L-1207 PUBLIC SAFETY AND HONORS BUILDINGS DEMOLITION PROJECT

tBP Project No. 22067.00

LOS MEDANOS COLLEGE
2700 East Leland Road
Pittsburg, CA, 94565
CONTRA COSTA COMMUNITY COLLEGE DISTRICT

VOLUME 2

TECHNICAL SPECIFICATIONS

100% CONSTRUCTION DOCUMENTS
FEBUARY 06, 2023

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SECTION 00 01 02 – CERTIFICATIONS PAGE

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SECTION 01 56 39 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.2 REFERENCES

A. Standard Specifications, latest edition, issued by California Department of Transportation (CSS

B. Edition Greenbook, latest edition: Standard Specifications for Public Works Construction.

1.3 DEFINITIONS

A. Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1.5 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:
   1. Storage of construction materials, debris, or excavated material.
   2. Parking vehicles or equipment.
   3. Foot traffic.
   4. Erection of sheds or structures.
   5. Impoundment of water.
   6. Excavation or other digging unless otherwise indicated.
   7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

1.6 QUALITY ASSURANCE

A. All work under this section will be subject to the inspection and approval of the Construction Manager.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other non-soil materials.

B. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements.
   1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet apart. High-visibility orange color, nonfading.
   2. Height of Fencing: 4 feet.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Protection Zones: Mulch areas inside protection zones and other areas indicated with 4-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

3.2 PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones in a manner that will prevent people from easily entering protected area except by entrance gates Protect and maintain erosion and sedimentation controls during earth moving operations.

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect.

C. Maintain protection-zone fencing and signage in good condition as acceptable to Landscape Architect and remove when construction operations are complete, and equipment has been removed from the site.

3.3 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving."

B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning

C. Do not allow exposed roots to dry out before placing permanent backfill.

3.4 ROOT PRUNING

A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
   1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
   2. Temporarily support and protect roots from damage until they are permanently covered with soil.
   3. Cover exposed roots with burlap and water regularly.
   4. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."

B. Root Pruning at Edge of Protection Zone: Prune roots by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.5 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
   1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
   2. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and the following:
   3. Cut branches with sharp pruning instruments; do not break or chop.
   4. Do not apply pruning paint to wounds.
   5. Prune tree in manner that results in a balanced and uniform appearance.

B. Chip removed branches and dispose of off-site.

3.6 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

C. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.7 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.8 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect.
   1. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
   2. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
   3. Perform repairs within 24 hours.
   4. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by District.

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 01 57 50 - EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. This WORK shall consist of temporary and permanent measures needed to control erosion and water pollution. These measures shall include, but not be limited to, berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, fiber rolls, silt fences, inlet protection, gravel bag check dams, construction entrances, hydroseeding, and other erosion control devices or methods. These measures shall be installed at the locations where needed to control erosion and water pollution during the construction of the PROJECT, and as directed by DISTRICT, and as shown on the DRAWINGS.

1.2 REFERENCES

A. Section 21, Erosion Control, of the Standard Specifications, latest edition, issued by California Department of Transportation (CSS), and other related sections.

B. Edition Greenbook, latest edition: Standard Specifications for Public Works Construction.

C. California Stormwater Quality Association (CASQA) "California Stormwater BMP Handbook" dated January 2011,

1.3 GENERAL

A. In compliance with the local, State and Federal regulations regarding storm water management during construction, the CONTRACTOR shall not allow any debris, waste materials or pollutants, originating from the CONTRACTOR’s operations, to enter the storm drainage system.

B. The Erosion Control Plan presented in the DRAWINGS serves as a minimum for the requirements of erosion control during construction. CONTRACTOR has the ultimate responsibility for providing adequate erosion control and water quality throughout the duration of the PROJECT. Therefore, if the provided plan is not working sufficiently to protect the PROJECT areas, then CONTRACTOR shall provide additional measures as required to obtain the required protection. CONTRACTOR shall include in the BID a minimum of all items shown on the Erosion Control Plan and any additional items that may be needed to control erosion and water pollution.

C. The Contractor shall train all employees and subcontractors concerning storm water pollution prevention requirements and shall ensure that they are aware of the consequences of non-compliance with these requirements. The Contractor shall include appropriate provisions in subcontracts to ensure that these requirements are met.

D. It is required that applicable construction site management guidelines contained in the "Blueprint for a Clean Bay", a guidance document distributed by the Bay Area Storm Water Management Agencies Association, be implemented as part of daily construction activities. Copies of this document are available on-line at

“https://www.cleancreeks.org/DocumentCenter/View/171/Blueprint-for-a-Clean-Bay-?bidId=”.

E. Temporary erosion control shall consist of, but not be limited to, constructing such facilities and taking such measures as are necessary to prevent, control, and abate water, mud, construction materials, hazardous materials and erosion damage to public and private property as a result of the Contractor’s operations.

F. Conformance with the requirements of this section shall in no way relieve the Contractor from the Contractor's responsibilities, as provided in CSS Section 13, "Water Pollution Control," and CSS Section 5-1.36, "Property and Facility Preservation," of the State Standard Specifications.

G. The CONTRACTOR shall be responsible throughout the duration of the construction period for installing and maintaining the applicable BMPs and for removing and legally disposing of temporary control measures, wastes and pollutants at an off-site location. The CONTRACTOR shall ensure all BMPs and temporary control measures required by the General Permit and the SWPPP are implemented by a Qualified SWPPP Practitioner (QSP) in accordance with the General Permit. Unless otherwise directed by the AGENCY or specified elsewhere in these specifications, the CONTRACTOR's responsibility for BMP implementation shall continue throughout any temporary suspension of work.

H. The CONTRACTOR is responsible for all treatment necessary to ensure water is disposed of in a legal manner.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Erosion Control Plan with recommended BMPs.

C. Construction schedule and Sequencing Plan for Erosion Control

D. At least 60 days before seed application, submit proof that the order for seed required for the Contract has been placed and accepted by the seed vendor. Include the seed's botanical names, quantity ordered, and the anticipated date of delivery.

E. Submit records for hydraulically applied erosion control materials that indicate (1) compliance with the specified application rates, (2) areas treated and quantity of materials applied, and (3) application date and time.

F. Submit seed labels. Seed labels must show: (1) Seed variety including botanical name and common name; (2) Lot number or other lot identification; (3) Origin; (4) Net weight; (5) Percent pure live seed; (6) Percent total viability; (7) Percent by weight inert matter; (8) Percent by weight other crop seed; (9) Percent by weight weed seed; (10) Name of restricted noxious weed seed by number per pound of seed; and (11) Name and address of the supplier or grower responsible for the analysis.

G. Plan for disposal of waste material.

H. All applicable permits for Erosion Control.

1.5 RESPONSIBILITIES, CONSEQUENCES, AND REMEDIES

A. Conformance with the provisions of this section shall not relieve the CONTRACTOR from the CONTRACTOR's responsibilities of the Contract Documents.

B. For purposes of this section, costs and liabilities include, but are not limited to, fines, penalties and damages, whether assessed against the DISTRICT or the CONTRACTOR, including those levied under the San Francisco Regional Water Quality Control Board, or other governing agencies.

C. If solid or liquid materials or waste, hazardous or otherwise, or pollutants originating from the CONTRACTOR's operation enter the storm drain system or water courses, the CONTRACTOR will be required to thoroughly clean up the affected storm drain facilities and water courses to the satisfaction of the DISTRICT. If the CONTRACTOR fails to clean up the affected facilities as

required, the DISTRICT will issue a stop-work order and take necessary actions to ensure the cleanup of the affected facilities.

1.6 QUALITY ASSURANCE

A. All work under this section will be subject to the inspection and approval of the DISTRICT'S Construction Manager.

B. Seed must be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts or by a seed technologist certified by the Society of Commercial Seed Technologists. Tests must be performed within 12 months before application.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials shall be submitted for approval prior to installation.

B. Materials may include hay bales, straw, fiber mats, fiber netting, wood cellulose, fiber fabric, gravel, and other suitable materials, and shall be reasonably clean, free of deleterious materials, and certified weed free.

C. Water must be of a quality that promotes germination of seeds and growth of plants.

D. Fiber must:
1. Disperse into a uniform slurry when mixed with water.
2. Contain 3/8-inch fiber strands for at least 25 percent by total volume.
3. Have at least 40 percent retained when passed through a no. 25 sieve.
4. Have an initial moisture content of no more than 15 percent of its dry weight when tested under California Test 226. The moisture content must be marked on the packaging.
5. Have a water holding capacity, by weight, of at least 1,200 percent when tested under ASTM D7367.
6. Be nontoxic to plants and animal life.
7. Be free of synthetic or plastic materials, lead paint, printing ink, varnish, petroleum products, seed germination inhibitors, and chlorine bleach.
8. Contain less than 250 ppm of boron.
9. Be colored to contrast with the area where it is to be applied. The coloring agent must be biodegradable, nontoxic, and free from copper, mercury, and arsenic, and must not stain concrete or painted surfaces.

E. Seed must not contain:
1. Prohibited noxious weed seed
2. More than 1.0 percent total weed seed by weight

F. Seed with a germination rate lower than the minimum rate shown may be used if authorized.

G. Deliver seed to the job site in unopened, separate containers with the seed tag attached.

H. Measure individual seed species and mix in the presence of the DISTRICT.

I. Straw must be stalks from wheat, rice, or barley furnished in air-dry condition with a consistency compatible for application with commercial straw-blowing equipment. Wheat and barley straw must be derived from irrigated crops.

J. Straw must be free of plastic, glass, metal, rocks, and refuse or other deleterious material.

K. Straw must not have been used for stable bedding.

L. Rolled Erosion Control Product:

1. RECP must be a long-term, degradable, open-weave textile manufactured or fabricated into rolls designed to reduce soil erosion and assist in the growth, establishment, and protection of vegetation. RECP must conform to the classification system established by the ECTC.
2. Deliver RECP in suitable wrapping to protect against moisture and extended ultraviolet exposure occurring before placement.
3. Jute mesh must be ECTC Type 3B made of unbleached and undyed woven jute. Jute mesh must comply with the requirements shown in the following table:

Jute Mesh

Quality characteristic	Test method	Requirement
Strands per foot (min, in each direction)	--	14–20
Roll width (min, inches)	--	48
USLE C-Factor for a 1.5:1 (H:V) unvegetated slope	--	≤ 0.25
Shear stress (max, psf)	ASTM D6460	2.0
Tensile strength (min, psf)	ASTM D5035	100
Functional longevity (months)	--	12
Average open area (%)	--	65 ± 5
Weight of fabric (min, oz/sq yd)	ASTM D3776	14.4–19.2

4. Netting must be ECTC Type 4 and made of 100 percent coconut fiber woven into a matrix. Netting must comply with the requirements shown in the following table:

Netting

Quality characteristic	Test method	Requirement		
		Type A	Type B	Type C
Thickness (min, inch)	ASTM D6525	0.30		
Roll width (min, inches)	--	72–158		
USLE C-Factor for a 1:1 (H:V) unvegetated slope	--	≤ 0.25		
Shear stress (max, psf)	ASTM D6460	2.25	4.4	4.6
Tensile strength (min, psf)	ASTM D5035	125		
Functional longevity (months)		36		
Average open area (%)		63 ± 5	48 ± 5	38 ± 5
Weight of fabric (min, oz/sq yd)	ASTM D3776	11.8	20	26

M. Erosion Control Blanket_must be ECTC Type 2D and made of processed natural fibers that are mechanically, structurally, or chemically bound together to form a continuous matrix that is surrounded by 2 natural nets. Erosion control blanket must comply with the requirements shown in the following table:

Erosion Control Blanket

Quality characteristic	Test method	Requirement		
		Type A	Type B	Type C
Roll width (min, inches)	--	72		
Matrix (%) Straw/coconut Woven coir (coconut fiber) Wood excelsior (6 inches or longer)	--	 70/30 -- --	 -- 100 --	 -- -- 80
USLE C-Factor for a 1:1 (H:V) unvegetated slope	--	≤ 0.20		
Shear stress (max, psf)	ASTM D6460	1.75		
Tensile strength (min, psf)	ASTM D5035	75		
Functional longevity (months)	--	12		

N. Fiber roll must be a premanufactured roll filled with rice or wheat straw, wood excelsior, or coconut fiber. Fiber roll must be covered with biodegradable jute, sisal, or coir fiber netting secured tightly at each end and must be one of the following:
1. 8 to 10 inches in diameter and at least 1.1 lb/ft
2. 10 to 12 inches in diameter and at least 3 lb/ft

O. Fiber roll must have a minimum functional longevity of 1 year.

P. Wood stakes must be untreated fir, redwood, cedar, or pine and cut from sound timber. The ends must be pointed for driving into the ground. Notched stakes must be at least 1 by 2 by 24 inches in size. Stakes without notches must be at least 1 by 1 by 24 inches.

Q. Metal stakes must be at least 1/2 inch in diameter and have tops bent at 90-degree angles or capped with an orange or red plastic safety cap that fits snugly onto the metal stake.

R. Steel staples must be a minimum of 11-gauge, 6-inch, U-shaped staples with a 1-inch crown. Provide heavier gauge and greater length if required by the job site conditions. You may use an alternative attachment device such as a 100 percent biodegradable fastener to install RECP instead of staples.

S. Rope to fasten fiber rolls must be 1/4 inch in diameter and biodegradable, such as sisal or manila.

PART 3 - EXECUTION

3.1 GENERAL

A. During all phases of construction, the CONTRACTOR shall perform the work in a manner which will minimize soil erosion and prevent water pollution from site runoff by utilizing the following:
1. Proper scheduling of work and careful construction practices.
2. Grading disturbed surfaces to provide positive drainage and prevent ponding of water.
3. Installing desilting basins, gravel bag dikes, silt fences and other erosion control measures to prevent sediment escape from the construction site and to maintain runoff quality.

B. DISTRICT will monitor CONTRACTOR’s erosion control and WORK methods. If the overall function and intent of erosion control is not being met, DISTRICT will require CONTRACTOR to provide additional measures as required to obtain the desired results.

C. The erosion control features installed by CONTRACTOR shall be adequately maintained by CONTRACTOR until the PROJECT is accepted.

3.2 CONSTRUCTION - GENERAL

A. Stabilization of Disturbed Areas:
1. Temporary sediment control measures shall be established within five (5) days from time of exposure/disturbance.
2. Permanent erosion protection measures shall be established within five (5) days after final grading of areas.

B. Stabilization of Sediment and Erosion Control Measures:
1. Sediment barriers, perimeter dikes, and other measures intended to either trap sediment or prevent runoff from flowing over disturbed areas shall be constructed as a first step in grading and be made functional before land disturbance takes place.
2. Earthen structures such as dams, dikes, and diversions shall be stabilized within five (5) days of installation.
3. Stormwater outlets shall also be stabilized prior to any upstream land disturbing activities.

C. Storm Sewer Inlet Protection: All storm sewer inlets which are made operable during construction or which drain stormwater runoff from a construction site shall be protected from sediment deposition.

D. Construction Access Routes:
1. Wherever construction vehicles enter or leave the construction site, a Stabilized Construction Entrance is required.
2. Where sediment is transported onto a paved road or pathway surface, the roads/paths shall be cleaned thoroughly at the end of each day.
3. Sediment shall be removed from roads/paths by shoveling or sweeping and be transported to a sediment controlled disposal area.
4. Street washing shall be allowed only after sediment is removed in this manner.

E. Water Usage
1. The CONTRACTOR shall use the least amount of water necessary for dust control and street sweeping operations.
2. The CONTRACTOR shall not use water to flush dust and debris down the street in place of street sweeping

F. The CONTRACTOR shall maximize the control of erosion and sediment by using the Best Management Practices for erosion and sedimentation control described in the California Stormwater Quality Association (CASQA) Stormwater Best Management Practice Handbook or ABAG Manual of Standards for Erosion and Sediment Control Measures.

3.1 HYDROSEED

A. General: Once grading operations are complete, apply Hydroseed to all disturbed areas of soil within the grading limits, as directed by the DISTRICT.

