actions (panel rejected, patch installed, etc.). Verify that corrective actions are performed in accordance with the Specifications.
- Verify that equipment used does not damage the geotextile by handling, equipment transit, leakage of hydrocarbons, or other means.
- Verify that crews working on the geotextile do not smoke, wear shoes that could damage the geotextile, or engage in activities that could damage the geotextile.
- Verify that the geotextile is securely anchored as specified in Construction Drawings and Specifications.
- Verify that adjacent panels are overlapped and seamed in accordance with the Specifications.
- Verify that the geotextile was not exposed to direct sunlight for more than 7 days.
- Examine the geotextile after installation to ensure that no potentially harmful foreign objects are present.

The CQA Monitor must inform both the CQA Manager and Contractor if the above conditions are not met.

5.9.1.4 Repairs

Repair procedures include:

- Patching--used to repair large holes, tears, and small defective areas.
- Removal--used to replace large defective areas where the preceding method is not appropriate.

5.9.1.5 Acceptance

The Contractor shall be responsible for maintaining the geotextile (or portions thereof) until final acceptance by the CQA Officer. The CQA Officer shall recommend final acceptance when all seaming has been completed, the Contractor has supplied all documentation, and all laboratory testing is complete and satisfactory. Prior to final acceptance, the Contractor, CQA Monitor, CQA Officer, and the County shall review the installation of the geotextile (or portions thereof) for completeness. Any areas that are found to deviate from the intended design, are incomplete, or in need of repair shall be recorded by the CQA Monitor for correction by the Contractor. When all repairs have been completed, the CQA Officer shall release the geotextile (or portions thereof) for installation of overlying materials.

The Contractor shall retain ownership of the geotextile throughout the installation of overlying materials as defined within their scope of work and until the project is complete.

5.10 Surveys and As-Builts

The CQA Officer shall coordinate with the Contractor’s surveyor to confirm that minimum design thicknesses and grades are achieved prior to placement of any additional material over the prepared subgrade and foundation layer. The 100-foot as-built grid shall be used to confirm minimum thicknesses and lines and grades of finished surfaces. As-built surveys and submittals shall be in accordance with requirements of the Specifications.

5.11 Phase I Confirmation Sampling

Confirmation screening, sampling, and analysis shall be conducted by project CQA personnel within Phase I after waste has been excavated and it appears that native soils have been encountered. Screening, sampling, and analysis is to be completed to document that waste and impacted soils have been removed and residual concentrations of COCs do not exceed project clean-up goals. This section of the CQA Plan discusses the required tasks to be undertaken by the CQA personnel, or their designated representative.

CQA personnel shall observe the Phase I excavation work along with the Contractor to identify that visible waste has been removed and soil underlying the waste that is free of impacts has been exposed. Identification of soil that has not been impacted may be identified via observed change in color, reduction in odor, and/or through testing with a photoionization detector (PID). Once an area has been excavated and the CQA personnel has established that waste has been removed a screening and/or sampling of the exposed soils shall be completed following the procedures outlined below. Additionally, a site-specific PID screening procedure shall be developed to calibrate PID readings that will be used to screen for waste removal during the waste removal work. Procedures for developing the site-specific PID correlation are provided below.

5.11.1 PID Site-Specific Correlation

A site- and contaminants-specific correlation needs to be developed with the PID. Therefore, an initial pilot study will be conducted to compare PID readings with analytical laboratory test results. The pilot study will be performed within the Stage 1 waste excavation area in Phase I after discolored impacted soil has been removed and a sufficiently large enough area of native, non-visually impacted soil has been exposed (i.e. prepared excavation). A minimum area of at least 1 acre of prepared excavation will be required to be exposed to perform the pilot study. The pilot study will be performed by the CM Team and will entail:

- The CM Team will randomly select 10 sample nodes from the sampling grid within the Stage 1 excavation established for the waste relocation area shown on Sheet 5 of the Construction Drawings and the Contractor shall survey and mark the sample node
- The CM Team will conduct paired PID readings/En Core® samples at each marked sample node and document all sample locations and identifications; PID readings will be documented

- En Core® samples will be placed in laboratory supplied sample containers and sent to a California licensed analytical laboratory under proper chain-of-custody and tested only for the corrective action program VOC chemicals of concern as described in section 5.11.2
- Analytical laboratory test results will be correlated with PID readings to develop a site-specific correlation
- The acceptable threshold PID value will be selected based on the site-specific correlation

After the pilot study has been completed one En Core® sample will be retrieved for every ten PID readings with the En Core® sample¹ being subjected to analytical laboratory testing during CQA.

5.11.2 En Core® Sample Analysis

All En Core® confirmation samples will be analyzed by a California-certified, off-site, laboratory by USEPA Method 8260B/5035 for TCE, PCE, cis-1,2 DCE, and 1,1-DCA.

5.11.3 PID Screening

PID screening of the Phase I base and side slopes materials will be performed on a near continuous basis as waste and impacted soils excavations are ongoing and nearing completion. In addition, to assess whether excavation can be stopped in a given area, at least 10 PID readings per acre will be taken at randomly selected grid nodes by the CM Team. This frequency would result in a minimum of one En Core® sample per acre. Because the Phase I area where waste relocation is proposed covers an area of approximately 30 acres, the minimum total number En Core® samples and analytical testing would be 30. As previously stated, selection of the sample locations will be completed by the project CM Team using the grid system established for the waste relocation area shown on Sheet 5 of the Construction Drawings. The procedure used for establishing the sampling grid is consistent with a previously CVRWQCB approved method for such, and is shown on Figure 4. Additional PID readings and paired En Core® samples may be performed at the discretion of the CM Team.

Because Phase I will be excavated in stages, random grid nodes within each stage will be selected by the CM Team for En Core® sampling at the rate of 1 test per acre of prepared excavation for sampling. Once a grid node(s) has been selected at random by the CM Team, the Contractor shall survey and mark the location(s).

Sampling of soils for VOCs shall be completed by exposing undisturbed native soil using decontaminated reusable equipment or freshly opened disposable equipment. Once undisturbed native soil is exposed, a sample of soil shall be collected using an En Core® sampler. The sample shall be placed directly into a clean, laboratory supplied container as soon as possible and capped. The sample containers shall be labeled with the sample identification number, sample date and time, and the sampler's initials and placed in an iced cooler for transport under chain-of-custody to a California certified analytical laboratory. The sample identification shall

¹ En Core® sampling would generally follow EPA Method 5035 guidelines.

consist of the individual grid node coordinates where the sample was collected and the sampling iteration number. For example, an initial sample collected at grid node G/10 would be labelled with the identification number G10-1. The second iteration at the same point would be G10-2.

As PID screening is completed and samples are collected, information shall be recorded in a field logbook and on a chain-of-custody form as needed for samples. The logbook shall document the location by grid node, the screening/sampling iteration, date and time of documentation, PID screening result, and any other observations or information the CQA personnel deems necessary. For samples, the chain-of-custody form shall include the sample identification as described previously, the date and time of sampling, quantity and type of containers, and list of analyses to be performed. The chain-of-custody document shall be completed onsite and shall accompany the samples through transportation and laboratory analysis. The field logbook shall include information on the area that is being represented by the sample or samples collected.

5.11.4 Review of Sample Analysis Results

Confirmation of waste removal will be considered complete if no confirmation PID reading of VOC concentrations is in the parts per million range and if En Core® sample test results confirm the PID readings.

If readings of VOC concentrations and/or samples have concentrations that exceed the clean-up goal, further excavation will be conducted in an area delineated by methods discussed in the following section until all samples are at or below the clean-up goal.

5.11.5 Iterative Delineation of Affected Area

If any PID reading/confirmation sample result exceeds the threshold VOC concentration, the extent of the affected area to be further excavated shall be delineated as follows:

1. PID readings shall be obtained from four adjacent nodes (unless previously screened/sampled or residing outside the waste excavation area).
2. If PID readings at any of the four step-out samples indicate VOCs in the parts per million range, then additional step-out PID readings at the next further out nodes shall be obtained.
3. This process shall be repeated until the area containing the VOC concentrations in the parts per million range has been delineated. The affected area shall be defined to extend to half-way between a sample location that yielded a parameter concentration over the threshold concentration, and a sample location that yielded a parameter concentration below or equal to the threshold concentration.
4. Once the affected area is delineated through step-out sampling and analysis, the affected area shall be over-excavated by at least 1 foot. The previously affected area shall be re-tested with the PID at the same locations where the previous PID readings were obtained as located by the Contractor's surveyor. If the results of the "re-confirmation" PID readings obtained after the over-excavation are at or below the

parts per million range, then the confirmation for the affected area shall be considered complete. If results of the “re-confirmation” PID readings exceed the parts per million range, the area shall undergo a subsequent excavation. When all affected areas have passed PID screening the waste removal will be considered complete.