B. Apply hydroseed with hydraulic spray equipment that mixes fiber, tackifier, fertilizer, and other erosion control materials specified. Seed may be dry applied to small areas not accessible by hydroseeding equipment if authorized by DISTRICT in advance.

C. Add water to hydroseed materials as recommended by the manufacturer and mix sufficiently to ensure an even application. A dispersing agent may be added to the mixture if authorized.

D. Equipment must have a built-in continuous agitation and discharge system capable of producing a homogeneous mixture and a uniform application rate. The tank must have a minimum capacity of 1,000 gallons. You may use a smaller tank if authorized in advance by the DISTRICT.

E. Apply materials in locations, rates, and number of applications shown and as follows:
1. Start application within 60 minutes after adding seed to the tank.
2. Apply in successive passes as necessary to achieve the specified application rate.
3. Apply all hydromulch or hydroseed materials shown for a single area within 72 hours.

F. If hydroseed materials are applied to areas covered by RECP, apply hydroseed materials to the rolled product as follows:
1. Verify the RECP is in uniform contact with the slope surface.
2. Spray materials into the RECP perpendicular to the slope and integrate well.
3. Do not displace or damage the RECP.

G. After the final application, do not allow pedestrians or equipment on the treated areas.

3.2 ROLLED EROSION CONTROL PRODUCT

A. Before placing RECP, ensure the subgrade has been graded smooth and has no depressed voids. The subgrade must be free from obstructions, such as tree roots, projecting stones, or foreign matter greater than 1 inch in diameter.

B. Fasten RECP to the surface with staples and anchor as shown.

C. Do not drive vehicles on RECP.

3.3 FIBER ROLL

A. Before installing fiber roll remove obstructions from the ground, including rocks, clods, and debris greater than 1 inch in diameter.

B. Install fiber roll approximately parallel to the slope contour. For any 20-foot section of fiber roll, prevent the fiber roll from varying more than 5 percent from level. Install fiber roll on slopes at the following spacing unless shown otherwise:
1. 10 feet apart for slopes steeper than 2:1 (horizontal:vertical)
2. 15 feet apart for slopes from 2:1 to 4:1 (horizontal:vertical)
3. 20 feet apart for slopes from 4:1 to 10:1 (horizontal:vertical)
4. 50 feet apart for slopes flatter than 10:1 (horizontal:vertical)

C. Type 1 fiber roll installation consists of placing and fastening as follows:
1. Place in a furrow that is from 2 to 4 inches deep.
2. Fasten with wood stakes every 4 feet along the length of the fiber roll.
3. Fasten the ends of the fiber roll by placing a stake 6 inches from the end of the roll.
4. Drive the stakes into the soil so the top of the stake is less than 2 inches above the top of the fiber roll.

D. Type 2 fiber roll installation consists of placing and fastening as follows:
1. Fasten with notched wood stakes and rope.
2. Drive stakes into the soil until the notch is even with the top of the fiber roll.
3. Lace the rope between stakes and over the fiber roll. Knot the rope at each stake.

4. Tighten the fiber roll to the surface of the slope by driving the stakes further into the soil.

E. If soil conditions do not allow driving stakes into the soil, drill pilot holes to facilitate driving of the stakes.

F. Maintain fiber roll in a way that provides sediment holding capacity and reduces runoff velocities as follows:
1. Remove sediment from behind the fiber roll if sediment is 1/3 of fiber roll height above ground.
2. Repair or adjust the fiber roll if rills or other evidence of concentrated runoff occur beneath the fiber roll.
3. Repair or replace the fiber roll if they become split, torn, or unraveled.
4. Add stakes if the fiber roll slumps or sags.
5. Replace broken or split wood stakes.
6. Remove sediment deposits, trash, and debris from fiber roll as needed. If removed sediment is deposited within project limits, it must be stabilized and not exposed to erosion by wind or water.

3.4 BMP MAINTENANCE

A. To ensure proper implementation and effectiveness of the BMPs, the CONTRACTOR shall regularly inspect, maintain, repair and/or replace the deployed BMPs throughout the construction site. The CONTRACTOR shall identify corrective actions and the time needed to address any deficient BMPs or reinitiate any BMPs that have been discontinued. The CONTRACTOR shall keep written records of all BMP inspections, maintenance and corrective actions.

B. The frequency of the BMP inspection shall be as follows:
1. Prior to a forecast storm
2. After any precipitation that causes runoff
3. At 24-hour intervals during extended rain events
4. Routinely, at a minimum of once every week.

C. If the CONTRACTOR or the DISTRICT identifies a deficiency in the deployment or functioning of a BMP, the deficiency shall be corrected immediately. If requested by the CONTRACTOR and approved by the DISTRICT in writing, the deficiency may be corrected at a later time or date but the corrective action shall not be later than the onset of the subsequent rain event. The correction of deficient BMPs shall be at no additional cost to the DISTRICT.

3.5 DISPOSITION OF TEMPORARY MEASURES

A. All temporary erosion and sediment control measures shall be disposed of within thirty (30) days after final site stabilization is achieved or after the temporary measures are no longer needed as determined by DISTRICT.

B. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion.

END OF SECTION

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Installation of the Work.
   2. Cutting and patching.
   3. Coordination of Owner-installed products.
   4. Progress cleaning.
   5. Starting and adjusting.
   6. Protection of installed construction.

1.2 INFORMATIONAL SUBMITTALS

A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.3 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
   1. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
   2. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.
   3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Landscape Architect's opinion, reduce the aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Landscape Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
   2. Furnish location data for work related to verification of connection points for utilities and/or storm drain connections to District's project manager prior to starting trench work.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Construction Manager.

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Make vertical work plumb and make horizontal work level.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
   4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
   5. Proceed with patching after construction operations requiring cutting are complete.

G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 02 41 00 – DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. Demolition, dismantling and cutting of existing building and site improvements as indicated, specified, and necessary for the completion of the Contract.
2. Capping active utilities.
3. Removing inactive utilities.
4. Site clearing.
5. Protective measures.
6. Removing demolished materials from the site.

B. Related requirements:

1. Division 31 for site clearing.

1.2 REGULATORY REQUIREMENTS:

A. No burning shall be allowed.
B. Do not use explosives.
C. Comply with the following California Code of Regulations:

1. Title 8: CAL/OSHA, Chapter, Subchapter 4 – Construction Safety Orders.
2. Title 24: Part 2, California Building Code, Chapter 33, Protection of Pedestrian during Construction or Demolition.
3. Bay Area Air Quality Management District.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

A. Waste management Plan: See Section 01 74 19 Construction Waste Management and Disposal.
B. Record documents: At completion of this work, submit record documents showing the actual, dimensioned locations of capped utilities referenced to permanent features surrounding the site.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Backfill excavations resulting from demolition operations with on-site or import materials conforming to structural backfill defined in Section 31 23 33 Utility Trenching and Backfill.

PART 3 - EXECUTION

3.1 GENERAL

A. Protection: Do not begin demolition until temporary barricades, warning signs and other forms of protection are installed.

1. Protect trees, plants, utilities and existing improvements, not to be removed, from injury or damage resulting from the Contractor's operation. Replace damaged improvements and utilities in kind at no cost to the Owner.
2. Provide all safeguards, including warning signs and lights, barricades, and the like, for protection of the public, Contractor's employees and adjacent property during demolition.

B. Noise control: Exercise caution and care to prevent generation of unnecessary noise. Keep noise levels to the minimum possible.
C. Dust control: Control dust by frequent sprinkling with water or other methods acceptable to the Architect. Assume liability for all claims related to flying dust.
D. Water control: Control the use of water to prevent damage to the existing facilities and site improvements to remain.
E. Drainage: Prevent debris from blocking items including, but not limited to, surface drainage inlets and systems, which must remain in operation.

3.2 PREPARATION

A. Mark location of utilities.
B. Shut-off, disconnect, cap-off and seal plumbing, mechanical, and electrical services, in accordance with the requirements of the authorities having jurisdiction, before starting deconstruction. Place markers to indicate location of disconnected services. Identify service lines and capping on record drawings.
C. Clearly mark location of salvaged material’s storage areas and provide and erect barriers and security devices as required.

3.3 EXISTING CONDITIONS

A. Intent of Drawings and other reference documents is to show existing conditions with information developed from field surveys and to generally show the extent and type of demolition required.
B. Make a detailed survey of existing conditions prior to commencing demolition, and report discrepancies or conflicts between Drawings and actual conditions in writing to the Architect for clarifications and instructions.
C. Do not proceed where such conflicts or discrepancies occur prior to receipt of Architect's instructions.

3.4 SALVAGED IMPROVEMENTS

A. Salvaged Improvements: Carefully remove items indicated to be salvaged and store where indicated on plans or where designated by the District. Avoid damaging materials designated for salvage.

3.5 DEMOLITION

A. Perform demolition in a systematic manner. Use such methods as required to complete work in compliance with governing regulations.

B. Where applicable, such as in public right-of-way, remove existing construction only to the extent indicated or necessary for installation of new construction and junction with existing materials.
C. Cut back finished surfaces to straight, plumb or level lines as required.

3.6 PATCHING

A. Patch materials to remain when damaged by demolition at no cost to the Owner.
B. Finish material and appearance of the patch or repair shall match the existing contiguous materials and finishes in all respects, as approved by the Architect.

3.7 TITLE TO MATERIALS

A. Except where indicated or specified otherwise, materials and equipment removed shall become the property of the Contractor and shall be removed from the site.
B. The Owner will not be responsible for the condition or loss of, or damage to, such property after Notice to Proceed.
C. Material and equipment shall not be viewed by prospective purchasers or sold on the site.

3.8 CLEAN-UP/DISPOSAL

A. Debris, waste, and removed materials are Contractor's property for legal disposal off the site.
B. Continuously clean-up and remove these items and do not allow to accumulate on or adjacent to the site. Refer to Section 01 74 00 for additional requirements on this subject.

END OF SECTION

SECTION 02 82 00
ASBESTOS ABATEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The General Conditions and Division I General Requirements shall be included in and made part of this Section.

B. Examine all project drawings and documents including other Sections of the Specifications for requirements therein affecting the work of this Section of the Specifications.

1.2 COMPLIANCE AND INTENT

A. The Contractor is responsible for repair, to the satisfaction of the District, of surfaces not scheduled for abatement or demolition that become damaged as a result of the work.

B. Contractor shall coordinate removal with all site requirements related to protection of existing site buildings and utilities. Water and encapsulants used during abatement work must not migrate beyond established regulated work area barriers. Additional precautions must be followed when working adjacent to existing structures.

C. This project deals with abatement of asbestos-containing materials (ACMs) and materials with asbestos content associated with the Public Safety (PS) Buildings and Honors Trailer demolition. It is necessary for the Contractor to coordinate all abatement work with the project drawings and specifications. During all work, provide monitoring and worker protective equipment in accordance with the California Occupational Safety and Health Administration (Cal-OSHA) and as required by this specification. Where there is conflict, the most stringent requirement shall apply.

D. The work covered by this specification includes the handling, removal, and proper disposal of ACMs and materials with asbestos content. All hazardous materials shall be removed and disposed of according to all federal, state, and local regulations. The Contractor shall determine if additional hazardous materials will be impacted by the scope of the abatement work. The cleanup of any incidental asbestos found in areas undergoing abatement of asbestos that become separated from the buildings during the dismantling process are part of the work.

E. The abatement workers shall have received Cal-OSHA and Asbestos Hazard Emergency Response Act (AHERA) accredited training and be certified for asbestos abatement work.

F. Any work that is likely to disturb ACMs remaining in the buildings must be completed by workers trained at minimum for Class II Asbestos Work.

G. Furnish all labor, materials, facilities, equipment, services, employee training, medical monitoring, permits and agreements necessary to perform the work required for asbestos abatement in accordance with this specification.

H. Comply with all federal, state, and local regulations pertaining to asbestos removal, storage, transportation and disposal; employee health and safety; Contractor certifications; and all licenses, permits, and training.

I. Work on the premises shall be confined to areas designated in the Project Documents. Materials and equipment shall be stored within areas designated by the District. Should additional space be required, the Contractor shall request permission for additional space.

J. Perform all work specified herein with competent persons trained, knowledgeable, and qualified in state-of-the-art techniques relating to asbestos abatement, handling, and the subsequent cleaning of contaminated areas.

K. During removal activities, the Contractor shall protect against contamination of soil, water, plant life, sensitive building finishes, and adjacent building areas. Contractor shall ensure that there is no airborne release of asbestos fibers or visible dusts. The District may collect air samples in the buildings and in adjacent areas to evaluate the Contractor's performance. Evidence of airborne levels of contaminants above background will require the implementation of additional controls.

L. It is the Contractor's responsibility to determine the quantities of ACMs that will require removal prior to commencement of the project. The Contractor shall conduct a site visit to determine exact locations of materials that will require abatement. This section provides appropriate protocols for handling and disposal of ACMs and materials with asbestos content. All ACMs and materials with asbestos content shall be removed according to the requirements outlined in this specification. If additional suspect ACMs are discovered during the abatement work, immediately notify the District and the consultant.

M. The work of this section shall be performed by an entity that holds a current, valid C-22 license issued by the California Contractor's State License Board (CSLB) and a current valid Certificate of Registration for Asbestos-Related Work issued by the California Department of Industrial Relations-Division of Occupational Safety and Health (Cal-OSHA), unless other specified. Display copies of CSLB license and Cal-OSHA Registration in a visible place at the job-site.

N. ACMs and materials with asbestos content removed during the abatement activities shall be disposed of in an approved manner complying with all applicable federal, state, and local regulations. Appropriate waste manifests or letters of salvage shall be furnished to the District thereby limiting the District's liability for improperly salvaged items. Materials are conveyed to the Contractor "as is," without any warranty, expressed or implied, including but not limited to, any warranty to marketability or fitness for a particular purpose, or any purpose. The District or the District's Environmental Consultant shall approve the hazardous waste disposal site(s) prior to disposal for materials that may be disposed of in that manner.

O. All interior and exterior asbestos abatement work shall be conducted using a negative pressure enclosure and three stage decontamination unit unless otherwise specified. The removal of any other exterior ACMs by mechanical methods or aggressive methods that render the material friable must be removed in a negative-pressure enclosure. Evidence of the release of asbestos above the background level will necessitate additional controls including but not limited to an enclosure.

1.3 DEFINITIONS

The following definitions pertain to work of this section.

1. Abatement: Process of controlling fiber release from ACMs including encapsulation, enclosure, controlled renovation procedures, removal, clean-up and disposal.
2. ACM: Asbestos-containing material
3. Aggressive Sampling: Air sampling either during or following the agitation of the air.
4. AHERA: Asbestos Hazard Emergency Response Act (40 CFR Part 763).
5. Airlock: A system for permitting ingress and egress with minimum air movement between a contaminated area and uncontaminated areas. Typically consists of two curtained or gasketed doorways separated by a distance of at least six feet such that one passes through one doorway into the airlock, allowing the doorway to close off the opening. This airlock must be maintained in uncontaminated condition at all times.
6. Ambient Air Quality: The quality of air (in terms of airborne fiber content) that is present in a given space.
7. Area Monitoring: Sampling of airborne asbestos fiber concentrations within the work area and outside the work area. Sampling shall represent airborne concentrations that may reach the breathing zone.
8. Asbestos Fibers: Refers to asbestos fibers having an aspect ratio of 3:1, and those fibers longer than five (5) microns.
9. Asbestos Permissible Exposure Limit (PEL): A level of airborne fibers specified by OSHA as an occupational exposure standard for asbestos. This level represents the 8-hour time-

weighted average of 0.1 fibers per cubic centimeter of air as measured by Phase Contrast Microscopy (PCM) analytical method.