Figure 4 presents a flow chart of the iterative confirmation sampling and grid definition approach.

5.11.6 Quality Control Sampling

In addition to confirmation samples the CM Team shall also collect quality control (QC) samples consisting of field replicate samples and matrix spikes/matrix spike duplicates (MS/MSD) samples. One MS/MSD sample shall be collected for every 10 En Core® samples or fraction thereof by the CM Team. Note that if step-out and re-confirmation samples are required, QA/QC samples must be collected at the same frequency. The field replicate and MS/MSD samples shall be analyzed for the same target parameters as the confirmation samples. The field replicate and MS/MSD samples shall be collected from the same depth interval and within 1 foot of the confirmation sample. If a sufficient sample volume cannot be collected for the field replicate or MS/MSD sample, another randomly selected node shall be designated for field replicate or MS/MSD sample collection.

5.11.7 Equipment Decontamination

Between sample collection locations with re-useable sampling equipment, rigorous decontamination procedures shall be employed to prevent cross contamination of samples. Decontamination will be completed using soap and water in a triple-rinse wash. The first wash shall consist of scrubbing the equipment with a non-phosphate detergent and water. This water shall be changed regularly to minimize carrying residue into the next wash. For the second wash, equipment will be rinsed clear tap or de-ionized water. Again, the water shall be changed frequently to minimize carrying residue into the next wash. For the third wash, equipment will be rinsed in de-ionized or distilled water only. After cleaning, equipment shall be stored on a clean surface such as plastic sheeting.

5.11.8 Protection of Clean Excavation Areas

Once the waste in a specific area has been relocated, and waste has been confirmed as being removed through the analytical testing, the Contractor shall take necessary precautions to protect that area from recontamination during activity in adjacent areas. The CM Team shall observe that the Contractor does not operate in areas that have passed confirmation testing. If the CQA Team observes non-decontaminated equipment operating in areas previously passing confirmation testing, they shall immediately bring it to the Contractor’s attention. After removal of the equipment, the CM Team shall observe the area for signs of contamination (i.e. newly deposited soil, odor, color variations, PID hits, etc.), and if observed, the CQA Team shall notify the Contractor and then retest the area after the Contractor has cleaned up the affected area.

6.0 CQA FOR WASTE PLACEMENT AND COMPACTION

6.1 Waste Compaction Equipment

Waste compaction equipment shall be observed prior to start of work to verify it meets the minimum compactor requirements described below:

- Operating weight of 100,000 pounds
- Engine power of 450 horsepower
- Non-low ground pressure tracks with a minimum 50 percent track-life

6.2 Waste Compaction Process

Observe waste compaction operations to verify that relocated waste is placed in designated locations, to the required grades and elevations, and compacted per project Specifications. Observe that waste is covered with alternative daily cover at the end of each working day.

7.0 CQA MONITORING OF HOT MIX ASPHALT

This section outlines the requirements for the HMA operations for the construction of the customer access road. The Contractor shall place the aggregate base material and HMA in accordance with the Construction Drawings and Specifications. Specifically excluded from this section is the aggregate base installation, which is addressed within a separate section of this CQA Plan.

The Contractor shall provide written certificates of compliance certifying that the HMA to be supplied meets the project requirements presented in the Construction Drawings and/or Specifications along with a Job Mix Formula (JMF). The certificates of compliance and JMF shall be accompanied by certified laboratory test results demonstrating that the HMA to be delivered to the job site was tested in accordance with, and meets, the requirements of the Construction Drawings and/or Specifications.

The certificates of compliance shall be signed by responsible personnel employed by the Contractor and submitted to the CQA Manager at least seven working days prior to shipment to the job site. The certificates of compliance shall include the following:

- The test procedures and the results of laboratory evaluations
- Certification that the tests described in the Specifications and herein were performed and that the results conform to the project requirements in the Construction Drawings and/or Specifications

The CQA Monitor shall observe the HMA material and the placement of thereof and shall sample the as delivered HMA per California Test Method T125 Appendix B for the following tests at the production frequencies listed in the Specifications as amended by the Standard Provisions Section 39-2.01A(4)(i) Department Acceptance:

- Asphalt binder content per AASHTO T308, Method A
- HMA moisture content per AASHTO T329
- Air voids content per AASHTO T269

This CQA Plan specifically excludes the following tests called out in the Specifications due to the relatively minor nature and limited quantity of HMA work to be completed:

- Voids in mineral aggregate per SP-2 Asphalt Mixture Volumetrics
- Dust proportion per SP-2 Asphalt Mixture Volumetrics
- Hamburg wheel track per AASHTO T324 (Modified)
- Moisture susceptibility per AASHTO T283

Prior to HMA placement, the CQA Monitor shall verify all testing on the earth materials underlying the roadway have been completed and the results of such meet, or exceed, Specification requirements. Additionally, the CQA Monitor shall observe the HMA subgrade for soft spots, loose material, overall surface preparation, and for general layout to confirm the area to be paved conforms to the dimensions and shape shown on the Construction Drawings. The CQA Monitor shall observe that the specified tack coat is applied to the subgrade and between paving lifts at the appropriate rate required by the Specification.

During placement of the HMA the CQA Monitor shall monitor the temperature of the ambient air, HMA subgrade, and the HMA to confirm they are consistent with the requirements for such as described in the Specifications. The CQA Monitor shall also conduct nuclear density gauge testing per California Test Method T375 (2012) at the production frequency listed in the Specifications. At the start of roadway construction, a nuclear gauge correlation factor shall be established for each nuclear gauge to be used on the project. The correlation factor shall be established per California Test Method T375 (2012). Relative compaction of the in-place, compacted HMA shall be calculated based on a laboratory test maximum density as defined in California Test Method T375 (2012). The CQA Monitor shall also observe the compacted, in-place material to confirm that the compacted thickness is consistent with the Construction Drawings.

8.0 CQA MONITORING FOR CONCRETE

The Contractor shall provide written certificates of compliance certifying that the concrete to be supplied meets the project requirements presented in the Construction Drawings and/or Specifications along with a mix design. The certificates of compliance shall be accompanied by certified laboratory test results showing that the concrete to be delivered to the job site was tested in accordance with, and meets, the requirements in the Construction Drawings and/or Specifications.

The certificates of compliance shall be signed by responsible personnel employed by the Contractor and submitted to the CQA Manager at least seven working days prior to shipment to the job site. The certificates of compliance shall include the following:

- The test procedures and the results of laboratory evaluations
- Certification that the tests described in the Specifications and herein were performed and that the results conform to the project requirements in the Construction Drawings and/or Specifications

The CQA Monitor shall collect representative samples of the concrete delivered to the site for use in conducting field tests and molding compressive strength test specimens in compliance with ASTM C31. The number of sets of concrete cylinder specimens created for each class of concrete placed on each day shall not be less than one set of four 6-inch by 12-inch (one 7-day, two 28-day, and a hold) or five 4-inch by 8-inch cylinders (one 7-day, three 28-day, and a hold), nor less than one set of cylinders for each 100 cubic yards of concrete placed. Samples collected for the molding of concrete compression test cylinders shall also be tested for the following:

- Concrete temperature per ASTM C1064
- Slump per ASTM C143
- Compressive strength per ASTM C39

If concrete delivered in another truck not sampled for the molding of compressive strength specimens appears to be out of the specification range for temperature and/or slump, the CQA Monitor shall conduct additional tests on those trucks to establish if the concrete meets the requirements of the Construction Drawings and/or Specifications.

Prior to the placement of concrete, the CQA Monitor shall observe the area to receive concrete for the following:

- Concrete subgrade has been prepared and compacted as required by the Specifications
- Reinforcing steel is placed as required by the Construction Drawings
- Reinforcing steel is of the size and grade required by the Construction Drawings
- Reinforcing steel is free of rust, scale, or other deleterious material that could affect the quality of the concrete bond to it
 - A light layer of tightly-adhering mill scale shall not be cause for rejection or action by the contractor
- Reinforcing steel is adequately tied and supported as to preclude its displacement during concrete placement
- Forms are sturdy and of the dimensions shown on the construction drawings
- Subgrade is moistened immediately prior to concrete placement and no standing water is present

- No trash or other deleterious material is present within the forms

During the placement of concrete, the CQA Monitor shall observe the placing procedures for the following:

- The approved mix design is delivered and placed
- Concrete is not allowed to free fall greater than 4 feet without the use of a tremie
- Concrete is not handled in a way as to cause segregation
- Concrete is adequately consolidated via internal vibration as to preclude the development of voids or “honeycombing” and to create adequate adhesion of the concrete to the reinforcing steel
- Concrete is placed to the shape and dimensions shown on the Construction Drawings
- Concrete does not exceed 90 minutes in age from the initial addition of water
- Concrete does not exceed 90 degrees Fahrenheit during staging and/or placing
- Concrete is finished and scored as required by the Construction Drawings and/or Specifications
- Concrete is cured per the Specifications

9.0 CQA MONITORING OF EROSION CONTROL RE-VEGETATION

9.1 General

Erosion control re-vegetation shall be observed to confirm that its placement is in compliance with this CQA Plan, the Construction Drawings and Specifications, and the seed manufacturer instructions.

9.2 Erosion Control Re-Vegetation Quality Assurance

9.2.1 Observation Frequency

Prior to the application of seed to the intermediate cover, the CQA Manager and/or CQA Monitor shall observe all prepared areas to ensure that the condition of the soil surface is consistent with the Construction Drawings and Specifications. During application, the CQA Manager and/or CQA Monitor shall periodically observe the seed application to ensure the rates of seed, fertilizer, and tackifier meets the requirements established by the design.

9.2.2 Acceptance Criteria

The surfaces to receive erosion control planting (i.e. intermediate soil cover) will have a loose, track-walked appearance. Areas observed to be over-compacted and not ready for seeding shall be corrected to the satisfaction of the CQA Manager and/or CQA Monitor. If an area is not fully

graded, or is still receiving pedestrian and vehicular traffic, it may not be seeded until the grading is completed and the area is no longer subject to traffic of any kind.

Application of the seed, fertilizer, and tackifier will be considered acceptable if the rates of application are consistent with the Construction Drawings and Specifications.

10.0 DOCUMENTATION

To provide evidence of satisfactory work performance, the CQA Monitor will document all stages of the AADS Phase I waste relocation project. The information shall be recorded on a standardized form or in a bound field logbook and maintained as specified by the Owner.

10.1 Daily Record Keeping

The purpose of daily record keeping is to record construction activities, including results of continuous or periodic visual observations, laboratory/field test data, sampling, review of test results, repairs, problems, solutions, and general field activity.

The CQA shall keep a Daily Field Inspection Report of project activities. At a minimum, this report shall include the following:

- Date and project identification
- Field activity and work locations
- Summaries of field communications
- Summary of equipment and personnel used
- Work activity monitored, general location on-site and any related tests taken
- Record of material sampling and testing activities
- Any variance from specified methods and standards
- Off-site materials received including geosynthetics or drainage materials, plus status of certificates or off-site testing for the materials
- Estimated quantities of material placed and compacted
- Unusual events
- Actions regarding acceptance/rejection of work
- Weather conditions
- Signature of person preparing the report

The daily field inspection report shall be reviewed by the CQA Officer and shall be submitted to the Project Manager. One complete set of Daily Field Reports shall be kept on site by the CQA personnel at all times. The contractor will be notified of the "pass/fail" nature of the CQA results but will not be provided with numerical data unless authorized to do so by the Owner.

10.2 Observation and Test Data Sheets

The CQA Monitor shall prepare observation and data sheets during all phases of construction for review by the CQA Officer. Observation and data sheets for this project may include, but would not be limited to the following:

- Field Construction Inspection and Meeting Reports
- Nuclear Density Data Sheets
- Field Density Summary
- Moisture Density Curve Data Sheets
- Oven Moisture Content/Drive Tube Density Data Sheets
- Sieve Analysis and Atterberg Limits Data Sheets
- Acceptance of Prepared Subgrade Forms
- Geotechnical Analytical and Results Log
- Photograph Log (including date, time, photographer, and noted activity)
- Request for Information (RFI), Submittal and Change Order Log

Additional observation and data sheets may be required. All entries shall be clear and legible. All documentation should be dated and signed or initialled clearly by the CQA Monitor.

10.3 Photo Documentation

The CQA Monitor shall prepare a photographic record to document construction of the AADS Phase I waste relocation project. Photographs shall be in color and shall include photographs of construction activities, problem areas, corrective actions, and final constructed features.

Photographs shall be taken daily and identified with the site designation, the date taken, the location, and a description of the activity covered by the photograph.

10.4 Monthly Progress Reports

A monthly progress report shall be prepared by the CQA Officer and submitted to the Owner. This monthly progress report shall contain, at a minimum, the following information:

- The date, project name, and location
- A summary of work activities completed in the last week, and those expected to be performed in the next week
- A summary of deficiencies and/or defects, and resolutions
- Summary of Requests for Information
- Summary of changes and/or change orders to the work

- Quantity of material incorporated into the project
- Percentage complete for each major bid item
- The signature of the CQA Manager

Every other report will include a summary of on-suite and third party laboratory test results.

10.5 Design Change Reports

Design and specification changes may be required during construction. In such cases, the CQA Monitor shall notify the CQA Officer. Design and specification changes shall only be made with written agreement of the CQA Consultant and the Owner.

10.6 Construction Difficulty Reports

In the event that the Contractor has extreme difficulty in the performance of any specified activities required, a special report shall be prepared to address the problem(s). The Owner, the Contractor, CQA Monitor, and CQA Officer (if needed) shall meet to discuss any problems encountered and to address the solution. If changes to the Construction Specifications are required, the CQA Consultant and the Owner shall be notified and approve any changes in writing.

10.7 Final Report

At the completion of the project, the CQA Consultant shall prepare a Statement of Certification to be submitted to the Owner and the Regional Water Quality Control Board; Central Valley Region. Within 30 days of project completion, the CQA Consultant shall prepare a final construction report suitable for presentation to Regional Water Quality Control Board; Central Valley. Copies of all reports and test results prepared by the CQA Monitor shall be submitted to the CQA Officer for review. Copies of all the documents shall be maintained at the CQA Consultant's office. This report shall verify that the work has been performed in compliance with the Construction Drawings and the Specifications. At a minimum this report shall contain:

- A summary of all construction activities
- As-Built Record Drawings
- A description of significant construction problems and the resolution of these problems
- A list of deviations (if any) from the Construction Drawings and Specifications and justification for these changes
- A statement signed and sealed by a Registered Civil Engineer or Certified Engineering Geologist registered in the State of California verifying that the project was constructed in general accordance with the Construction Drawings, Specifications, and CQA Plan.

The Final Report should also include the Phase I Groundwater Monitoring Well Decommission Report as a stand-alone report. This report will be composed and submitted when decommissioning activities are completed and will be included with the Final Report.

10.8 Red Line As-Builts

A set of red line as-built drawings shall be prepared by the Contractor during the course of construction. The as-built drawings shall accurately locate all construction items including, but not limited to, actual limits of Phase I excavation, locations of the decommissioned groundwater monitoring wells, Phase I and II intermediate cover limits, perimeter of waste consolidation areas, limits of soil buttress, perimeter and flow line of installed drainages, soil berms, etc. The CQA Consultant shall review the as-built drawings and provide comment to the Contractor for finalizing. Upon completion of the final as-built drawings, the Contractor shall forward digital and hard copies of the drawings to the CQA Consultant for inclusion in the final report.

10.9 Record Documentation

As the work is completed, final Record Drawings and Specifications along with a report shall be prepared under the direction of the CQA Consultant using the Contractor prepared as-built drawings. These drawings and report shall be retained as a permanent record of construction. The report shall include CQA As-Built Summary documents that includes a summary of test results and discusses typical construction conditions and procedures. The Record Drawings and Specifications along with report will be submitted to the Owner. The Contractor shall submit all "As-Built" documents to the Owner as required by the Construction Drawings and Specifications.