10. Asbestos-Containing Material (ACM): Those manufactured products and construction materials including structural and mechanical building materials, as well as packings and gaskets that contain more than one percent (1.0%) asbestos by weight.
11. Asbestos: Asbestos includes asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite-gunerite (amosite), anthophylite, tremolite, and actinolite. For the purposes of determining worker respiratory protection, both the asbestiform and non-asbestiform of the above minerals, and any chemically treated or altered materials shall be considered as asbestos.
12. Authorized Visitor: Designated employees or consultants for the District and representatives of any federal, state or local regulatory or other agency having jurisdiction over the project.
13. Baseline: Refers to the background levels of asbestos monitored before abatement.
14. Breathing Zone: A hemisphere forward of the shoulders and head with a radius of approximately six to nine inches.
15. Breach: A rift or gap in the critical or secondary barriers that allow egress of air from the containment to outside, or vice versa.
16. Bridging Encapsulant: An encapsulant that forms a discrete layer on the surface of an in-situ asbestos matrix.
17. Cal-OSHA: State of California, Department of Occupational Safety and Health (DOSH).
18. Chain-of-Custody: A legal concept involving documentation of the physical possession of a sample(s) from the moment it is collected, transported, analyzed, and ultimately stored in an archive.
19. Change Rooms: Refers to the two chambers in the decontamination area used to change into and out of protective clothing.
20. Certified Industrial Hygienist (CIH): A person certified by the American Board of Industrial Hygiene.
21. Clean Room: An uncontaminated area or room that is part of the worker decontamination enclosure system, with provisions for storage of workers' street clothes and protective equipment.
22. Clearance Level: Clearance level for samples analyzed by PCM will be less than 0.01 fibers per cubic centimeter of air and for TEM will be less than 70 structures per square millimeter (<70 s/mm2). Samples may be collected by aggressive or non-aggressive sampling methods and the minimum air volume shall be 1,200 liters.
23. Competent Person: One who is capable of identifying existing and predictable hazards and who has the authority to take prompt corrective measures to eliminate them.
24. Critical Barrier: A unit of temporary construction that provides the only separation between asbestos work area and an adjacent potential occupied space. This includes the decontamination unit, perimeter walls, ceilings, penetrations and any temporary critical barriers between the work area and the uncontaminated environment.
25. CSLB: Contractors State Licensing Board
26. Decontamination Area: Area which is constructed to provide the means for workers to store clothing, equipment and other articles, and to properly remove contamination upon concluding work activities that result in exposure to these hazardous materials.
27. DOP: Dioctylphthalate, the challenge aerosol used to perform on-site leak testing of HEPA filtration equipment.
28. DOT: Federal Department of Transportation.
29. DOSH: Division of Occupational Safety & Health (see also Cal-OSHA)
30. Decontamination Unit: Refers to system of airlocks used to decontaminate personnel, waste bags, equipment, etc. when exiting the work area. A decontamination unit shall be set up for each containment area.
31. Demolition: The wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of any facility.
32. Disposal Bag: Minimum six (6) mil thick leak-tight plastic bags used for transporting asbestos waste from a work area to disposal or shipping container. Each disposal bag must have

required labels according to Title 8 CCR 1529 (Cal-OSHA asbestos rule), 5194 (HAZCOM). RACM waste must be additionally labeled according to 49 CFR 171-179 (USDOT), and 40 CFR 61 Subpart M (NESHAP). Hazardous waste disposal bags must be labeled with generator's name, address, site location, generator number, and the following information:

CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST
RQ WASTE ASBESTOS, 9 NA 2212 PG III
(Class 9 placard)
HAZARDOUS WASTE
STATE AND FEDERAL LAW
PROHIBITS IMPROPER DISPOSAL
IF FOUND, CONTACT THE NEAREST
POLICE OR PUBLIC SAFETY
AUTHORITY OR THE CALIFORNIA
DEPARTMENT OF TOXIC SUBSTANCES CONTROL

33. District: Contra Costa Community College District.
34. Encapsulant: A liquid material that can be applied to ACMs that controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging) or by penetrating into the material and binding its components together (penetrating encapsulant).
35. Encapsulation: A specified procedure necessary to coat ACMs or asbestos contaminated surfaces with an encapsulant to control the possible release of asbestos fibers into the ambient air.
36. Enclosure: The construction of an airtight, impermeable, permanent barrier surrounding the ACM to prevent the release of asbestos fibers into the air.
37. Environmental Consultant: CIH, Certified Asbestos Consultant (CAC), and/or Certified Site Surveillance Technician (CSST) retained by the District.
38. Equipment Decontamination Enclosure System: A decontamination enclosure system for materials and equipment, typically in a designated area of the work area, and including a washroom, a holding area, and an uncontaminated area.
39. Equipment Room: A contaminated area or room that is part of the worker decontamination enclosure system, with provisions for storage of contaminated clothing and equipment. The equipment room shall be kept clean from asbestos-containing debris at all times.
40. Excursion Limit: A California Code of Regulations (Title 8 CCR 1529) requirement that ensures no employee exposed to airborne concentrations of asbestos in excess of 1.0 fibers per cubic centimeter of air as averaged over a sampling period of thirty (30) minutes.
41. Filter: A media component used in respirators to remove solid or liquid particles from the inspired air.
42. Fixed Object: A unit of equipment or furniture in the work area that cannot be removed from the work area.
43. Friable Asbestos-Containing Material: Material that contains more than 1.0% asbestos by weight, and that can be crumbled, pulverized or reduced to powder by hand pressure when dry.
44. Foreman: An individual who typically fulfills the duties of "competent person" as defined by Title 8 CCR 1529. This individual must supply documentation of a passing grade in a Cal-OSHA accredited course in Asbestos Contractor/Supervisor training. The foreman must be on-site during all abatement work.
45. Glove Bag: A polyethylene bag with two inward projecting long sleeve gloves, designed to enclose an object from which an ACM is to be removed. Bags shall be seamless at the bottom, have a minimum thickness of 6 mils, and shall be labeled appropriately.

46. Glove Bag Technique: A method for removing ACM from heating, ventilation and air conditioning (HVAC) ducts, piping runs, valves, joints, elbows, and other non-planar surfaces. The glove bag is constructed and installed in such a manner that it surrounds the object or material to be removed and contains all asbestos fibers released during the process. Secondary containment shall be provided for all glove bag work unless otherwise noted.
47. Gross or Full Abatement: Designated rooms, spaces, or areas of the project that have been totally sealed, contained in polyethylene, equipped with decontamination enclosure systems, and placed under negative pressure.
48. HEPA: High Efficiency Particulate Air filter capable of filtering out airborne particulate 0.3 microns or greater in diameter at 99.97 percent efficiency.
49. Manifest: The document authorized by both Federal and State authorities for tracking the movement of ACMs.
50. Movable Object: A unit of equipment or furniture in the work area that can be removed from the work area.
51. Negative Pressure Respirator: A respirator in which the air pressure inside the respiratory inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere, and negative during inhalation in relation to the air pressure of the outside atmosphere.
52. Negative Pressure: Air pressure lower than surrounding areas, generally caused by exhausting air from a sealed space (work area).
53. NESHAP: National Emission Standard for Hazardous Air Pollutants – EPA Regulation 40 CFR Subpart M, Part 61.
54. NIOSH: National Institute for Occupational Safety and Health: Sets test standards, analytical methods, and certifies performance of various respirator designs (research institute within Federal OSHA).
55. NIST: National Institute of Standards and Technology: Administers the NVLAP Program.
56. NOA – Naturally Occurring Asbestos. Found in soil, fill and concrete.
57. NVLAP: National Voluntary Laboratory Accreditation Program – evaluates and certifies laboratories doing PLM and TEM analyses.
58. Passive Sampling: Refers to air sampling with no air agitation.
59. Permissible Exposure Limits (PEL): A level of airborne fibers specified by OSHA as an occupational exposure standard for asbestos. This level represents the 8-hour time-weighted average of 0.1 fibers per cubic centimeter of air and 30-minute excursion limit of 1.0 fibers per cubic centimeter of air as measured by Phase Contrast Microscopy (PCM) analytical method.
60. Phase Contrast Microscopy (PCM): Technique using a light microscope equipped to provide enhanced contrast between the fibers and the background. Filters are cleared with a chemical solution and viewed through the microscope at a magnification of approximately 400X. This method does not distinguish between fiber types and only counts those fibers longer than 5 microns and wider than approximately 0.25 microns. Because of these limitations, fiber counts by PCM typically provide only an index of the total concentration of airborne asbestos in the environment monitored.
61. Polarized Light Microscopy (PLM): An optical microscope technique used to identify asbestos content and distinguish between different types of asbestos fibers by their shape and unique optical properties.
62. Powered Air Purifying Respirator (PAPR): A full facepiece respirator that has the breathing air powered to the wearer after it has been purified through a filter.
63. Protection Factor: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.
64. Remodel: Replacement or improvement of an existing building or potion thereof where exposure to airborne asbestos may result. Remodel includes, but is not limited to, installation of materials, demolition, cutting, patching, and removal of building materials.
65. Respirator: A device designed to protect the wearer from the inhalation of harmful atmospheres.

66. Shower Room: A room between the clean room and the equipment room in the work decontamination enclosure system. This room contains hot and cold or warm running water and soap suitably arranged for complete showering during decontamination. The shower room comprises an airlock between contaminated and clean areas.
67. Surfactant: A chemical wetting agent added to water to improve penetration, this reducing the quantity of water required for a given operation or area.
68. Transmission Electron Microscopy (TEM): Asbestos structure analysis for a specified volume of air. TEM is a technique that focuses an electron beam onto a thin sample. As the beams transmits through certain areas of the sample, an image resulting from varying densities of the sample is projected onto a fluorescent screen. TEM is the state-of-the-art analytical method for identifying asbestos fibers collected in air samples in non-industrial settings. TEM microscopes equipped with selected area electron diffraction (SAED) capabilities also can provide information on the crystal structure of an individual particle.
69. TSI – Thermal Systems Insulation
70. Visible Emissions: Any emission containing particulate material that is visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.
71. Visual Inspection: A visual inspection by Environmental Consultant, of the work area under adequate lighting to ensure that the work area is free of visible PCB material, debris, and dust.
72. Washroom: A room between the work area and the holding area in the equipment decontamination enclosure system equipped with water for decontamination of equipment and sealed waste containers. The washroom or shower room comprises one airlock.
73. Water Filtration: Refers to water filtration to as small a particulate size as technically feasible, but not more than 5 microns.
74. Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, HEPA vacuuming, or other cleaning utensils dampened with amended water and afterward thoroughly decontaminated or disposed of as asbestos contaminated waste.
75. Work Area: The area where asbestos removal is performed and that is defined or isolated to prevent the spread of asbestos fibers, dust or debris, and entry by unauthorized personnel. Work area is a regulated area as defined by Title 8 CCR 1529.

1.4 SCOPE OF WORK

A. Provide the removal of ACMs and materials with asbestos content as specified in this section. Reference all other sections of the Specifications and other sections included in the contract documents for information and requirements that affect the work of this Section.

B. All workers that contact ACM shall be trained at minimum in accordance with Title 8 CCR 1529 for Class IV Work. Workers that will perform work that may disturb remaining ACMs shall be trained in accordance with Title 8 CCR 1529 for Class III Work. Construction work that will create debris during removal of architectural components or attachments to existing finishes with ACM is considered Class III work. Any limited abatement required to complete required construction must be coordinated with the construction documents.

C. Table 1 attached provide estimated quantities of ACMs and materials with asbestos content requiring removal. The Contractor is responsible for field verifying quantities of these materials and difficulty in abating the same. Coordination and defined areas of abatement is required where ACMs and materials with asbestos content will remain.

D. The following materials can be disposed of as Category I Non-friable ACMs if they are not rendered friable during removal: PS Building: parapet cap sealant and black floor mastic.

E. The following materials can be disposed of as Category II Non-friable ACMs if they are not rendered friable during removal: PS Building: HVAC ducting sealant, sink undercoat, Honors Trailer: building caulking at wood joints and grey sealant.

F. Note some asbestos containing materials are associated with lead containing materials and/or paint. Coordinate removal and disposal with Section 02 87 00 – Lead-Containing Paint Removal and Lead-Related Construction.

G. Some wall systems may have multiple layers or backer material. Removal that requires abatement shall include all layers to the building wall or ceiling framing as applicable.

1.5 REFERENCES

The publications listed below form a part of this specification by reference. The publications are referred to in the text by basic designation only. If there is a conflict between any of the listed regulations or standards, then the most stringent or restrictive shall apply.

A. American National Standards Institute (ANSI) and American Society for Testing and Materials (ASTM)

1. ANSI Z9.2, 1979 (R 1991), Fundamentals Governing the Design and Operation of Local Exhaust Systems
2. ANSI Z87.1, 2003, Occupational and Educational Eye and Face Protection
3. ANSI Z88.2 1992, Respiratory Protection
4. ANSI Z89.1, 1986, Requirements for Protective Headgear for Industrial Workers
5. ANSI Z41, 1999, Personal Protection – Protective Footwear
6. ANSI Z88.6, 1984, Respiratory Protection – Respiratory Use Physical Qualifications for Personnel
7. ASTM C 732, 1982 (R 1987) Aging Effects of Artificial Weathering on Latex Sealants
8. ASTM D 522, 1993 (Rev. A) Mandrel Bend Test of Attached Organic Coatings
9. ASTM D 1331, Solutions of Surface-Active Agents
10. ASTM D 2794, 1993 Resistance of Coatings to the Effects of Rapid Deformation (Impact)
11. ASTM E 84, 1991 (Rev. A) Surface Burning Characteristics of Building Materials
12. ASTM E 96, 1994 Water Vapor Transmission of Materials
13. ASTM E 119, 1988 Fire Tests of Building Construction and Materials
14. ASTM E 736, 1992 Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
15. ASTM E849, 1986 Safety and Health Requirement Relating to Occupational Exposure to Asbestos
16. ASTM E 1368, 1990 Visual Inspection of Asbestos Abatement Projects
17. ASTM E1494, 1992 Specifications for Encapsulants for Friable Asbestos-Containing Building Materials

B. California Assembly Bills (CAB)

1. CAB 040, Yearly Registration of Contractors

C. California Code of Regulations (CCR)

1. Title 8 CCR 5208, General Industry - Asbestos
2. CCR CARS, Carcinogen and Asbestos Registration Sections 340-344.53, 341.6 Amended, and 341.9 Amended Through 341.14
3. CCR ESO, Electrical Safety Orders, Chapter 4, Subchapter 5
4. CCR 1523, Illumination
5. CCR 1529, Asbestos in the Construction Industry
6. CCR 1531, Construction Respiratory Protective Equipment
7. CCR 3203, Injury and Illness Prevention Program
8. CCR 3204, Access to Employee Exposure and Medical Records
9. CCR 3220, Emergency Action Plan
10. CCR 3221, Fire Prevention Plan
11. CCR 5144, Respiratory Protection Equipment Standard
12. CCR 5194, Hazard Communication Standard
13. CCR 6003, Accident Prevention Signs

14. Title 22, Division 4, Minimum Standards for Management of Hazardous and Extremely Hazardous Waste

D. California Health Services (CHS) Titles 22 and 23, California Administrative Code Disposal Requirements
   1. CHS 25123, Section 25123
   2. CHS 25124, Section 25124
   3. CHS 25143, Section 25143
   4. CHS 25163, Section 25163
   5. CHS 66508, Section 66508
   6. CHS 66510, Section 66510
   7. CHS DIV 4, Division 4, Commencing with Section 66000, "Disposal"

E. California Health and Safety Code (CHSC)

   CHSC 20
   1. Division 20, Commencing with Section 24200

F. California Labor Code (CLC)
   1. CLC DIVISION 5, Part 1, commencing with 6300

G. California Propositions (CP)
   1. CP 65, Proposition 65

H. California State Board of Equalization (CSBE)
   1. CSBE ETU, Excise Tax Unit

I. California State License Board (CSLB)
   1. CSLB CBPC, California Business and Professional Code Sections 7058.5 and 7058.7, "Certification"

J. Code of Federal Regulations (CFR)
   1. 29 CFR 1910.134, Respiratory Protection
   2. 29 CFR 1910.141, Sanitation
   3. 29 CFR 1910.145, Accident Prevention Signs and Tags
   4. 29 CFR 1926.21, Safety Training and Education
   5. 29 CFR 1926.55, Gases, Vapors, Fumes, Dusts, and Mists
   6. 29 CFR 1926.65, Hazardous Waste Operations and Emergency Response
   7. 29 CFR 1926.59, Hazard Communication
   8. 29CFR 1910.1000, Air Contaminants
   9. 29 CFR 1926.1101, Asbestos
   10. 40 CFR 61-SUBPART A, General Provisions
   11. 40 CFR 61-SUBPART M, National Emission Standard for Asbestos
   12. 40 CFR 260, Hazardous Waste Management Systems: General
   13. 40 CFR 745, Lead; Requirements for Lead-Based Paint Activities
   14. 40 CFR 763, Asbestos Containing Material in Schools

K. State and Local Regulations
   1. Regulation 11, Rule 2, Bay Area Air Quality Management District

L. Underwriters Laboratories, Inc. (UL)
   1. UL 586-96, 1996 Test Performance of High-Efficiency Particulate Air Filter Units

1.6 SUBMITTALS PRIOR TO START OF WORK

A. The reviews by the District or District's designated representative are intended to be only for general conformance with the requirements. The District or the District's designated representative assumes no responsibility for permits, licenses, notices, materials and methods, equipment or

temporary construction required to execute the work described in this Section of the Specification or in other Sections of the Specification or in other documents included in the contract documents.