TABLES

**TABLE 1
MATERIAL EVALUATION TESTING FREQUENCY¹**

| ASTM TEST DESIGNATION¹ | PIPE BEDDING AND PIPE ZONE BACKFILL (CY) | EARTHFILL/ CLASS 2 AGGREGATE BASE (CY) | SUBGRADE PREPARATION (SF) | SOIL WEDGE BUTTRESS FILL (CY) | INTERMEDIATE SOIL COVER (CY) |
|--|---|---|----------------------------------|--------------------------------------|-------------------------------------|
| D2488 (Visual Soil Description) | --- | 10,000 | 10,000 | 10,000 | 10,000 |
| D2487 (Soil Classification) | --- | 10,000 | 10,000 | 10,000 | 10,000 |
| D1557 (Maximum Density/Optimum Moisture) | --- | 10,000 | 10,000 | 10,000 | --- |
| D6913 (Particle Size) | 5,000 | 10,000 | 10,000 | 10,000 | --- |
| D1140 (#200 Sieve Wash) | 5,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| D4318 (Atterberg Limits) | --- | --- ² | 10,000 | --- ² | --- ² |

¹ Minimum one test per material type.

² Unless plastic soils encountered, at which point the frequency is per 10,000 cy.

**TABLE 2
SOIL CONSTRUCTION TESTING FREQUENCY¹**

| ASTM TEST DESIGNATION^{1,2} | EARTHFILL/ CLASS 2 AGGREGATE BASE (CY) | SUBGRADE PREPARATION (SF) | SOIL WEDGE BUTTRESS FILL (CY) | INTERMEDIATE SOIL COVER (CY) | PIPE BEDDING SAND AND PIPE ZONE BACKFILL (CY) |
|--|---|--|--|---|--|
| D6938 (Nuclear Moisture-Density) | 5,000 ³ | 1,000 | 5,000 ³ | --- | --- |
| D2488 (Visual Soil Description) | 10,000 | 5,000 | 10,000 | 5,000 | --- |
| D2487 (Soil Classification) | 10,000 | 5,000 | 10,000 | 5,000 | --- |
| D1557 (Maximum Density/Optimum Moisture) | 10,000 | 5,000 | 10,000 | --- | --- |
| D6913 (Particle Size) | 10,000 | 5,000 | 10,000 | --- | --- |
| D1140 (#200 Sieve Wash) | 10,000 | 5,000 | 10,000 | --- | --- |
| D4318 (Atterberg Limits) | --- ⁴ | 5,000 | --- ⁴ | 10,000 | --- |

¹ Minimum one test per material type.

² Pipe bedding to be vibrated into placed; jetting or flooding not allowed.

³ Minimum one test per lift.

⁴ Unless plastic soils are encountered, at which point the frequency is 10,000 cy.

**TABLE 3
FILL PLACEMENT AND COMPACTION**

| FILL | MAXIMUM LOOSE LIFT THICKNESS (IN.) | MAXIMUM COMPACTED LIFT THICKNESS (IN.) | MOISTURE CONTENT | MINIMUM SUBGRADE OR LIFT RELATIVE COMPACTION | METHOD OF TEST | FINISHED GRADE TOLERANCE (FT) |
|---|------------------------------------|--|-----------------------|--|----------------|-------------------------------|
| Subgrade ¹ | --- | --- | --- | 90% | ASTM D1557 | ±0.1 |
| Earthfill | 8 | --- | ±2% of Optimum | 90% | ASTM D1557 | ±0.2 |
| Earthfill – within 12 inches of base of road base | 8 | --- | 0 to 3% above Optimum | 95% | ASTM D1557 | ±0.2 |
| Trench Backfill | 8 | --- | ±2% of Optimum | 90% | ASTM D1557 | +0.1 |
| Soil Wedge Buttress Fill ² | 8 | --- | ±2% of Optimum | 90% | ASTM D1557 | ±0.2 |
| Intermediate Soil Cover ³ | --- | 12 | ±2% of Optimum | 85% | ASTM D1557 | ±0.2 |
| Pipe Bedding and Pipe Zone Backfill ⁴ | 6 | --- | Dry | --- | --- | +0.1 |
| Class 2 Aggregate Base | 6 | --- | 0 to 3% above Optimum | 95% | ASTM D1557 | 0.0 to +0.2 |

¹Subgrade that directly supports aggregate base shall be compacted to 95% of its maximum dry density at 0% to +3% above optimum moisture.

²If, in the opinion of the CQA Officer, soil being placed as part of the Soil Wedge Buttress Fill cannot be compacted to the requirements presented in this table due to the yielding nature of the underlying waste, the Wedge Fill Soil Buttress soils may be compacted to a firm and unyielding condition as established by the CQA Monitor or Officer.

³Contractor shall perform two 12" maximum compacted lifts that results in a 2-foot-thick compacted lift as indicated on the Construction Drawings. Each lift a minimum of three (3) passes with a D9 non-low ground pressure track dozer (minimum operating weight of 100,000 lbs.). If the Contractor proposes use of different equipment or compaction method, then the Contractor shall complete a test strip (50' X 50') on recently relocated waste at Phase II to verify this method will provide minimum 85% compaction at plus or minus two percent optimum moisture. Compaction will be tested per ASTM D1557. The County will NOT allow the use of low ground pressure track equipment for any substitution. Any deviation from this requirement requested by the Contractor will be subject to CQA Officer/Monitor's approval.

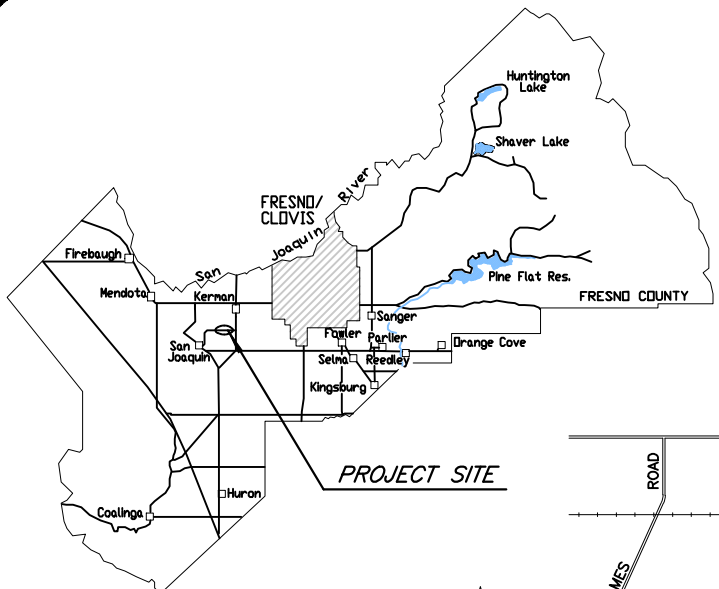
⁴No relative compaction requirement is specified. Relative compaction is not an appropriate specification for sands and gravels with little to no fines (i.e. minus #200 standard sieve). Rather, these materials when placed in a dry state, will achieve sufficient relative density. The pipe bedding material will be of limited thickness. The pipe zone backfill should be compacted as described in this Specification.

**TABLE 4
PROPERTIES FOR EARTHWORK MATERIALS**

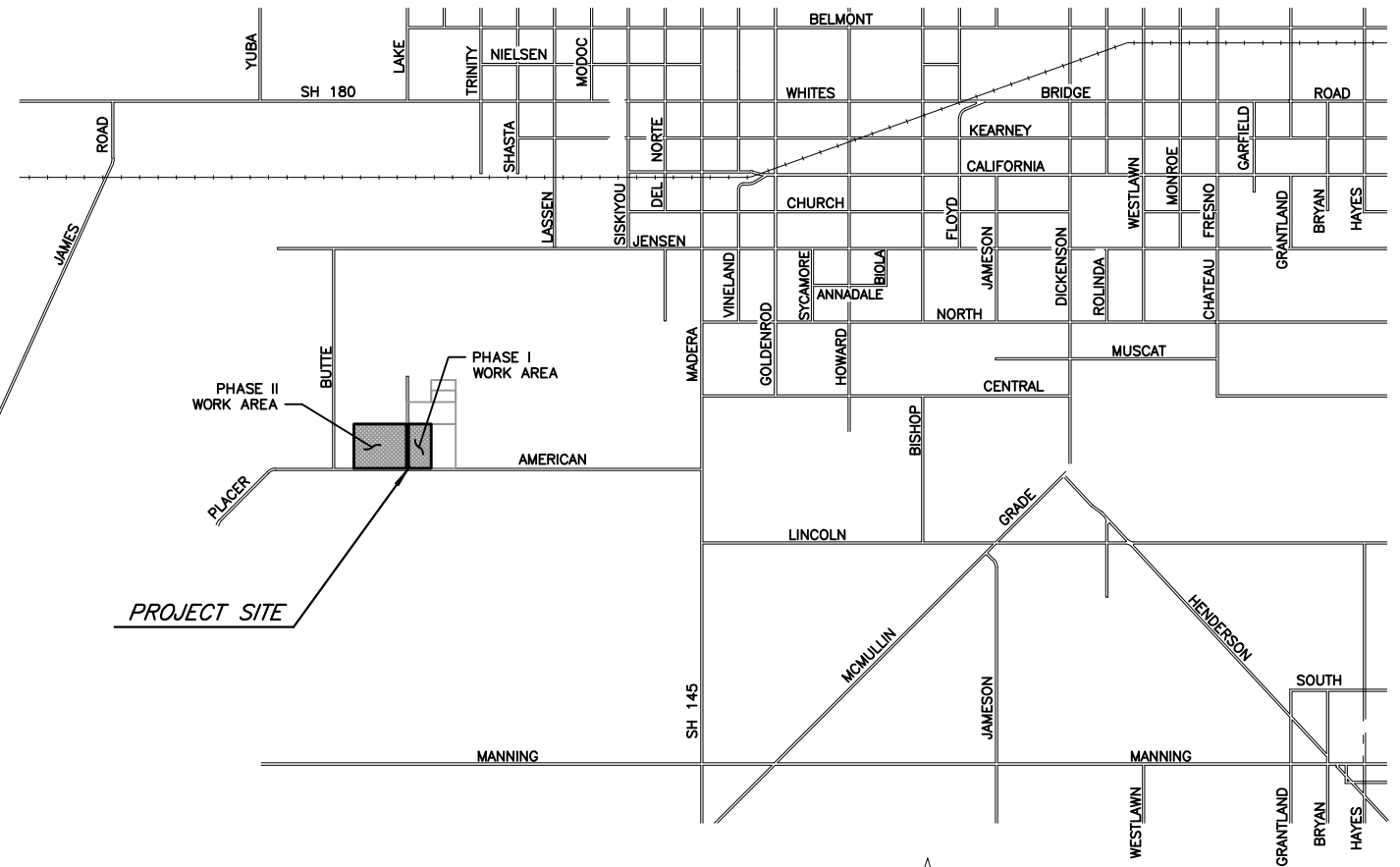
| MATERIAL AND PROPERTY | TEST | REQUIREMENTS | | | |
|---|---------------------------------|--|--|--|--|
| Earthfills Material Gradation Maximum Particle Size USCS Classification | D6913 D2488 | 3 inches SM and SC and approved mixtures, clean and nonexpansive (i.e. PI<15) | | | |
| Class 2 Aggregate Base | --- | See Section 26, Caltrans Standard Specifications, Class 2 ¾-inch maximum particle size aggregate base as indicated on the Construction Drawings | | | |
| Intermediate Soil Cover Maximum Particle Size Plasticity Index USCS Classification | D6913 D4318 D2488 | <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center; vertical-align: top;"> Sieve Screen 1" #20 #60 #200 </td> <td style="width: 5%; text-align: center; vertical-align: middle;"> </td> <td style="width: 45%; text-align: center; vertical-align: top;"> Percent Passing 100 80 minimum 45 minimum 12 to 50 </td> </tr> </table> PI<15 SM and SC and approved mixtures, clean and nonexpansive | Sieve Screen 1" #20 #60 #200 | | Percent Passing 100 80 minimum 45 minimum 12 to 50 |
| Sieve Screen 1" #20 #60 #200 | | Percent Passing 100 80 minimum 45 minimum 12 to 50 | | | |
| Soil Wedge Buttress Fill USCS Classification | D2488 | SM and SC and approved mixtures, clean and nonexpansive | | | |
| Trench Backfill Material Gradation Maximum Particle Size USCS Classification/Material Description | D6913 D2488 | 1 inches SM and SC and approved mixtures thereof, clean and non-expansive (i.e. PI<15) | | | |
| Pipe Zone Backfill | --- | See Section 64-1.02B, Caltrans Standard Specification, crushed rock | | | |
| Pipe Bedding | --- | See Section 19-3.02F(2), Caltrans Standard Specifications, culvert sand bedding | | | |

FIGURES

LOCATION: N:\American Ave_Fresno_County of\2016-A086_American Ave_Clean Closure Work Plan\CAD\Working Drawings\CQA Plan Figures\Fig1_SITE_LOC_VICINITY.dwg DATE: 10/20/2020 PLOT SCALE: 1:1 PLOTTED BY: GLA-USER



PROJECT LOCATION MAP
NTS



PROJECT VICINITY MAP
NTS



| | | DATE |
|----------|-----|----------|
| DESIGNED | SRF | 10/28/20 |
| DRAWN | JMG | 10/28/20 |
| CHECKED | BMY | 10/28/20 |