B. Before commencing work involving the abatement of asbestos, submit the following for review by the District or District's designated representative:

1. Provide a detailed asbestos abatement work plan that is specific for the materials to be removed in each structure.
2. Provide an asbestos site safety plan prior to project initiation. The site safety plan shall deal with the following, at a minimum: site safety and health hazards; fiber release incidents; control of water leakage or discharge within and/or from the work area; medical emergency; asbestos handling procedures; fall protection; electrical safety; Contractor's internal administrative and inspection procedures; earthquakes and/or fire emergency procedures; protocol for responding to complaints or questions from interested parties; 24-hour emergency telephone numbers for individuals with authority to respond to emergencies.
3. Competent Person (as defined by Title 8 CCR 1529): Demonstrate education and specialized training with successful completion of examination of a Cal-OSHA accredited asbestos training course.
4. Workers: Demonstrate education and specialized training with successful completion of a Cal-OSHA accredited asbestos training course.
5. Submit current certificates (less than 11 months) signed by each employee and trainer that the employee has received proper training in the handling of materials that contain asbestos. Include documentation showing that the worker understands the following; health implications and risks involved (including the illnesses possible from exposure to airborne asbestos fibers), the use and limits of the respiratory equipment to be used, and the results of monitoring of airborne quantities of asbestos concerning health and respiratory equipment.
6. Proof of Respirator Fit Testing: Provide proof of respirator fit testing. Fit testing records must be less than eleven (11) months old and document testing on each type of respiratory protective equipment used for this project. Fit testing records must be signed by the Competent Person.
7. Foreman Training: Submit evidence that the foreman to be used on the job fulfills the qualifications detailed in this specification and has experience in similar jobs.
8. Medical Examinations: Submit evidence signed by a physician that each employee used on the job has received an appropriate medical examination as detailed in Title 8 CCR 1529. The submitted document must be less than eleven (11) months old.
9. Written Notification to Fire and Police Departments: Provide documentation showing notification to local fire and police departments of the abatement three (3) days before commencement.
10. Certificates of Compliance: Submit manufacturer's certification that vacuums, ventilation equipment, and other equipment required to contain airborne asbestos fibers conform to ANSI Z9.2. Submit results of onsite DOP testing of all HEPA-filtered ventilation equipment.
11. Satisfactory proof that written notification and subsequent updates have been provided to the Bay Area Air Quality Management District, in accordance with Regulation 11, Rule 2, Cal-OSHA, and Title 40 CFR Part 61 Subparts A&M, National Emission Standards for hazardous Air Pollutant, U.S. EPA as needed for any friable removal.
12. Licenses: Submit copies of state and local licenses, evidence of Cal-OSHA registration and permits necessary to carry out the work of this contract.
13. Notification of Other Contractors: If other contractors are working at the job site, before beginning any work the Contractor must inform all other contractors in writing regarding the location, nature, and requirements of the work areas.
14. Safety Data Sheets (SDSs)/Specification Sheets: The Contractor shall submit SDSs and Specification Sheets for all chemicals, encapsulants, etc. to be used for this project.

1.7 SUBMITTALS AT THE COMPLETION OF THE PROJECT

A. Upon completion of on-site work, the Contractor shall provide a detailed project summary that will include each of the items listed below. The project summary shall be submitted and approved by the District's representative and shall include the following:

1. Copies of the Security and Safety Logs showing names of persons entering the workspace. The logs shall include date and time of entry and exit, supervisor's record of any accident (detailed description of accident).
2. Chain of custody documentation and laboratory reports for all analyses performed.
3. Emergency evacuations and any other safety or health incident.
4. Submit uniform hazardous and non-hazardous waste manifests prepared, signed and dated by an agent of the landfill. The manifest must certify the amount of hazardous materials delivered to the landfill. The manifest must be provided to the District or District's designated representative within ten working days after delivery.
5. Personal air sample results.
6. Pressure differential readings for each differential recording device on the site.
7. Project Summary:
    a. Abatement contractor's name and address, certification number (CSLB), registration number (DOSH) and Tax ID number.
    b. Hazardous waste hauler certifications (DHS, DOT).
    c. Name, address, and registration number of hazardous waste hauler.
    d. Laboratory performing analyses (NVLAP).
    e. Name of project and project reference number.
    f. Specific inventory (including locations and approximate quantities) of the hazardous materials which were removed or handled.
    g. Number of employees working on the project.
    h. Dates of commencement and completion of on-site work.
    i. Work method(s) employed (i.e., glove bag, mini-containment, full containment with negative air and decontamination enclosure system, etc.)
    j. Name, location, telephone number and EPA registration of waste disposal site(s) used.
    k. DOP testing results.

1.8 CONTRACTOR MONITORING

A. The District or District's designated representative reserves the right to perform air sampling in selected areas during the project. District or District's designated representative reserves the right to stop work within an area if while performing monitoring, instances of substantial non-conformance with this Section or other Sections of the Specification presenting health hazards to workers, the general public or the surrounding areas are observed. Work shall not resume until the corrective measures have been enforced. Instances of substantial non-conformance shall include, but not be limited to, the following:
    1. Activities or misconduct imperiling worker's safety and health.
    2. Airborne fiber concentrations as measured by PCM outside of the containment area exceeding background or 0.01 fibers per cubic centimeter of air (f/cc) whichever is greater. Airborne concentrations as measured by TEM outside of the containment area exceeding background or 70 asbestos structures per square millimeter (S/mm^2), whichever is greater.
    3. Loss of negative pressurization for more than two minutes.
    4. Breaches in containment resulting in potential release of asbestos to non-work areas.

B. The consultant shall perform visual inspections of each regulated area prior to abatement to verify proper containment and controls. A visual inspection(s) will be performed at the conclusion of the abatement to verify complete removal. The consultant will perform air sampling inside and outside the regulated work areas during all phases of the work to verify air quality beyond the work areas during abatement and air quality inside the work areas following abatement.

C. The District or District's designated CAC may perform visual inspections and air testing as requested to verify performance.

PART 2 - PRODUCTS

2.1 SIGNS AND LABELS:

A. Provide labeling in accordance with state and federal EPA requirements. Provide the required signs, labels, warnings, placards, or posted instructions for containers used to transport hazardous material to the landfill.

B. Location of Caution Signs and Labels: Provide bilingual caution signs at all approaches to work areas in languages used by the Contractor's employees. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide labels and affix to all asbestos-containing materials, scrap, waste, debris, and other products contaminated with hazardous materials.

C. Warning Sign Format: Vertical format conforming to Title 8 CCR 1529:

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGED TO LUNGS
AUTHORIZED PERSONNEL ONLY
WEAR RESPIRATORS AND
PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

D. Warning Label Format: Provide labels that comply with Title 8 CCR 1529 of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST

2.2 ENCAPSULANTS

A. Encapsulants shall be U.L. Listed, in full-scale E-119 fire test.

B. Average depth of penetration shall meet manufacturer's recommendations.

C. Dry mil thickness of bridging encapsulating systems (if used) shall be as indicated in the specific treatment instructions included in this specification, and as recommended by the manufacturer.

D. Performance Requirements: Classification - penetrating encapsulant; spray applied and brushable. Product shall be tested and listed by EPA and possess the following characteristics:

1. Flame resistance/flame spread ~25 (ASTM E162) V6.
2. Fire classification - UL Class A approved in the specific or similar assembly to its intended application.
3. Product shall be tested and rated non-toxic and non-irritating under the Federal Hazardous Substances Control Act and contain no methylene chloride.
4. Material shall be tinted sufficiently to provide a readable contrast to background color to which it is applied.

2.3 PLASTIC SHEETING:

A. Use fire-retardant (FR) polyethylene (poly) film.

1. Thickness - 6-mil, minimum, NO EXCEPTIONS.
2. Flame Resistance/Flame Spread Rate <25.
3. Conforms to NFPA #701 and Tested in accordance with ASTM E-84.

2.4 TAPE, ADHESIVE, SEALANTS:

A. Tape, 2" or wider, shall be capable of sealing joints of adjacent sheet of polyethylene and shall attach polyethylene sheet to finished or unfinished surfaces or similar materials. Tape shall be capable of adhering under dry and wet conditions, including use of amended water. Taping to critical or sensitive surfaces shall be completed using preservation sealing tape.

B. Spray adhesive for sealing polyethylene to polyethylene shall contain no methylene chloride or methyl chloroform (1,1,1-trichloroethane) compounds.

C. Fire resistant sealants shall be compatible with concrete, metals, wood, etc. Sealant shall prevent fire, smoke, water and toxic fumes from penetrating. Sealant shall have a flame spread, smoke and fuel contribution of zero, and shall be ASTM and UL rated for 3 hours for standard method of fire test for fire stop systems.

2.5 DIFFERENTIAL PRESSURE RECORDER(S):

A. Where interior / exterior work area containments are required, each shall have a minimum differential pressure of 0.025 inches of the water gauge at all times. Fluctuations below 0.025 inches of water column are unacceptable and may require temporary cessation of work until conditions are corrected.

B. Differential pressure recorder(s) shall be used to document the level of pressure difference between the containment space and all other spaces. Defective or non-operating instrumentation may require temporary cessation of work until instrumentation is repaired or replaced.

C. The differential pressure instrument will be checked a minimum of four times per day by a person familiar with the operation. Each check shall be documented with a time and date notation and the initials of the person performing the check. A copy of the differential pressure recordings shall be submitted daily to the consultant.

D. Differential air pressure systems shall be in accordance with Appendix J of EPA's "Guidance for Controlling Asbestos-Containing Materials in Buildings, EPA 560/5-85-024. The Differential pressure system shall be continuously monitored by the Contractor using a recording instrument. The recording instrument shall be connected to an audible alarm that will activate at a pressure differential of -0.025 inches of the water gauge air pressure.

2.6 VACUUM EQUIPMENT:

A. All vacuum equipment used in the work area shall use HEPA filtration systems and be of the wet-dry type. The Contractor shall provide on-site independent DOP-equivalent testing to document the effectiveness of the vacuum units. The test results shall be signed by the individual performing the testing. Provide documentation to the District or District's designated representative with 5 days of DOP-equivalent testing.

2.7 LOCAL EXHAUST SYSTEM:

A. Where containments are required, sufficient High Efficiency Particulate Absolute (HEPA) ventilation units shall be used to maintain the negative pressure in each interior work area at 0.025 inches of water column and a minimum of four (4) air changes per hour.

B. The ventilation system shall remain in operation 24 hours a day until the work area has passed the specified clearance criteria. HEPA filtered air which is exhausted to maintain negative pressure shall be exhausted from the building at locations approved by the consultant and District or District's designated representative. Exhausted air shall not be near or adjacent to other building intake vents or louvers or at entrances to buildings.

C. The Contractor shall provide on-site independent DOP-equivalent testing to document the effectiveness of the air filtration units. The test results shall be signed by the individual performing the testing. Repeat testing if the unit or the air filtration units have been repaired or replaced.

Provide documentation to the District or District's designated representative within 5 days of DOP-equivalent testing.

2.8 RESERVE EQUIPMENT:

A. Contractor shall have the following equipment on site: one reserve, functioning and DOP-tested HEPA Filter Vacuum Cleaning Units, three reserve and DOP-tested HEPA area filtration unit. Contractor shall also have sufficient polyethylene (poly), respirators, protective equipment, tape, tools, and decontamination enclosure systems for each work area.

B. Provide authorized visitors, District, Consultants or other contractors requiring access to the work area with suitable protective clothing, headgear, eye protection, as described in this specification, whenever the visitor must enter the work area. The Contractor shall have available and maintain adequate supplies of protective clothing and other suitable protective equipment for this purpose. All protective equipment shall be new and for the exclusive use of visitors.

C. The Contractor shall document that each visitor has been trained and fit-tested prior to entering an abatement area.

2.9 SCAFFOLDING:

A. Scaffolding, as required to do the specified work, shall meet all applicable safety regulations and Cal-OSHA standards. A non-skid surface shall be furnished on all scaffold surfaces subject to foot traffic. Scaffolding shall be adequately protected to prevent contamination of planking and framing.

2.10 TRANSPORTATION EQUIPMENT:

A. Transportation equipment, as required, shall be lockable and suitable for loading, temporary storage, transit and unloading of contaminated waste without exposure to persons or property. Any vehicle used to transport asbestos waste shall be properly registered with all applicable controlling agencies.

2.11 CONNECTIONS TO WATER SUPPLY:

A. Contractor shall assure that all connections to the site's water system shall include backflow protection. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water shall not damage existing finishes or equipment.

B. Employ heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system in each work area. Provide fittings as required to allow for connection to existing wall hydrants or spouts.

2.12 WATER HEATER:

A. The hot water supply must be adequate to allow for 15 minutes of continuous usage while maintaining a water temperature of 85°F. At minimum provide UL rated 40-gallon electric water heater to supply hot water for the decontamination unit shower. Provide relief valve compatible with water heater operation; pipe relief valve down to drip pan on floor with type L copper. Drip pans shall consist of a 24-inch X 24-inch X 6-inch-deep pan, made of 19-gauge galvanized steel with handles. Wiring of the water heater shall comply with NEMA, NEC and UL standards.

2.13 OTHER TOOLS AND EQUIPMENT:

A. The Contractor shall provide other suitable tools for the stripping, removal, and disposal activities.

B. Prohibited Equipment: The following equipment is prohibited from use on this project unless accepted in writing by the District or District's designated representative:

1. High or low-pressure water blasting equipment for hosing of work areas.
2. Bead blasting or other uncontained abrasive blasting methods.
3. Vacuum-powered removal or collection equipment located outside the asbestos work area, such as a “Vacu-Loader”.
4. Gasoline, propane, diesel or other fuel powered equipment inside the building, unless previously approved in writing by the District or District’s designated representative.
5. Equipment that creates excessive noise or vibration that would affect the safety of the building or generate complaints from neighboring building occupants. No equipment shall exceed an A-weighted sound level of 85 dB as measured at 3 ft. from the radiating source without written permission of the District or District’s designated representative.
6. Metal wire-brushes.
7. Flammable solvents with a flash point below 140 degrees F or materials containing ethylene glycol ether, methylene chloride, ethyl chloroform (1,1,1-trichloroethane), or other hazardous substances.
8. Non-fire retardant polyethylene sheeting.
9. Polyurethane spray foam for application in fire-rated assemblies, including but not limited to penetrations into stairwells, mechanical rooms, electrical closets, rated floor-to-floor assemblies, etc.

PART 3 - EXECUTION

3.1 INITIAL AREA ISOLATION

A. The District or the District’s designated representative reserves the right to inspect and approve all containment setups before any abatement is undertaken.