**AMERICAN AVENUE DISPOSAL SITE
PHASE I WASTE RELOCATION
CQA PLAN**


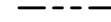




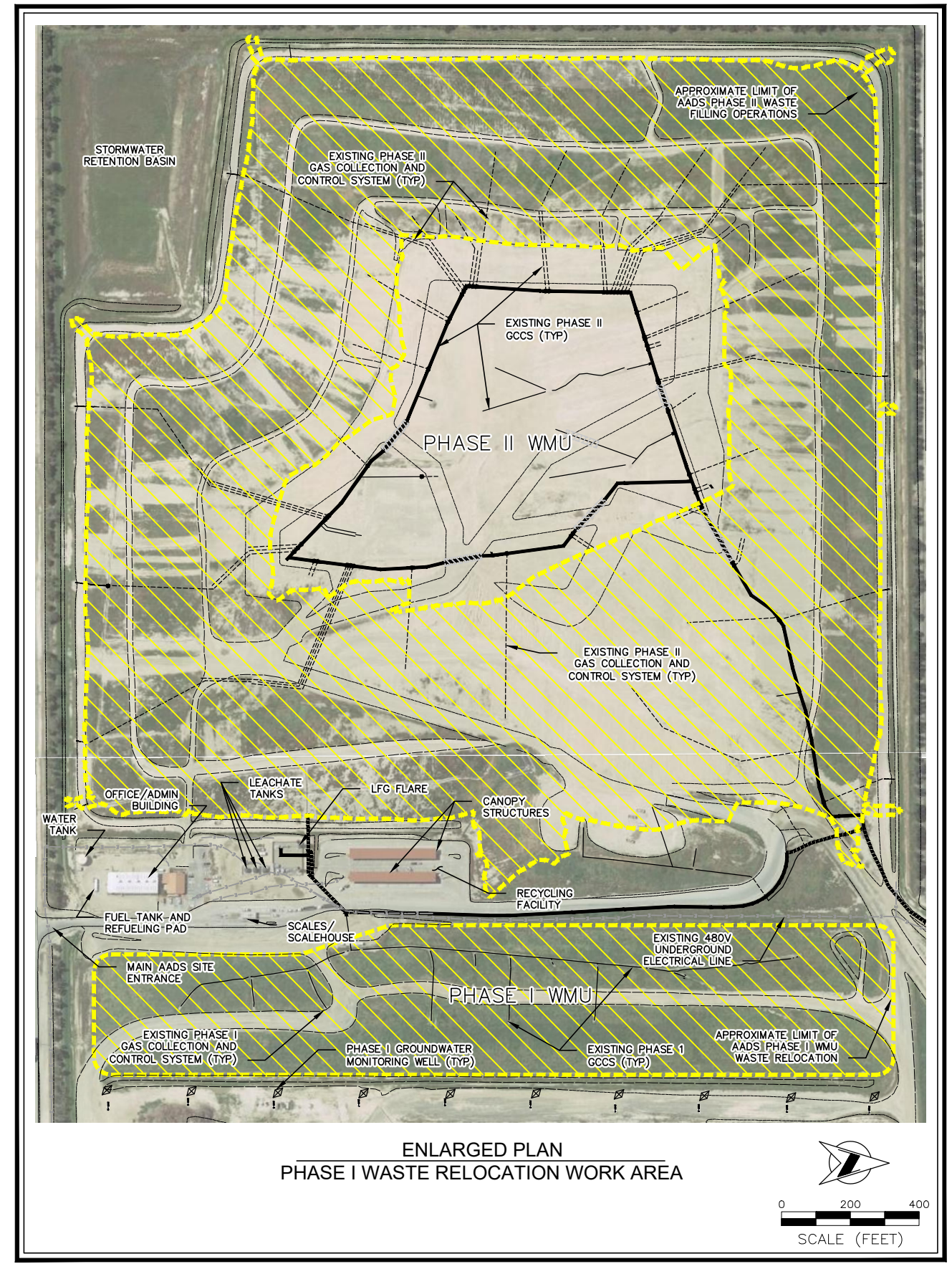
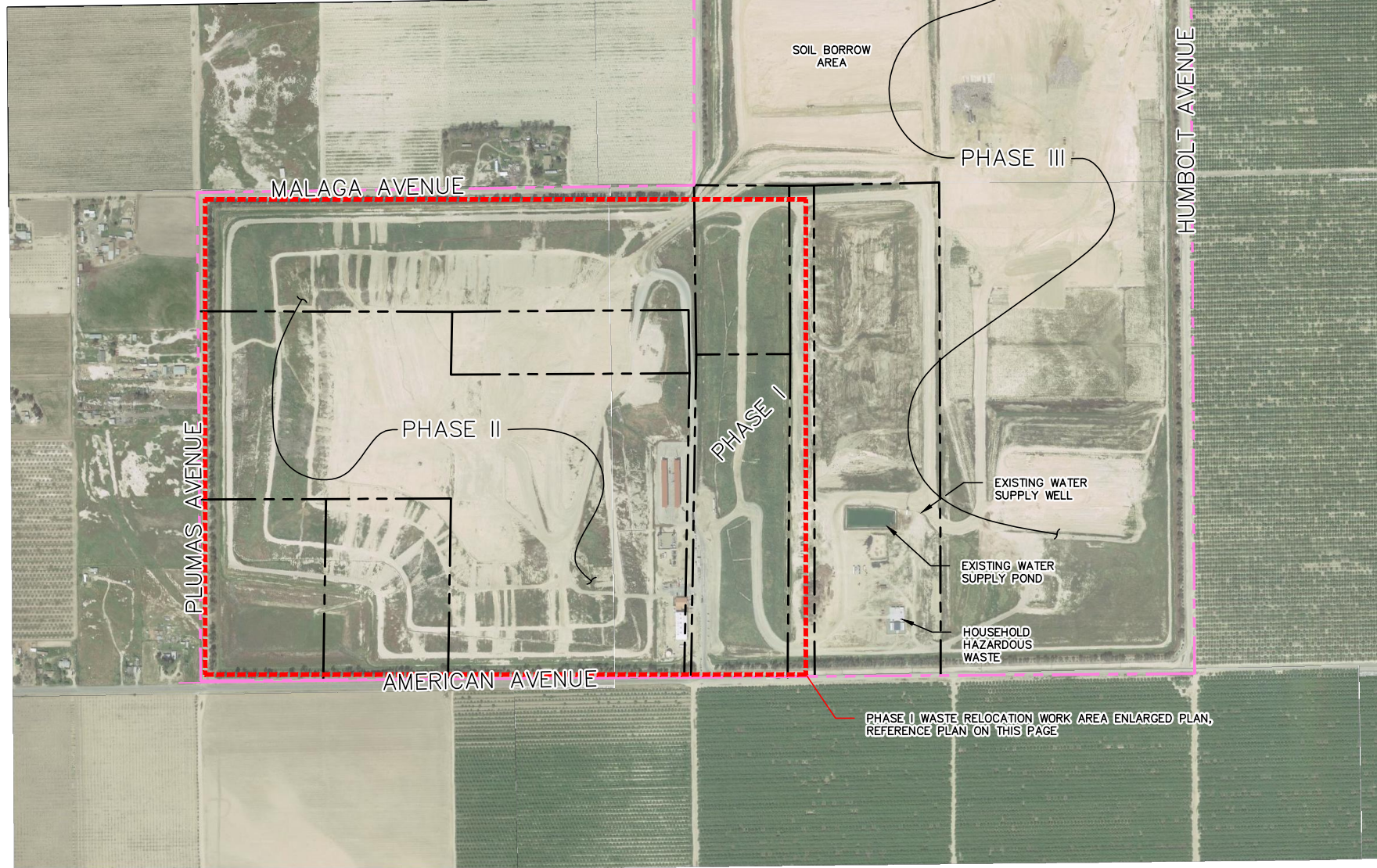
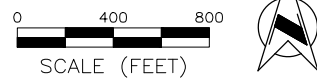
DEPARTMENT OF PUBLIC WORKS AND PLANNING

**FIGURE 1
SITE LOCATION AND
VICINITY MAP**

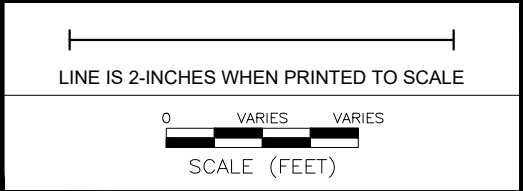
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LEGEND

-  APPROXIMATE LIMITS OF PHASE I WASTE RELOCATION WORK AREAS
-  ASSESSOR PARCEL LINE (COUNTY OF FRESNO)
-  EDGE OF ROAD (PAVED/UNPAVED)
-  PROPERTY LIMITS OF AADS



| | DESIGNED | SRF | DATE |
|--|----------|-----|----------|
| | SRF | | 02/04/21 |
| | SRF | | 02/04/21 |
| | SRF | | 02/04/21 |



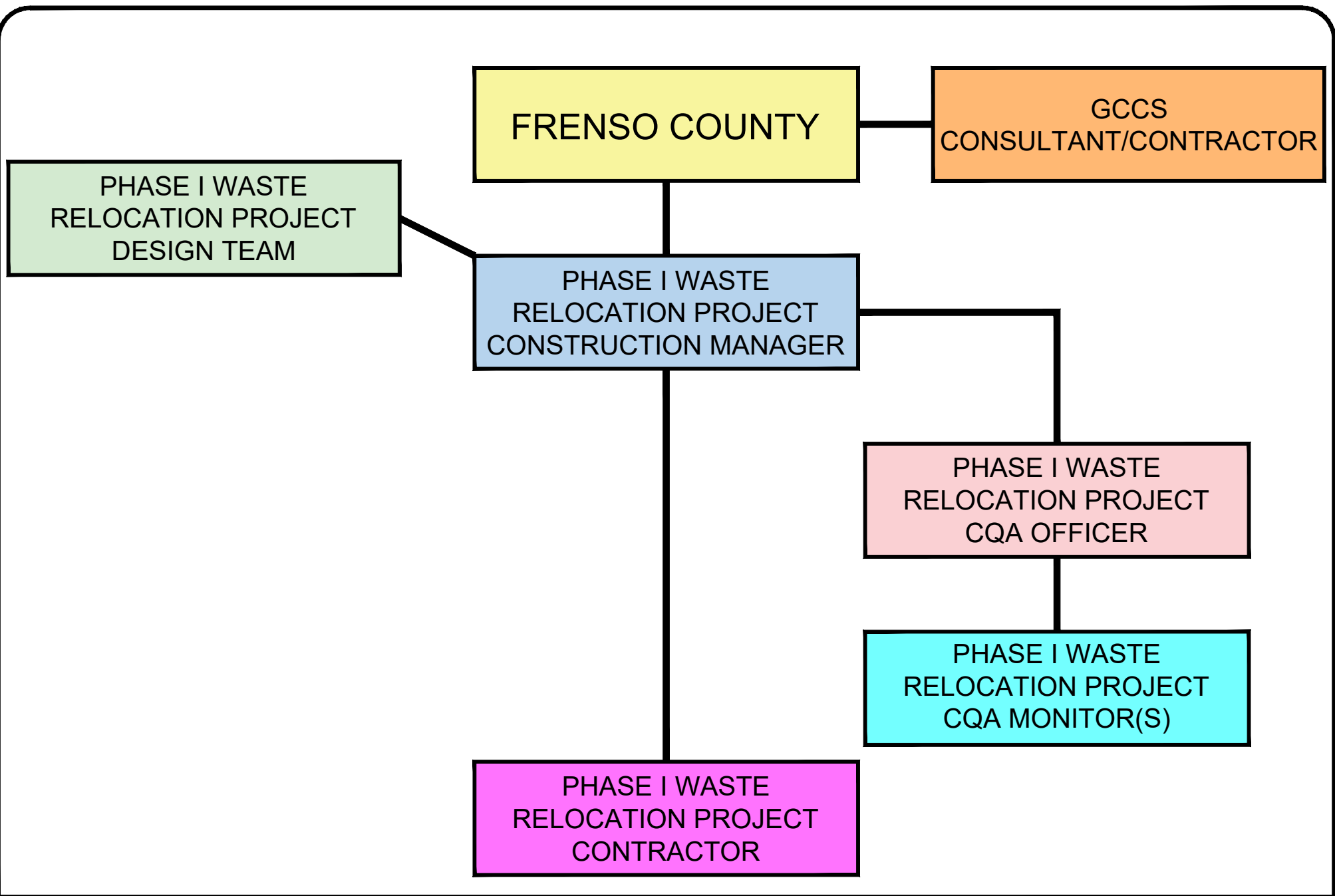
AMERICAN AVENUE DISPOSAL SITE
PHASE I WASTE RELOCATION CQA PLAN



DEPARTMENT OF PUBLIC WORKS AND PLANNING

FIGURE 2
SITE PLAN

LOCATION: N:\American Ave_Fresno, County of\2016.A086_American Ave_Clean Closure\Task 4 Clean Closure Work Plan\CAD\Working Drawings\COA Plan Figures\FIG3_PHASE I WASTE RELOCATION PROJECT ORGANIZATION CHART.dwg DATE: 10/25/2021 PLOT SCALE: 1:1 PLOTTED BY: GLA-USER



| | | DATE |
|----------|-----|----------|
| DESIGNED | SAH | 10/25/21 |
| DRAWN | SAH | 10/25/21 |
| CHECKED | JVR | 10/25/21 |

AMERICAN AVENUE DISPOSAL SITE
 PHASE I WASTE RELOCATION
 CQA PLAN



DEPARTMENT OF PUBLIC WORKS AND PLANNING
 FIGURE 3
 PHASE I WASTE RELOCATION PROJECT
 ORGANIZATION CHART

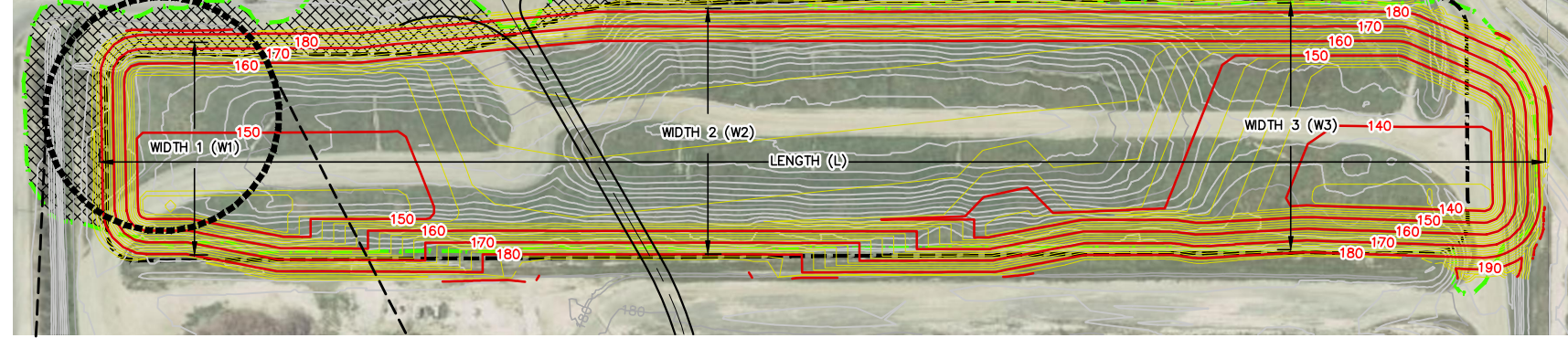
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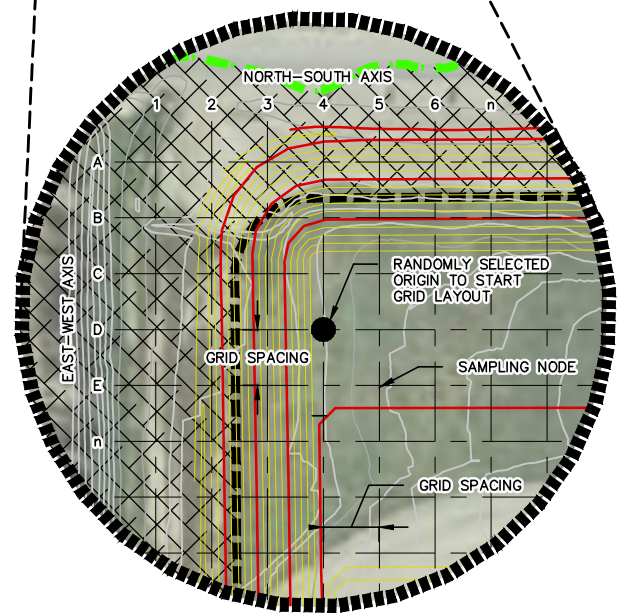
$$\text{GRID SPACING} = \left[\frac{\text{AREA} \pi}{\text{SF}} \right]^{0.5}$$