B. If a containment area is breached (failure of polyethylene seals, visible dust emission, fiber counts above background level, etc.), the Contractor shall take immediate action to control the breach and clean the area to the satisfaction of the District or the District’s designated representative.

C. If sample results indicate that conditions have exceeded the baseline or clearance criteria, as determined by the District or District’s designated representative, all work shall cease. Work shall not recommence until the condition(s) causing the increase have been corrected.

D. Verify that all electrical power, gas, control water, fire life safety lines and sprinkler systems to the work area have been isolated so that there is no possibility of reactivation and electrical shock.

E. Provide all connections for temporary utilities in the work area needed throughout abatement. Temporary electrical power shall be according to OSHA and the National Electrical Code for Wet Environments.

F. Contractor shall conform to lockout requirements and secure the work area at all times. Area entrances and exits shall be secured by the Contractor throughout the abatement phase. Unauthorized visitors are strictly prohibited. Only the District or District’s designative representatives are permitted at the job site. Contractor shall ensure that all doors, gates, windows, and potential entrances to the work areas and the designated waste location areas are secured and locked at the end of each workday.

G. Contractor shall store all materials, equipment, and supplies for the project inside the building or in areas designated by the District and in accordance with District requirements.

H. As required, establish designated limits for the abatement work area with continuous barriers. Provide signs around the perimeter of all the interior and exterior work areas according to EPA and Cal-OSHA.

I. The Contractor shall be responsible for identifying all HVAC components (if applicable) that lead into or out of the work areas. All components shall be disconnected and sealed airtight for the duration of the abatement work. All openings shall be sealed with two (2) layers of 6 mil polyethylene secured with duct tape or equivalent, as applicable.

J. Pre-clean the work area and fixed objects in the work area using HEPA filtered vacuums and/or wet cleaning methods. Protect fixed objects with protective barriers (as appropriate) and cover with 6 mil poly sealed with tape.

3.2 CONTAINMENT SET-UP PROCEDURES

A. Containment is required for removal of all interior ACMs, as well as exterior / roofing ACMs if not removed intact. Contractor shall construct critical barrier containment(s). The work area(s) shall be placed under negative pressure as outlined in this specification throughout the abatement work. Note: A three-chamber decontamination unit will be required for removal of friable materials and if ACMs are removed by aggressive means or mechanical removal methods. Cover walls and floors with 6-mil poly and secure with tape (as appropriate).

B. Protect all walls scheduled to remain with 4 - 6mil poly within the regulated work areas.

C. Any disturbance of ACMs and materials with asbestos content must be performed within a regulated area. If dust or debris is generated from asbestos related activity, work must be performed in a mini-enclosure with negative pressure or critical barrier containment.

D. To permit the inspector to view the majority of the work area, the Contractor shall provide easily accessible viewing ports from the clean space into each abatement area. Viewing ports must be a minimum of 2' x 2', clear-see-through plastic with no scratches, tape or glue marks.

E. Pressure differential recorders are required to monitor the pressure differential in the work area. The recorders must be calibrated prior to arriving on site. Calibration shall be performed by qualified technicians following the procedures outlined by the manufacturers. Provide documentation of calibration before beginning work.

F. A three-chambered decontamination unit shall be required during abatement of friable ACM or abatement work conducted in full containment. A two-chamber decontamination unit will be required for critical barrier work areas. The unit shall be located immediately outside the contained area. A pre-fabricated unit is acceptable. Chambers shall be arranged as follows: (1) a clean/change room shall be the first chamber entered from outside the work area, (2) a shower shall be located between the clean/change room and the dirty/change room, and (3) a dirty/change room shall be the last chamber before entering the work area.

   1. The clean/change room of the worker decontamination unit shall be of sufficient size to accommodate the work crew and their belongings. It shall include a respirator storage area and be fully equipped with reserve equipment and materials such as clean suits, towels, soap, tape, and respirator filters.
   2. Worker decontamination unit walls shall be a minimum of two layers of 6-mil fire retardant poly and floors shall be constructed with a minimum of three layers of fire retardant poly. All entry and exit doorways shall consist of at least two sheets of overlapping, fire resistant poly. At no time shall the flapped doors be taped open to expedite material or personnel load-out.

G. All water from the shower and bag wash area shall be filtered to the technically feasible limit but not more than five (5) microns before disposal. In addition, the Contractor shall comply with all current local, state and federal codes relating to waste water release. All water connections must be verified for leaks and turned-off at the conclusion of each shift. All shower water shall be drained from the shower pan at the end of each shift.

H. A two-chamber decontamination unit may be allowed, unless noted elsewhere, during the abatement work conducted in critical barrier containments. The unit shall be located immediately outside the contained area and shall contain a wash down area. A pre-fabricated unit is acceptable.

I. Approved fire extinguishers (Class ABC, multi-purpose, dry chemical type, rated: 4A; 60BC) shall be readily available to workers (maximum travel distance of 50 feet) inside and adjacent to work area(s). Personnel and emergency exits shall be clearly indicated on the inside of the containment area. The emergency exit plan shall be approved by the consultant prior to the set-up of any work areas.

3.3 PERSONNEL PROTECTION

A. Informed Workers:

1. All workers shall be informed of the hazards of asbestos and ACMs and any other hazardous materials exposure present within the site. Workers shall also be instructed in the use and fitting of respirators, protective clothing, decontamination procedures, and all other aspects associated with the abatement work.

B. Personal Hygiene Practices:

1. The Contractor shall enforce and follow good personal hygiene practices during the abatement of ACMs and materials with asbestos content. These practices will include but not be limited to the following: no eating, drinking, smoking or applying cosmetics in the work area. The Contractor shall provide a clean space, separated from the work area, for these activities.
2. Workers shall remove street clothes in the clean room and put on a respirator and clean protective clothing before entering the work area. Upon exiting the work area, remove gross contamination from clothing before leaving the work area; proceed to the change room and remove clothing except respirators; proceed to the shower; clean the outside of the respirator with soap and water while showering; remove respirator and thoroughly wash. Following showering, proceed directly to the clean room and dress in street clothes. Do not wear disposable clothing outside the decontamination enclosure system.
3. If data gathered by the consultant, District or District's designated representative in areas adjacent to the work areas shows exposure to airborne asbestos or other hazardous materials exceeding Cal-OSHA criteria, that area will become regulated and workers must wear protective clothing and approved respirators and must have a shower facility provided to them.

C. Respirators:

1. Establish a respiratory protection program as outlined by ANSI and required by Cal-OSHA. Select respirators from those approved by the National Institute for Occupational Safety and Health (NIOSH). Respirators selected must be approved by the Competent Person. Submit program for review a minimum of five (5) working days prior to the commencement of abatement activities.
2. Provide workers with approved and personally-issued respirators with replaceable filters. Provide sufficient quantity of filters approved by NIOSH for use in asbestos environments so that workers can change filters as required by the manufacturer.
3. At a minimum, provide each employee with the following respiratory protection for each work phase:
   a. Pre-cleaning, containment set-up, and containment removal work: NIOSH-approved, half-face respirators with HEPA cartridges.
   b. Asbestos abatement of Category I and II Non-Friable ACMs: half-face respirators with HEPA cartridges and organic vapor cartridges (as necessary).
4. At all times, respiratory protection selected shall, at a minimum, meet the requirements of the Table 1 below.

Table 1 – Respiratory Protection

Airborne Concentration of Asbestos	Required Respirator
Not in excess of 1.0 f/cc (10 X PEL)	Half-mask air purifying respirator other than a disposable respirator, equipped with high efficiency filters
Not in excess of 5.0 f/cc (50 X PEL)	Full facepiece air purifying respirator equipped with high efficiency filters

Not in excess of 100 f/cc (1,000 X PEL)	Any powered air purifying respirator equipped with high efficiency filters or any supplied air respirator operated in continuous flow mode
Not in excess of 100 f/cc (1,000 X PEL)	Full facepiece supplied air respirator operated in pressure demand mode
Greater than 100 f/cc or unknown concentration	Full facepiece supplied air respirator operated in pressure demand mode, equipped with an auxiliary positive pressure self-contained breathing apparatus

5. Provide Type C continuous flow or pressure-demand, supplied-air respirators if the average airborne concentration of asbestos exceeds 100 times the permissible exposure limit; i.e., 8-hour time-weighted average (TWA) and ceiling limit. Use the respirators presented in Title 8 CCR 1529 that afford adequate protection at such upper concentrations of airborne asbestos. When Type C Respirators are required provide the following:
   a. The air supply system shall provide Grade D breathing air that conforms to OSHA and ANSI Commodity Specification for Air.
   b. Compressed Air System for Type C Respirators shall be high pressure, with a compressor capable of satisfying the respirator manufacturer's recommendations. The compressed air system shall have compressor failure alarm, high temperature alarm, and a carbon monoxide alarm. It also shall have suitable in-line air purifying absorbent beds and filters to assure Grade D breathing air.
   c. Use of Belt: Type C respirators shall be worn with belt to minimize possibility of dislodging face mask when hose is snagged in the work area.

D. Protective Clothing:
   1. Provide personnel exposed to asbestos fibers with fire retardant disposable protective whole-body clothing, head coverings, gloves, and foot coverings. Provide appropriate gloves to protect worker’s hands from exposure to hazardous materials. Make sleeves secure at the wrists and make foot coverings secure at the ankles with tape. Ensure that all personnel entering and leaving the work area follow this procedure. Suits shall be of adequate size to accommodate the largest employee. Foot covers may be part of the coveralls. Non-disposable footwear shall be left in the work area until it is decontaminated or disposed of at the completion of the job.
   2. Protective clothing will be worn inside the work area after the area passes pre-abatement inspection and shall remain in use until the area passes final clearance inspection.

E. Eye Protection: Provide safety glasses or goggles to personnel removing or handling asbestos-containing materials and waste.

F. Shower Requirements: Contractor shall assure that all certified employees and visitors use protective equipment and the shower or wash down facility following each entry into the containment area after the start of the asbestos abatement.

G. Emergency Precautions and Procedures:
   1. Establish emergency and fire exits from the work area. Display necessary signage at exits and paths to exits with representative visual aids. A diagram of all emergency and fire exits shall be posted in a conspicuous area proximate to the entrance to each work area.
   2. The Contractor’s supervisor/competent person shall be trained and certified in first aid and CPR and be prepared to administer first aid to injured personnel after decontamination. Seriously injured personnel shall be treated immediately or evacuated without delay for decontamination.

When an injury occurs, the Contractor shall implement fiber reduction techniques until the injured person has been removed from the work area.

3. In the event of a loss of negative pressure to the work area, work shall stop immediately and entrances to the work area sealed tight. The Contractor shall also institute fiber reduction controls until negative pressure is re-established to acceptable levels.

3.4 ASBESTOS REMOVAL (GROSS REMOVAL TECHNIQUE)

A. The Contractor shall abate all ACMs and materials with asbestos content identified in this specification and/or that require disturbance to complete work specified in other specification sections.

B. The Contractor shall continuously apply wetting agent throughout the removal process. The wetting agent shall be applied with a low-pressure fine spray to minimize fiber releases. The materials shall be thoroughly saturated so that there is no detectable fiber release. All ACMs shall be immediately packaged in leak-tight containers following removal.

C. Minimize removal activities of ACMs that generate airborne particulate. To the extent feasible, score or cut-out ACMs in sections, wetting along the scoring line continually, and misting the air with an airless sprayer to knock down suspended particulate. After completion of removal work, surfaces from which asbestos has been removed shall be brushed and/or wet cleaned to remove all visible material and residue.

D. Wet clean the exterior surfaces of waste containers in the equipment decontamination enclosure system prior to removal from the work area. Ensure that workers do enter from uncontaminated areas into contaminated areas in the equipment decontamination enclosure system. The Contractor shall transport asbestos-containing waste bags to the waste debris box at designated hours approved by the District or District's designated representative. RACM shall be packaged in a minimum of two (2) 6-mil polyethylene bags. Bags shall be properly labeled for RACM disposal including site-specific generator labels. Non-friable waste shall be packaged in clear, leaktight containers and properly labeled while stored on-site. Asbestos-containing debris and contaminated water shall be cleaned from the work area at the end of each work shift. The Contractor shall clean the work area using wet methods and HEPA vacuum equipment.

3.5 ASBESTOS REMOVAL (GLOVEBAG TECHNIQUE)

A. Bags commercially manufactured specifically for glovebag enclosure removal of asbestos shall be used. All bags shall be a minimum of 6 mil clear poly, appropriately sized for removal area and task.

B. Maximum temperature of components allowable for glovebag work shall be as specified by glovebag manufacturer. Glovebag procedures shall not be permitted on live steam equipment or any equipment in excess of 150 degrees Fahrenheit.

C. Pre-clean the work area and protect immediate work area by covering floor and nearby equipment with 6 mil poly. Temporarily wrap damage/deteriorated asbestos insulation adjacent to the work with 6 mil poly to prevent further damage or disturbance during removal.

D. Provide two (2) workers for each glovebag operation.

E. Install glovebag around pipe, seal with staples and tape leaving enough sealed space above the pipe to allow access. Secure bag to pipe to support weight of stripped insulation and water (additional support may be provided by a scaffold or ladder).

F. Insert HEPA vacuum nozzle and flexible tubing or wetting agent sprayer into hole location provided and seal airtight with duct tape.

G. Smoke test the glovebag and repair leaks as required.

H. During removal, periodically use HEPA vacuum to compensate for any leaks and wet the inside surfaces of the bag to control fiber release.

I. Cut the insulation sharply for neat sealing of exposed insulation. Leave 4 inches of margin at the bag/seal point.

J. After removal and detail cleaning, wash down all surfaces to below the levels where the bag will be sealed, and saturate the waste.

K. Upon completion of the removal work but prior to commencing with encapsulation, the consultant shall conduct a visual inspection to confirm complete removal and adequate cleaning. The District or District's designated representative reserves the right to conduct visual inspections.

L. Seal all substrate surfaces from which asbestos material was removed with an approved encapsulant.

M. Gather tools in a glove hand and pull the glove inside out. Seal the arm with a minimum of six (6) inches of tape and cut through the middle of the tape. Bend and re-tape the ends. Save the "bagged" tools for the next glovebag operation or clean by placing in a pail of water.

N. Collapse the bag with the HEPA vacuum. With the vacuum still applied, seal the bag just above the glove level. Remove the nozzle and tubing. Place a 6-mil waste bag over the glovebag and carefully remove the glove bag from the component and immediately seal it in a labeled waste bag. Check the component for loose waste and vacuum as required.

O. Seal exposed insulation with fiberglass wettable cloth or other approved material while the insulation is damp, unless other removal is planned.

3.6 REGULATED AREA MONITORING

A. Prior to each work shift and continuously throughout the project, each containment and decontamination enclosure system shall be inspected and repaired as needed.

B. Ambient asbestos fiber levels outside each work area shall not exceed 0.01 f/cc (PCM) or 70 s/mm^2 (TEM) or background whichever is greater. If the asbestos fiber concentrations outside work areas exceed those levels shown above, then abatement must stop and operations be reviewed and modified until the fiber count can be reduced to within the acceptable limits.

3.7 AIR MONITORING

A. The purpose of any air monitoring that may be conducted by the District or District's designated representative will be to detect possible release of fibers or dusts (asbestos or lead) emanating from the work areas.

B. All PCM air sample analysis shall comply with NIOSH Method 7400. All TEM analysis shall be consistent with modified-AHERA protocols or NIOSH 7402.

C. The District or District's designated representative reserves the right to perform and/or observe final clearance inspection and sampling.

D. The method of analysis for pre-abatement and clearance air samples shall be via Phase Contrast Microscopy (PCM). The method of analysis for in-progress asbestos air samples shall be PCM and TEM at the option of the consultant and District or District's designated representative.

E. The Contractor shall be responsible for all personal air sampling. These samples shall be taken each shift and for each distinct crew operation and shall be used to verify adequacy of fiber control and respiratory protection. Personal breathing zone air sampling shall be in accordance with the Cal-OSHA asbestos standard. A minimum of 25% of the workforce shall be monitored during each shift. All sample results shall be available on-site within 24-hours of sample collection.

3.8 CLEARANCE INSPECTIONS

A. The consultant shall conduct visual inspections. Contractor shall notify the consultant when the decontamination process in each containment area is complete. Evidence of debris will require

additional clean up by the contractor. Contractor shall be responsible for re-cleaning all areas found to be deficient.

B. If the consultant determines that the work area is sufficiently clean, the Contractor may proceed. If the consultant determines that certain areas require additional cleaning, the Contractor shall re-clean the work area and request a second inspection of the recleaned area.

C. Once the initial visual is passed, the Contractor shall remove all but the containment critical barriers.

D. Following the visual inspection, the Contractor shall provide a coating of non-diluted encapsulant in the work area. The Contractor shall allow the encapsulant to dry for the period specified by the manufacturer.

E. Asbestos Clearance Testing: Following encapsulation and drying time, the consultant shall conduct air clearance sampling. Clearance air sampling shall not take place until all encapsulant is dry. The District or District's designated representative reserves the right to approve the initiation of clearance sampling.

3.9 ASBESTOS CLEARANCE CRITERIA:

A. The clearance level per containment shall be less than 0.01 fibers per cubic centimeter via PCM or less than 70 structures per square millimeter via TEM. Aggressive air sampling shall be used for clearance purposes. Multiple samples shall be collected in large containment areas.

B. If air samples do not pass the required clearance criteria, the area shall be recleaned and new samples shall be collected by the consultant. The Contractor shall be responsible for all costs associated with re-sampling and re-analyses.

C. The consultant will notify the Contractor and District or District's designated representative in writing of acceptable asbestos fiber concentrations. The Contractor shall then remove all the remaining barriers in the work area.

3.10 ASBESTOS DISPOSAL

A. It is the responsibility of the Contractor to determine current waste handling, labeling, transportation and disposal regulations for the work site and for each waste disposal landfill. The Contractor must comply fully with these Specifications, local, state, and federal regulations and provide documentation of the same.

B. Ensure that polyethylene bags are sealed air-tight. All bags shall be wet cleaned prior to removing them from the equipment decontamination enclosure system.

C. Ensure all disposal containers are properly labeled according to 8 CCR 1529, 5194 (HAZCOM), 49 CFR 171-179 (USDOT), 40 CFR 61 Subpart M (NESHAP), and any local regulations and state regulations as required by this specification.

D. Filter all wastewater to the technically feasible limit, but not more than five (5) microns before disposal. Comply with all current local, state and federal codes relating to waste water release.

E. Asbestos-containing waste that is properly labeled and double-bagged may be temporarily stored in areas approved by the District. Areas must be made secure before storing the waste. Waste is not to remain in temporary storage area for longer than ten (10) days before final load-out of materials.

F. All friable asbestos waste shall be double-wrapped prior to transport from the site.

G. All vehicles used to transport hazardous waste must be registered with the Department of Toxic Substances Control and Department of Transportation and maintain proper registration and with vehicle at all times.

H. Trucks must have an enclosed cargo area with a storage compartment that is fully lined with a minimum of one (1) layer of 6-mil polyethylene on the walls and two (2) layers on the floor.

I. All vehicles and containers used to transport waste are subject to inspection and approval of District or District's designated representative prior to departure from site.

J. Contractor shall not throw bags into the truck in a way that may cause the bags to burst open.

K. Contractor shall provide at minimum two (2) days advance notification to the District when signatures are required on manifest(s). The Contractor shall ensure that the Hazardous Waste Manifest is correctly filled out. The Contractor shall give the appropriate copies to the District and shall also instruct the District in writing that they must send the appropriate copy to the Department of Toxic Substances Control.

L. Contractor is responsible for all coordination with the waste disposal site and with the waste hauling company.

M. Debris box for hazardous waste shall be fully lined with a double layer of polyethylene sheeting and must be locked at all times when unattended.

N. Debris box shall be constructed with minimum 20-gauge steel with no windows or openings other than the door. The door of the container shall have a secure cover on the locking device with access to the lock only at the key-hole. Once the debris box is filled and the manifest is signed, Contractor must transport the debris box off the job site.

O. Waste disposal shall be in a landfill approved by the District or District's designated representative that meets current federal EPA and state requirements.

TABLE I
ESTIMATED QUANTITIES
ASBESTOS-CONTAINING MATERIALS

HM# / Material Description	Material Location(s)	Waste Category	Asbestos Result	Estimated Quantity*
Public Safety (PS) Building				
Parapet Cap Sealant – Grey	Perimeter Parapet Caps at the Seams throughout the Roof Structures	Cat. I	5% CH	200 sf
HVAC Ducting Sealant – Grey	HVAC Ducting Assemblies at all Roof Levels	Cat. II	2% CH	600 sf
Sink Undercoating – Black	Room 15 and 2nd Floor Sink Closet	Cat. II	2% CH	6 sf (2 sinks)
12" Brown Floor Tile with Black Mastic	Room 15	Cat. I	Tile: ND Black Mastic: 2% CH	160 sf
Honors Trailer				
Building Caulking at Wood Joints	Exterior Wall at Corners of Building	Cat. II	5% CH	100 lf
Grey Sealant	Metal Edges at Ribs and Ridge Line	Cat. II	2% CH	10 lf

None Detected, NA = Not Applicable, CH = Chrysotile, AM = Amosite, RACM = Regulated asbestos containing material (friable), Cat. I = Non-friable (note ACM must be reclassified as a RACM if rendered friable during removal), Cat. II = Category II Non-friable (note ACM must be reclassified as a RACM if rendered friable during removal), sf = square feet, lf = linear feet, ea = each,
*Estimated quantity should be field verified prior to abatement or abatement design

END OF SECTION

Honors Trailer - Building Caulking at Wood Joints

Honors Trailer - Grey Sealant at Metal Roof Edges and Ridge Line

PS Buildings - 12 inch Brown VFT with Black ACM Mastic

PS Buildings - Black Sink Undercoating

PS Buildings - Grey HVAC Duct Sealant

PS Buildings - Grey Parapet Cap Sealant

ATTACHMENT A
ASBESTOS ABATEMENT WORK PLAN OUTLINE

In accordance with the contract documents, the Contractor is required to prepare a written, site-specific Asbestos Abatement Work Plan, and submit to the Owner for approval prior to start of work. This plan is required for the contractor to meet Cal-OSHA requirements as well as the contract documents and shall describe work procedures and control methods that will protect the Owner's facilities and the environment.

I. Location of Work:
The work to be completed under this work plan will be completed at:
(Building name)
(Location within building)
Previous asbestos inspections or surveys have found that ACMs are present at the following locations:
(List all materials and locations to assure the Owner and the Contractor are aware of all hazardous materials locations)

II. Description of Work:
Describe the anticipated work scope

III. Schedule:

Phase/Task	Anticipated Date(s)
Mobilization	_____
Set-up of work area(s), containments	_____
Abatement	_____
Final Cleaning	_____
Visual Inspection	_____
Final Clearance (visual and air sampling)	_____
Teardown	_____
Demobilization	_____

IV. Equipment and Materials
List all equipment and materials to be used, such as the following:

HEPA Vacuums	Negative air filtration units
Scrapers	Manometers
Power saws	Shower facilities
Pry bars	Airless sprayers/compressors
Cutting shears	Cleaning detergents
Other hand tools	Solvents (must be approved by Owner)
Encapsulants/sealants	Roller/brushes
Gloves	Disposable coveralls
Respiratory protection	Eye & foot protection

V. Crew
List all workers and supervisors with emergency contact names and phone numbers.

Clearly identify the supervisor and competent person who have authority for all safety and health.

VI. Control Measures and Work Practices

Describe in narrative format specific work procedures, exposure/ contamination controls, and engineering controls. This description should include, but not be limited to, the following:

OSHA Class I, II, III and IV work
Negative pressure enclosure
Respiratory protection
Mini-containments
List other procedures
Wet methods
Glovebag removal
HEPA vacuums
Solvent removal of mastic

VII. Respiratory Protection and Protective Clothing/Personal Protective Equipment

List all respiratory protection including types and manufacturers which are anticipated for this project. Identify the phases of the project for which respirators will be required or likely to be required. List all personal protective equipment anticipated to be used on the project.

VIII. Decontamination/Hygiene Facilities

Identify the types and locations of decontamination or hygiene facilities to be used on this project. Specify use of disposable towels, soap, hot and cold water, and other supplies. Specify the required use of the facilities, including use of the facilities prior to eating, drinking, smoking and before leaving the project site. Describe handling or treatment of asbestos-contaminated solid waste and wastewater.

IX. Air Monitoring Data

Identify general worker air monitoring protocols to be followed on this project, including worker category classifications, frequency of monitoring, anticipated laboratory to be used for analysis, pump calibration techniques, etc. Identify the competent person responsible for conducting personal air monitoring.

X. Containment Diagram

Include a diagram (hand written is acceptable) of the containment(s) showing the containment perimeter in relation to the surrounding areas, locations of negative air machines and exhaust locations, direction of airflow, and decontamination areas.

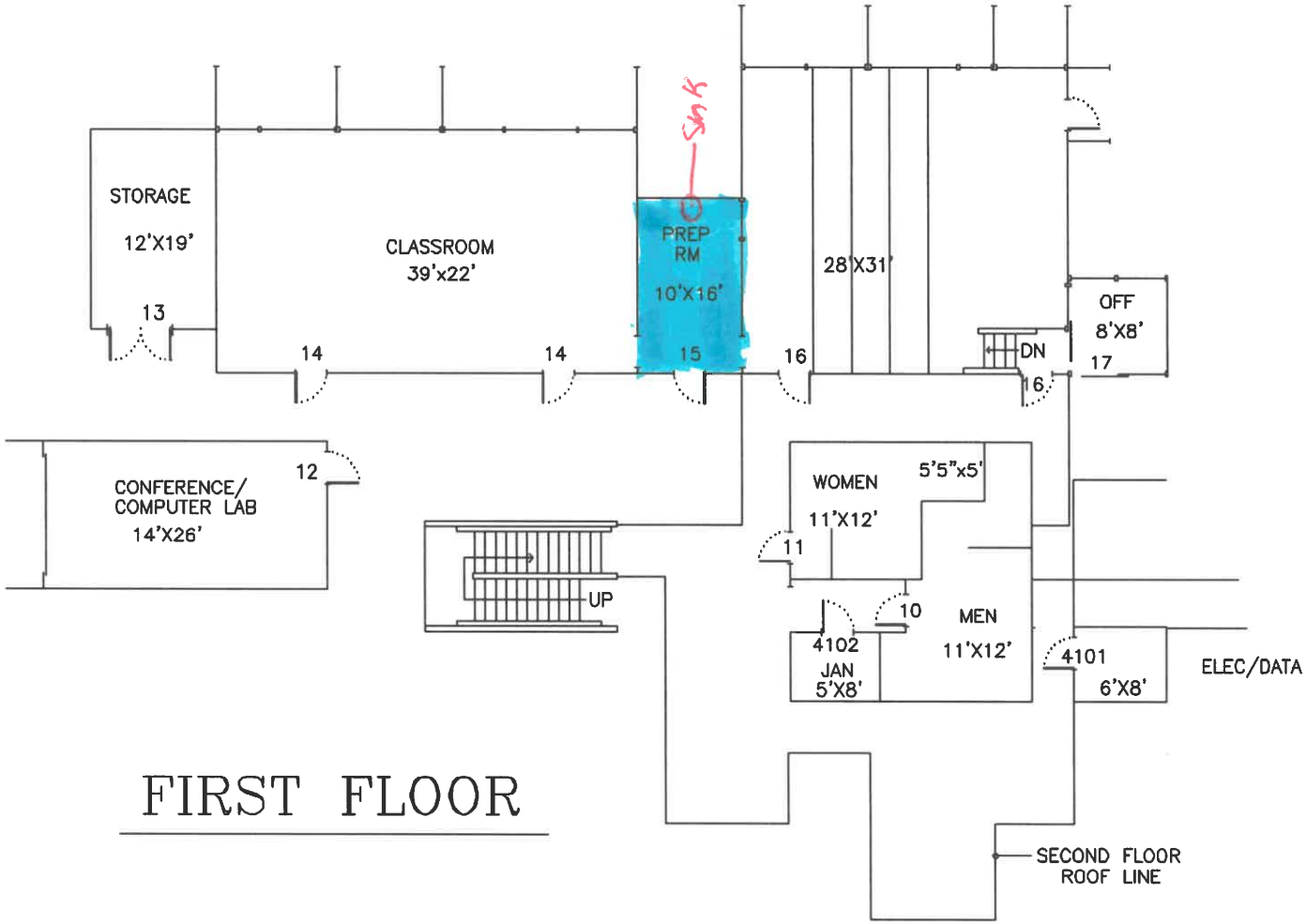
XI. Waste

Describe how all waste on this project will be packaged, labeled, stored, transported, manifested and disposed

XII. Preparation of Asbestos Abatement Work Plan

Date Prepared and Prepared By (signature, name and title)

LOS MEDANOS COLLEGE – CCCD



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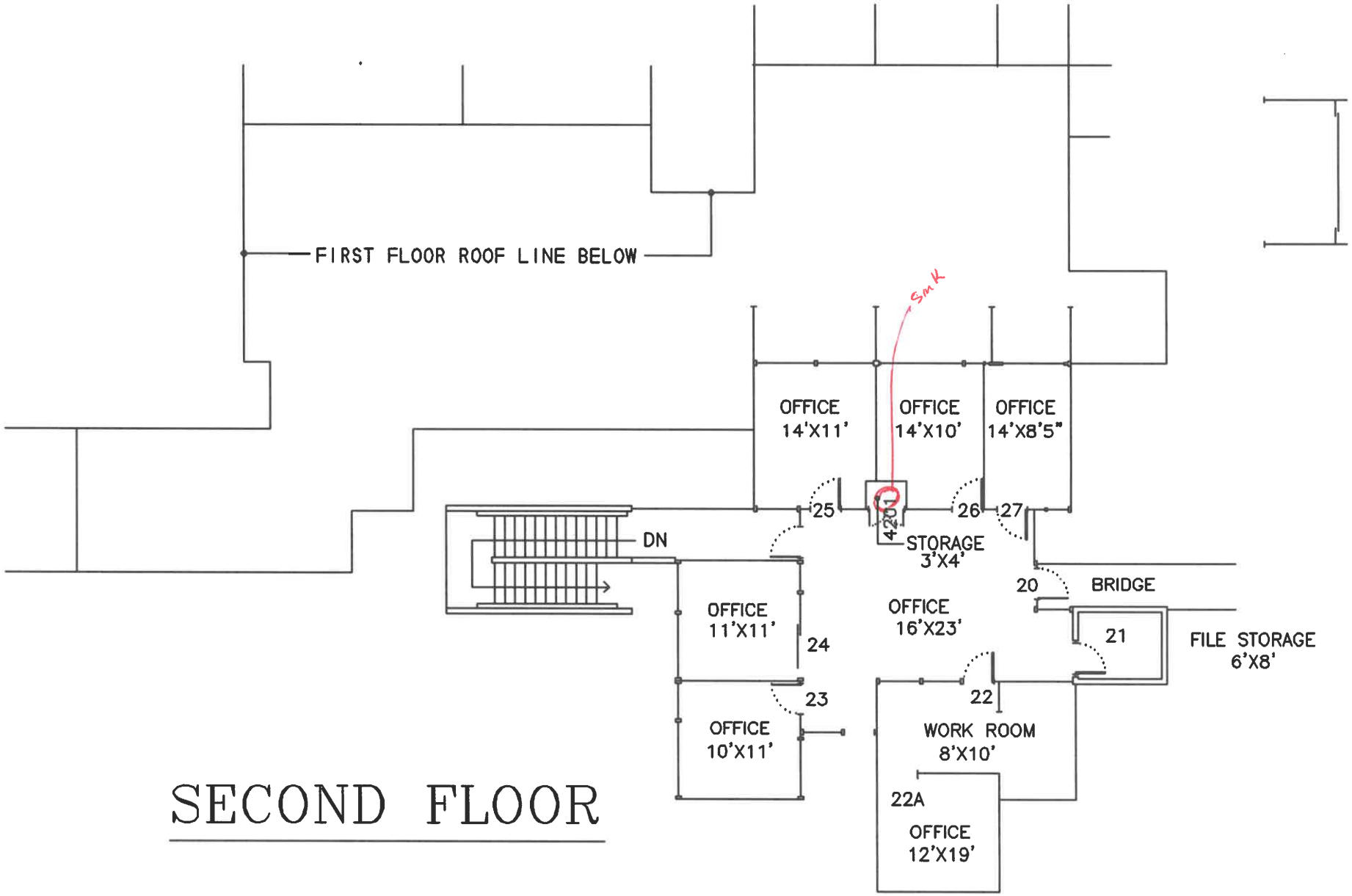