$$\text{AREA} = \left[\frac{W1+W2+W3}{3} \right] \times L$$

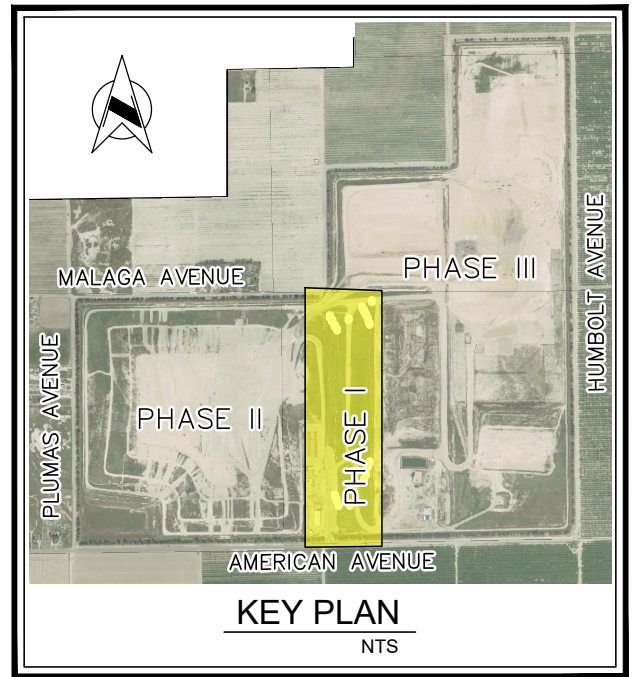
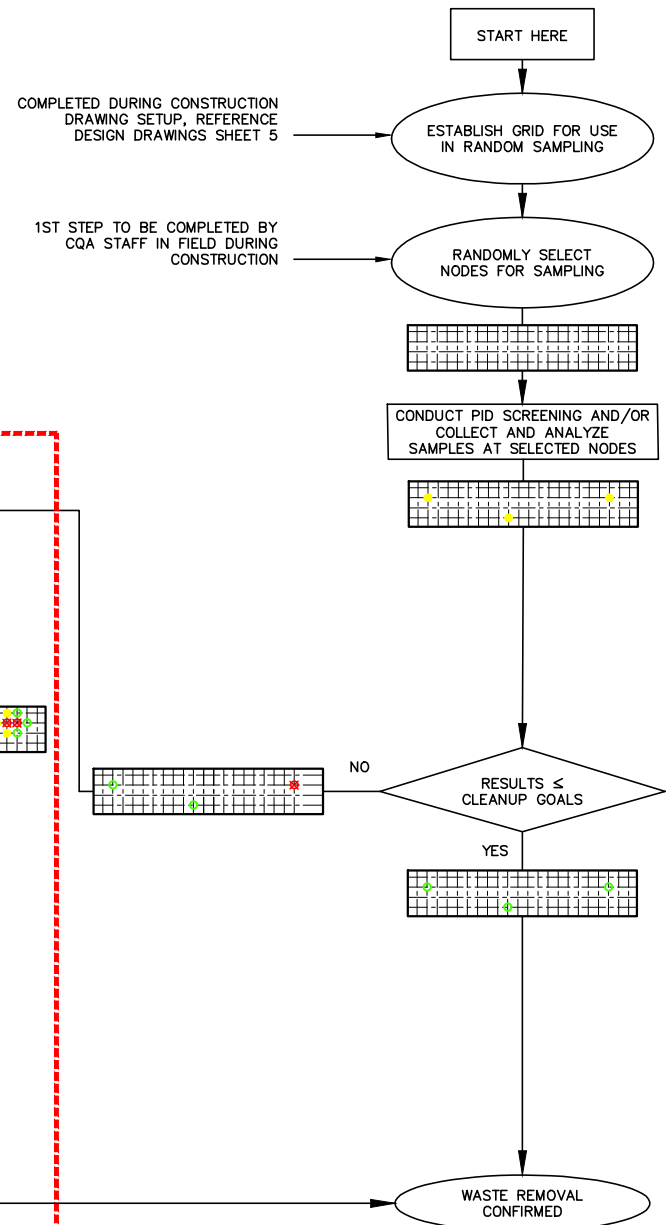
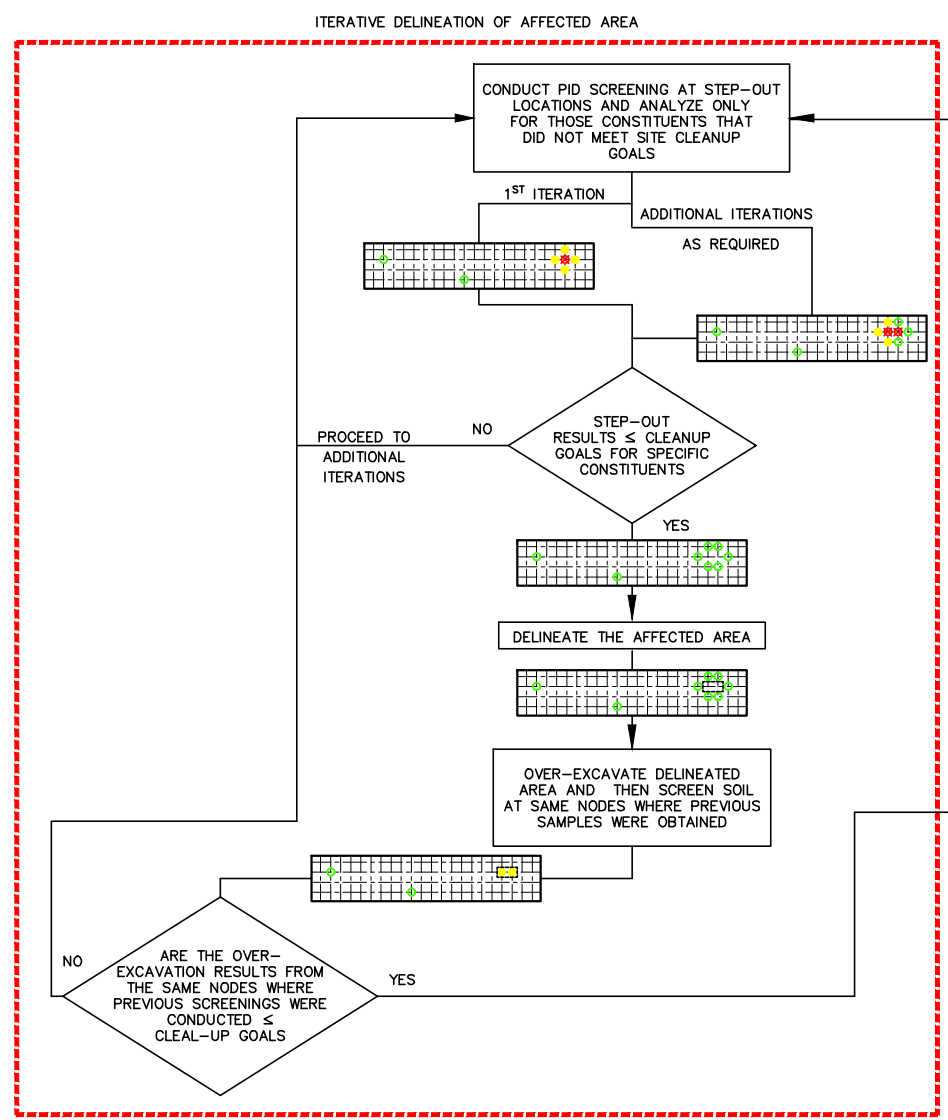
$$\text{SF} = L$$



METHOD OF CALCULATING GRID SPACING



SETTING UP SAMPLE GRID

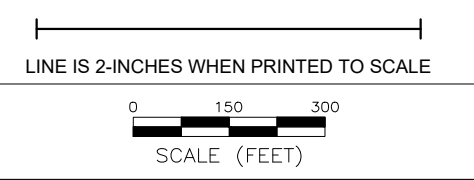


KEY PLAN
NTS

- LEGEND**
- 200— EXISTING GRADE MAJOR CONTOUR (10-FOOT)
 - EXISTING GRADE MINOR CONTOUR (2-FOOT)
 - 200— PROPOSED GRADE MAJOR CONTOUR (10-FOOT)
 - PROPOSED GRADE MINOR CONTOUR (2-FOOT)
 - - - - ESTIMATED LIMITS OF WASTE (INFERRED)
 - - - - LIMITS OF PHASE II WASTE FILLING STAGE
 - - - - APPROXIMATE LIMIT OF PHASE I WMU
 - ▨ MISCELLANEOUS AADS OPERATIONAL WASTES (NOT A PART OF PHASE I WMU)
 - SAMPLE COLLECTION NODE
 - SAMPLED NODE ACHIEVING CLEAN-UP GOALS
 - ⊗ SAMPLED NODE NOT ACHIEVING CLEAN-UP GOAL
 - AFFECTED AREA DELINEATED FOR FURTHER CLEAN-UP AND SAMPLING

- NOTES**
1. EXISTING TOPOGRAPHY BASED ON AERIAL PHOTOGRAPHIC SURVEY PERFORMED BY QUANTUM SPATIAL IN DECEMBER 2016.
 2. WASTE LIMITS SHOWN ARE COMPRISED OF BOTH PHASE I WASTE AND MISCELLANEOUS AADS OPERATIONAL WASTE.
 3. MATERIAL IDENTIFIED AS "PHASE I WASTE" IS LOCATED WITHIN THE OVERALL BOUNDARY OF THE "ESTIMATED LIMITS OF WASTE" AND DOES NOT INCLUDE THE "MISCELLANEOUS AADS OPERATIONAL WASTE."
 4. FLOW CHART PRESENTS AN EXAMPLE WITH TWO ITERATIONS, FIELD CONDITIONS MAY REQUIRE THAT MORE ITERATIONS BE COMPLETED TO PROPERLY DELINEATE THE EXTENTS OF AFFECTED AREAS AND DEPTHS AND CONFIRM WASTE REMOVAL.
 5. EXCAVATION OF PHASE I WASTES SHALL CONTINUE IN THE DOWNWARD, NORTHWARD, AND EASTWARD DIRECTIONS UNTIL ALL WASTE HAS BEEN CONFIRMED AS REMOVED. WASTE EXCAVATION ON THE SOUTH AND WESTERN SIDES OF PHASE I SHALL BE EXCAVATED TO THE DESIGN GRADES, AND THEN HAVE INTERMEDIATE COVER SHALL BE PLACED PER PROJECT DESIGN DOCUMENTS.

| | | DATE |
|----------|-----|----------|
| DESIGNED | SRF | 10/28/20 |
| DRAWN | SRF | 10/28/20 |
| CHECKED | BMV | 10/28/20 |



AMERICAN AVENUE DISPOSAL SITE
PHASE I WASTE RELOCATION CQA PLAN



DEPARTMENT OF PUBLIC WORKS AND PLANNING
FIGURE 4
PHASE I WASTE RELOCATION
ITERATIVE DELINEATION PROCESS