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HM 03

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PROJECT: Honors Trailer - Lake Page _____ of _____

JOB NO. R1227237 Date _____ Comp. By _____ CHECKED BY: _____

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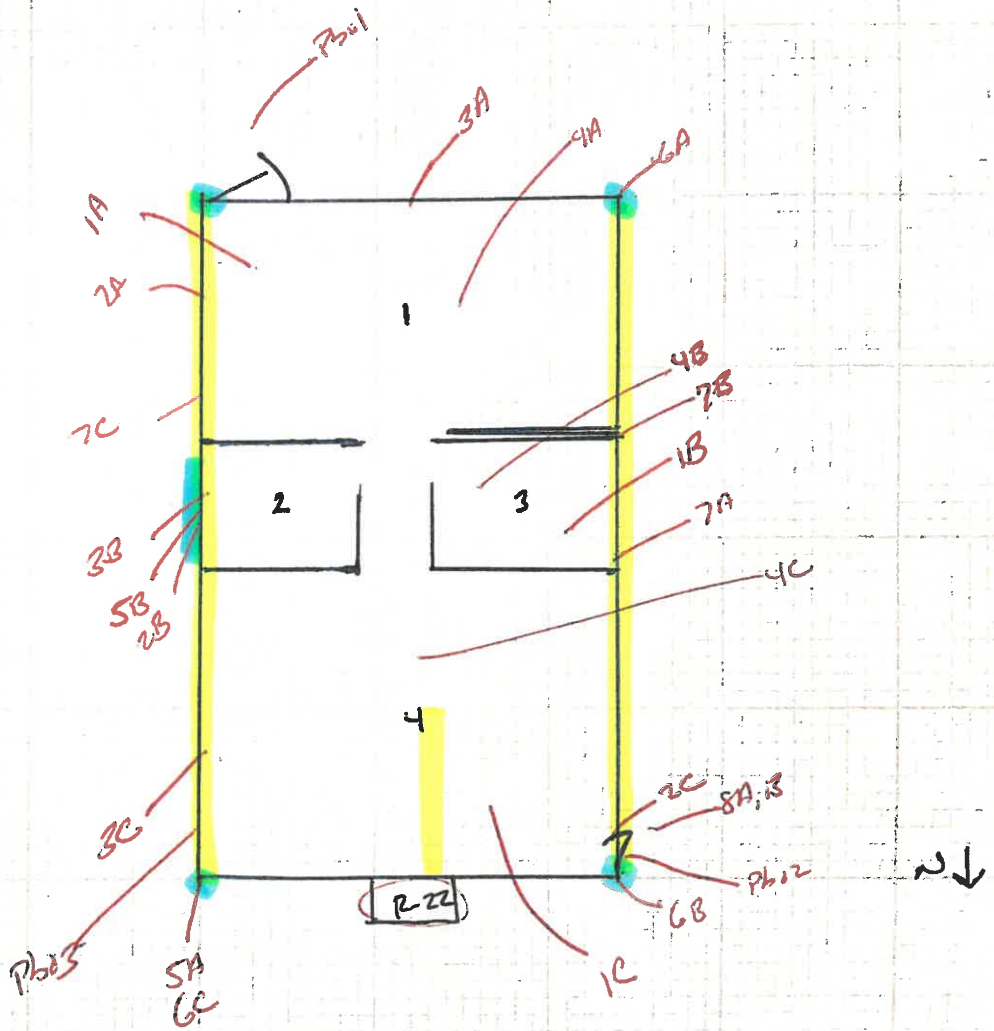
40 tubes

20 Baffles

1 - R22



HM07 HM06

Form 112–5-93

SECTION 02 83 00
LEAD-CONTAINING PAINT REMOVAL AND LEAD-RELATED CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY OF LEAD RELATED WORK

A. General. This section involves the requirements for removal and/or disturbance of building materials and painted components that contain detectable quantities of lead. Existing building materials and components with paint coatings considered to be lead containing paint (LCP) include, but are not limited to metal doors (brown) of the Public Safety (PS) buildings. All painted surfaces not specifically tested shall be assumed to contain lead. No bulk building materials are known to be lead containing. The intent of this work and the required procedures is to minimize lead emissions and contamination resulting from demolition and dismantling of the building and equipment, refinishing and construction related activities that will impact lead containing materials.

B. Lead-Related Construction Work: The Contractor's lead related construction work consists of any work activity or task which results in the coincidental removal or disturbance of paints, surface finishes, or other lead containing materials. The Contractor shall determine and implement applicable OSHA worker protection requirements (8 CCR1532.1) and ensure proper clean up and disposal of any resulting paint chips and lead wastes resulting (including water) from all lead-related construction activities including, but not limited to, the following:

1. Removal of all damaged or peeling paint from painted interior and exterior building materials.
2. Removal of intact paint coatings from building substrates.
3. Removal of intact paint from mechanical components and structural steel prior to hot work.
4. Demolition of plaster, drywall, wood, metal, concrete, etc. with lead containing paint.
5. Demolition that will impact existing painted surfaces including but not limited to drilling, cutting, removal of existing of attachments (electrical, mechanical, structural.), and paint preparation of existing surfaces.

C. Specific Scope of Work: Lead-related construction work scope as described above shall include the following structures:

Public Safety (PS) Building –: Removal of lead containing paint surfaces. Extent of removal must be coordinated with contract documents.

Results of the lead sampling for the project site are included at the end of this specification section. All paint and other building materials suspected to contain lead that were not specifically sampled should be assumed to contain lead.

1.2 REGULATIONS

A. The Contractor shall comply with the requirements of the current issue of the following regulations and guidelines governing lead removal, lead-related construction and disposal and other applicable Federal, State, and Local Government regulations. The regulations listed herein are incorporated by reference.

1. Code of Federal Regulations (CFR):
   a. 29 CFR 1926, Construction Standards
   b. 29 CFR 1926.62, Lead in Construction
   c. 29 CFR 1910.94, Ventilation
   d. 29 CFR 1910.134, Respiratory Protection
   e. 29 CFR 1910.1025, Lead
   f. 29 CFR 1910.1200, Hazard Communication
   g. 29 CFR 1926.55, Gases, Vapors, Fumes, Dusts, and Mists
   h. 29 CFR 1926.57, Ventilation
   i. 40 CFR Part 50.12, Ambient Air Quality Standard for Lead
   j. 40 CFR Parts 260, 261, 262, 263, 264, 265 and 268, Hazardous Waste Management
   k. 49 CFR Parts 172, 173, 178, 179, Hazardous Material Transportation

2. California Code of Regulations:
   a. 8 CCR Division 1, Chapter 4, Subchapter 4, Construction Safety Orders
   b. 8 CCR 1532.1, Lead in Construction
   c. 8 CCR 1537, Welding, Cutting, and Heating of Coated Metals
   d. 8 CCR 5144, Respiratory Protection
   e. 17 CCR 35001 – 36100, Accreditation, Certification, and Work Practices for Lead-Based Paint and Lead Hazards
   f. 26 CCR Division 22, Hazardous Waste
3. Guidelines for the Evaluation and Control of Lead Based Paint Hazards in Housing, U.S. Department of Housing and Urban Development (HUD), June 1995.

1.3 DEFINITIONS

A. Definitions specific to the work of this section:
   1. Abatement: Procedures for control of lead exposures to the Contractor's workers, District Employees, Public and the environment by removal, enclosure, and/or encapsulation of lead containing paints (LCPs), Lead Containing Construction Materials (LCCMs), and LCP coated components and proper clean up and disposal of resulting lead contaminated dust, chips, debris, and abatement wastes. Also include procedures for control of lead exposures resulting from welding or other hot work on surfaces with LCPs or residues.
   2. Action Level (AL): An exposure of 30 µg/m3 of airborne lead as an 8-hour TWA. When the AL is met or exceeded, certain protective health and safety measures are triggered per 8 CCR1532.1 Lead.
   3. Action Levels for Lead Content: The levels of lead concentration established for each type of analysis performed, which if the lead concentration equals or exceeds the action levels specified herein, renders the material hazardous.
      a. Action Level for Toxicity Characteristic Leaching Procedure (TCLP) by EPA 200.7: Action level for TCLP is 5.0 milligrams per liter.
      b. Action Level for Total Threshold Limit Concentration (TTLC) by EPA 6010: Action level for TTLC is 1,000 milligrams per kilogram.
      c. Action Level for Soluble Threshold Limit Concentration (STLC) by EPA 200.7: Action level for STLC is 5.0 milligrams per liter.
   4. Airlock: A system for permitting ingress or egress with minimum air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways at least three feet apart.
   5. Air Monitoring: The process of measuring the lead content of a specified volume of air in a stated period of time.
   6. Area Monitoring: Sampling of lead concentrations within the lead control area and inside the physical boundaries which is representative of the airborne lead concentrations that may reach the breathing zone of personnel potentially exposed to lead.
   7. Authorized Visitor: District or District's Representative, Architect, Contractor's Observation Service, or a representative of any regulatory or other agency having jurisdiction over the project.
   8. Change Room and Shower Facilities: Rooms within the designated boundary around the lead control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross-contamination.
   9. Clean Room: An uncontaminated area or room which is part of the worker decontamination enclosure system, with provisions for storage of workers' street clothes and protective equipment.
   10. Competent Person: An onsite supervisor who has been formally trained in lead abatement and who is capable of identifying lead hazards, substandard and improper lead abatement controls, procedures, practices, and conditions and who has sufficient experience and authority to take prompt corrective measures to eliminate them.
   11. Decontamination Room: Room for removal of contaminated personal protective equipment (PPE).
   12. District: Contra Costa Community College District

13. District's Observation Service: Consultant retained by the District to inspect work areas, and collect environmental samples (air, bulk, waste).
14. DOP Test: Test of a High Efficiency Particulate Absolute filter (HEPA) system to verify that a minimum of 99.97% of all particles 0.3 microns in diameter are captured by the filter system test must be conducted with dioctylphthalate (DOP) test aerosol in accordance with ANSI Z9.2 1979 and Federal Standard 209 B for Class 100 air and as indicated in UL 586.
15. Eight-Hour Time Weighted Average (TWA): Airborne concentrations of lead averaged over an 8-hour workday to which an employee is exposed.
16. Fixed Object: A unit of equipment or furniture in the Work Area which cannot be removed from the Work Area.
17. Hazardous Waste: Lead paint debris and materials shall be classified as hazardous due to the characteristic of toxicity, as determined by testing in accordance with the California Code of Regulations, Title 22, Division 4, Chapter 30, Article 11. Any substance(s) listed in Article 11 Section 66699 at concentrations greater than their listed Soluble Threshold Limit Concentration (STLC) or Total Threshold Limit Concentration (TTLC) may need to be further characterized by the Toxicity Characteristic Leaching Procedure (TCLP) in accordance with 40 CFR 261 and other tests prior to disposal as a hazardous waste.
18. HEPA Exhaust System: A portable local exhaust system equipped with HEPA filtration and capable of maintaining a constant, low velocity air flow into contained contaminated areas from adjacent uncontaminated areas when used as Differential Pressure Equipment. Also capable of use as local exhaust to control lead fumes generated from hot work.
19. HEPA Filter: A High Efficiency Particulate Absolute (HEPA) filter capable of trapping and retaining 99.97% of lead particles greater than 0.3 microns in diameter.
20. HEPA Vacuum Equipment: High efficiency particulate air filtered vacuuming equipment with a filter system capable of collecting and retaining lead dust. Filters shall be certified to be of 99.97% efficiency for retaining particles of 0.3 microns diameter or larger.
21. Intact LCP Components: LCP components removed substantially intact with LCP firmly adhering to the surface. Examples are door, door trim, baseboards, etc., with intact paint. Also referred to as architectural debris with intact paint.
22. Lead Based Paint (LBP): Lead Containing Paint (LCP) that is at least 0.5% lead by weight when analyzed by AAS or ICP AES (equivalent to 5000 ppm of lead) or 1.0 milligrams of lead per square centimeter (mg/cm2) as determined by XRF testing or as identified by specification. LBP is also a Lead Containing Construction Material (LCCM).
23. Lead Containing Construction Materials (LCCM): Any construction material: (l) containing lead at analytically detectable levels greater or equal to 50 ppm; or (2) containing paints or other finishes with lead at levels greater than 600 ppm; or (3) consisting of paints containing lead at any level capable of posing an occupational or environmental hazard during any phase or process of the current construction or demolition project. Occupational hazards shall be considered evident when airborne exposure levels exceed or are likely to exceed the permissible exposure level (PEL) set by Cal/OSHA. Environmental hazards shall be considered evident when lead surface contamination levels exceed 800 µg/ft2 on Work Area surfaces and/or when any of the State or Federal hazardous waste criteria for lead is met or exceeded.
24. Lead Containing Paint (LCP): Any paint or finish coating with a lead content of 0.06% lead or greater. Cal/OSHA regulation requires assessment of employee exposure for all tasks where lead is present at this level or higher. Note: At lead levels below 0.06% exposure assessments are still required for "Trigger Tasks".
25. Lead Control Area: An enclosed area or structure with full containment to prevent the spread of lead dust, paint chips, or debris of LCP removal operations. The lead control area is isolated by physical boundaries to prevent unauthorized entry of personnel.
26. Lead Related Waste: Paint chips, vacuum dust, and debris, used cleaning articles, waste water, plastic sheets and other disposable items which were used during the LCP abatement process and as a result are considered lead contaminated waste or assumed hazardous waste pending further characterization.
27. Lead Impacted Construction: Any construction activity, excluding abatement, which disturbs lead or lead containing paints or coatings and which may, under specific circumstances, result in worker and or environmental exposure.

28. Lead Related Construction: Any construction activity or process, including but not limited to lead abatement, LCCM (i.e. paint) removal, lead impacted construction, or welding on lead containing surfaces which may expose workers, building occupants, or the environment to a release of airborne lead or surface lead contamination.
29. Mini containment or Mini enclosure: A small temporary enclosure constructed of impervious material (such as plastic sheeting) with at least one airlock to permit ingress and egress. The entire Work Area is contained or enclosed by this system to prevent the escape of contamination outside the Work Area.
30. Permissible Exposure Limit (PEL): An exposure to airborne lead of 50 micrograms of lead per cubic meter of air (50 µg/m3), averaged over an 8-hour workday which is referred to as a time weighted average (TWA). This is the highest level of Lead in air an employee can be permitted to be exposed to in an eight-hour work day. For longer work days, the PEL is lowered and can be determined by dividing 400 by the number of hours worked per day. When the PEL is exceeded, the Contractor must take action to lower the exposure level and protect the worker per 8 CCR1532.1 Lead.
31. Personal Monitoring: Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour TWA concentration in accordance with Title 8 CCR 1532.1. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulder, with a radius of 6 to 9 inches and the center at the nose or mouth of an employee.
32. Physical Boundary: Area physically roped or partitioned off around an enclosed lead control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead control area".
33. Qualified Person: The individual identified by the Contractor to be responsible for conducting air sampling, calibration of air sampling pumps, evaluating sampling results, and conducting respirator fit tests.
34. Recognized Training/Educational Institution: University, college, Steel Structures Painting Council, or a professional training organization funded by or meeting U.S. Environmental Protection Agency (EPA) and/or California Department of Public Health (DPH) training accreditation requirements for contractors performing lead-based paint or construction related work that exceeds the Department of Occupational Safety and Health (DOSH) Permissible Exposure Limit (PEL) for lead.
35. Removal: All herein specified procedures necessary to remove and clean up all LCCM or LCP from the designated areas and to dispose of these materials at an acceptable site in accordance with Federal, State and Local Regulations. Removal of LCP may be by whole painted component or by removing LCP from painted components either onsite or offsite.
36. District's Representative: Consultant retained by the District.
37. Trigger Task: Task specifically identified by the CAL/OSHA Lead standard as a potential exposure hazard requiring certain protective measures to be implemented prior to obtaining the results of an initial exposure assessment. Trigger tasks include, but are not limited to, any of the following tasks when materials or paints which contain lead are present and will be disturbed:
    a. Manual demolition
    b. Manual scraping or sanding
    c. Heat gun application
    d. Use of power cleaning tools
    e. Rivet busting
    f. Abrasive blasting
    g. Welding, cutting or torch burning
38. Visually Clean: Free of visible dust, paint chips, dirt, debris, or films removable by vacuuming or wet cleaning methods specified. For outside soil or ground cover areas, visually clean shall mean free of construction or paint debris, chips or dust distinguishable from the initial soil or ground conditions.
39. Washroom: A room or area established outside the Work Area for hand washing at minimum. Where the lead PEL is exceeded, the wash room shall contain a shower facility with hot and cold water and a water filtering system.

40. Wet Cleaning: The process of eliminating lead contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been washed with specified detergent solutions and rinsed with clean water.
41. Work Area: A designated and controlled area in which lead abatement actions are undertaken or which may become contaminated as a result of such actions. A Work Area is a controlled area delineated at minimum by barrier tape (or similar means) and signage to restrict access to Authorized Personnel. In some instances, a higher degree of physical isolation and control may be required and specified.

1.4 SUBMITTALS AND NOTICES

A. Requirements are as set forth in the General Conditions and Division 1, for items required to be submitted under this section.

B. Product data shall include manufacturer's product data, specifications, samples and application instructions and other pertinent information necessary.

C. Project procedure submittal for LCP coating removal. Submit the following:
   1. Detailed work plan for all lead-related paint removal including:
      a. removal method to be employed;
      b. lead contamination controls for each different type of method or work operation involving lead containing paint removal;
      c. equipment and materials proposed to be used on LCP coatings;
      d. the procedures and practices for protection of building occupants and the environment; and
      e. detailed description of Work Area preparation and containment controls for lead-related construction work, cleaning and decontamination procedures, signage, and security measures.
   2. Detailed plan for disposal of lead contaminated wastes generated by this work in accordance with all applicable Federal, State and Local regulations. Each separate waste stream should be addressed including name of waste stream, methods of handling, packaging, labeling, storage, transportation, and disposal or recycling. For materials to be disposed, indicate the classification of the waste (RCRA hazardous, California hazardous or non-hazardous).
   3. Method of transport of hazardous waste including name, address, EPA I.D. number, and telephone number of the transporter and the name, class, address, EPA I.D. number, and telephone number of hazardous waste site(s) to be utilized for disposal of each waste stream.
   4. Proposed location, size and type of secured waste storage containers to be used. Include system that will be used for segregating different waste streams.
   5. Detailed schedule for completion of lead-related construction work to be updated on a weekly basis indicating tasks being performed until job completion.
   6. Detailed plan for protection of workers conducting lead-related construction work which includes all information required for the CAL/OSHA lead compliance plan per Title 8 CCR 1532.1. At minimum, for each removal method, the plan shall detail protective clothing and equipment and procedures and worker decontamination facilities and procedures.

D. Project Procedures Submittal for Hot Work on LCP Surfaces
   1. Detailed work plan for containment and removal of lead containing paint, capture of fumes from all hot work including welding and torch cutting on painted structural steel or painted mechanical components. Include equipment and materials proposed to remove paint, capture, HEPA filter, and exhaust all lead containing fumes for protection of workers, building occupants, and the environment.
   2. Cal/OSHA lead compliance plan for welders per 8 CCR 1532.1 Lead.
   3. Daily air monitoring plan to verify that airborne lead levels do not exceed the specified limits in any occupied areas of the building.

E. Project procedure submittal for lead-related construction demolition (e.g. removal of plaster, drywall, wood, stucco, etc. with LCP, cutting and demolition of concrete, demolition of painted mechanical components, removal of ceramic tile). Submit the following:

1. Detailed work plan for all lead-related construction including:
    a. removal method to be employed;
    b. lead contamination controls for each different type of method or work operation involving lead containing materials;
    c. equipment and materials proposed to be used on lead containing materials;
    d. the procedures and practices for protection of building occupants and the environment; and
    e. detailed description of Work Area preparation and containment controls for lead-related construction work, cleaning and decontamination procedures, signage, and security measures.
2. Detailed plan for disposal of lead contaminated wastes generated by this work in accordance with all applicable Federal, State and Local regulations. Each separate waste stream should be addressed including name of waste stream, methods of handling, packaging, labeling, storage, transportation, and disposal or recycling. For materials to be disposed, indicate the classification of the waste (RCRA hazardous, California hazardous or non-hazardous).
3. Method of transport of hazardous waste including name, address, EPA I.D. number, and telephone number of the transporter and the name, class, address, EPA I.D. number, and telephone number of hazardous waste site(s) to be utilized for disposal of each waste stream.
4. Proposed location, size and type of secured waste storage containers to be used. Include system that will be used for segregating different waste streams.
5. Detailed schedule for completion of lead-related construction work to be updated on a weekly basis indicating tasks being performed until job completion.
6. Detailed plan for protection of workers conducting lead-related construction work which includes all information required for the CAL/OSHA lead compliance plan per Title 8 CCR 1532.1. At minimum, for each removal method, the plan shall detail protective clothing and equipment and procedures and worker decontamination facilities and procedures.

F. Lead Paint Removal Personnel Qualification and Protection Submittal. Submit the following:
1. Employee training certifications demonstrating that all employees engaged in LCP removal or hot work activities have attended formal lead hazard and lead related construction training by a Recognized Training/Educational Institution. All training for other lead related construction activities shall be in accordance with the worker training provisions in the CAL/OSHA and California Department of Public Health (DPH) lead regulations and this specification:
    a. The minimum acceptable training course duration is 40 hours for the Contractor's lead abatement Supervisor/Competent Person and all workers conducting removal of LCP.
    b. The minimum training course for workers conducting other lead related construction work shall meet all requirements of 8 CCR1532.1, Lead. Documentation shall consist of training institution certificates or certification by trainer for each employee with dates trained and a copy of the training syllabus.
    c. Updated information shall be provided in advance of on-site lead worker personnel changes.
2. Documentation that all employees engaged in lead-related construction activities or the "Trigger Tasks" have had the appropriate medical examinations specified in Title 8 CCR1532.1 within the prescribed time periods immediately preceding project start up. It shall be the Contractor's responsibility to secure any and all medical and exposure information releases required for employee records in accordance with regulation. Evidence of medical requirement compliance shall include, but are not necessarily limited to:
    a. Documentation of medical surveillance examination by a licensed medical physician prior to commencement of onsite LCP related work including baseline blood lead levels performed within the last six (6) months.
    b. Statement by the examining physician that employee is fit to wear a respirator in accordance with 8 CCR 1532.1 within the last twelve (12) months.
3. Documentation that all employees required to wear respirators has passed respirator fit tests within the past twelve (12) and has been assigned individual respirators which fit them.
4. Methods, procedures and plan for monitoring employee airborne lead exposure during lead abatement activities. Methods and procedures, at a minimum, shall comply with requirements outlined in Title 8 CCR 1532.1 Lead.

G. Lead Related Construction and Equipment Submittal. Submit the following;
   1. Calibration data showing where secondary standards (rotameter) for personal air monitoring equipment have been calibrated from a primary standard within the last 30 days from the date of submittal.
   2. Product data sheets and safety data sheets (SDSs) for each product proposed for use on this project such as wetting agents, chemical paint removers, detergents, adhesives, and abrasives.
   3. Manufacturers certification that HEPA vacuums, HEPA ventilation equipment, and other equipment required to contain airborne dust and fume conform to ANSI Z 9.2
   4. Certification that HEPA filter exhaust systems have been DOP tested in place after installation and been found to provide 99.97% efficient air cleaning for particulates greater or equal to 0.3 microns in diameter. All DOP filter certification testing shall be conducted on site by an independent testing firm.

H. Lead Related Construction/Paint Removal Daily Submittal. Submit the following documentation daily to the District's Observation Service within 24 hours of initiation:
   1. An accurate daily entry log or roster of all authorized personnel entering and exiting the Work Area.
   2. Copies of initial and periodic personnel air monitoring laboratory results and calculated eight-hour time weighted average results for each employee monitored shall be provided within 48 hours of sample collection.
   3. Provide District's Observation Service at least 24 hours' notice prior to scheduling startup of each different by type of lead related construction operation including chemical paint removal, manual demolition of paint finishes or equipment, and hot work on lead containing surfaces.
   4. Updated training and medical certifications (as required herein) shall be provided prior to assignment of new personnel and for existing personnel prior to the stated allowable time limits or expiration dates. The allowable intervals since the last medical examination (12 months), blood lead test (6 months), or fit test (12 months), shall not be exceeded.

1.5 DISTICT'S OBSERVATION SERVICE

A. The District's Observation Service is authorized to provide lead removal and lead related construction compliance observation and monitoring, testing, and technical oversight services including, but not limited to:
   1. Airborne lead monitoring to evaluate the effectiveness of the Contractor's lead dust and fume control work practices, procedures, and dust containment methods. The results from this monitoring shall be used to evaluate the Contractor's personal monitoring data and to evaluate the Contractor's compliance with occupational and environmental regulations.
   2. Visual inspections to verify if the Contractor has met the requirements for various phases of the lead related construction process including Work Area preparation, removal, and clean up and decontamination.
   3. Classify the typical waste streams produced by lead-related construction work according to existing California hazardous waste criteria by laboratory analysis.

B. The District's Observation Service will perform the following:
   1. Inspect the preparation of work areas prior to lead-related construction work.
   2. Review the Contractor's initial and periodic lead exposure air monitoring results.
   3. Inspect paint removal on painted steel prior to hot work.
   4. Periodically, inspect lead-related construction work areas.
   5. Conduct a post work visual inspection of all work areas and wipe testing if requested by the District.
   6. Verify waste stream testing produced by lead-related construction work according to existing California hazardous waste criteria by laboratory analysis.

1.6 CONTRACTOR'S COMPLIANCE AND QUALITY ASSURANCE

A. The Contractor shall have a Competent Person onsite at all times while lead-related construction work is in progress. The Contractor's Competent Person shall communicate and coordinate with the District's Observation Service with regard to work schedule, inspections, daily submittals, and compliance issues.

B. The Contractor's Competent Person shall:
   1. Ensure the Contractor's compliance with the plans, specifications, and work plans.
   2. Conduct worker exposure monitoring using a Qualified Person and provide results to the District's Observation Service.
   3. Pre-inspect Work Areas for compliance and completion prior to notifying the District's Observation Service of the Work Area's readiness for inspection.
   4. Accompany the District's Observation Service during Work Area pre-start and clearance inspections upon request.
   5. Ensure all of the Contractor's lead related construction workers have current valid medical, blood lead test, training, and respirator fit testing records where required and provide copies of all new or updated records to the District's Observation Service for approval before assigning the workers to any work within Work Areas.
   6. Take timely and appropriate corrective actions to ensure compliance with the lead-related construction specifications and to eliminate unsafe, unhealthy, and environmentally unsound work practices regardless of whether or not they are brought to the Contractor's attention by the District's Observation Service.
   7. Adhere by the initial characterization of waste for proper packaging, labeling, storage, transportation, and disposal of waste. Ensure any additional waste testing required is completed and ensure proper storage, shipping and timely disposal of all hazardous waste.

PART 2 - PRODUCTS

2.1 PROTECTIVE COVERING

A. Polyethylene sheets, fire resistant, of 6 mil thickness in size (dimensions) to minimize the frequency of joints.

2.2 CLEANERS

A. For cleanup and decontamination, a tri-sodium phosphate (TSP) wash solution containing at least five percent (5%) TSP shall be used. Alternative cleaning and decontamination agents shall be subject to approval by the District's Observation Service and District's Representative.

2.3 TAPE

A. Duct tape (or approved equivalent) two (2) inches or wider, capable of sealing joints of adjacent sheets of polyethylene sheeting and for attachment of polyethylene sheeting to finished or unfinished surfaces of dissimilar materials and capable of adhering under both dry and wet conditions.

2.4 CHEMICAL PAINT REMOVAL SYSTEMS

A. Chemical paint removal systems shall be selected on the basis of the type of paint/coating to be removed, the substrate type, and chemical compatibility with new coating systems to be applied. Chemical removal systems shall effectively remove paint without adversely affecting the treated surface's suitability for repainting or adversely affecting the bonding, appearance or durability of the coatings to be applied.

B. Chemical paint removal systems containing methylene chloride are prohibited.

C. Submit manufacturer's product data sheets for each chemical remover for review and evaluation by the District's Observation Service and District's Representative. All chemical paint remover products are subject to approval by the District's Observation Service and District's Representative.

2.5 SPRAY ADHESIVE

A. Provide spray adhesive in aerosol cans which is specifically formulated to stick to sheet polyethylene.

2.6 DISPOSAL CONTAINERS

A. Provide six (6) mil thick polyethylene sheeting, six (6) mil leak tight polyethylene bags and other impervious containers as required by applicable regulations. All waste shall be labeled as hazardous or potentially hazardous waste unless proven otherwise by appropriate sampling and laboratory analysis.

B. All hazardous waste shipping containers shall meet applicable DOT requirements.

2.7 WARNING SIGNS AND LABELS

A. Caution Signs: To be minimum of 20 x 14 inches and includes phrase "Caution Lead Hazard, Keep Out Unless Authorized" in minimum two-inch-high letters. These shall be posted at each approach to each lead or removal Work Area or area where lead related construction hot work is conducted.

B. CAL/OSHA Lead Warning Posters: "Warning Lead Work Area, Poison, No Smoking or Eating" shall be posted at the entrance to each Work Area.

C. Labels: Hazardous waste shall be labeled according to Federal, State and Local regulations including, but not limited to, the California Code of Regulations, Title 22, Chapter 30 and the U.S. Department of Transportation 49 CFR Parts 172, 173, 178 and 179.

2.8 PERSONAL PROTECTIVE EQUIPMENT

A. Personal protective equipment shall comply with the requirements of Title 8 CCR 1532.1 Lead.

B. Minimum protective clothing and equipment for lead-related construction work shall consist of fire retardant, disposable, full body coveralls, disposable boots, gloves, or equivalent in accordance with ANSI Z41. Sleeves at wrists and cuffs at ankles shall be secure.

C. Eye protection and hard hats shall be available and worn at all times and shall conform to ANSI 87.1 and ANSI 89.1

D. The Contractor shall provide Authorized Visitors with suitable disposable protective clothing, headgear, respirators, and footwear whenever authorized visitors are required to enter the Work Area. Up to an average of ten sets per day of suitable personal protective equipment shall be made available for authorized visitors.

E. All disposable clothing worn during each work shift shall be removed prior to exiting the Work Area and shall be properly segregated and placed in container for proper waste characterization. The Contractor shall bear full responsibility for additional costs associated with waste profiling and disposal if wastes are not properly segregated.

2.9 RESPIRATORS

A. Provide workers with personally issued respiratory equipment approved by NIOSH and suitable for the lead exposure level in the Work Area. Where respirators with disposable filters are employed, provide sufficient filter for replacement as required by the worker or applicable regulation. Each respirator shall be washed whenever the worker wearing it showers or at least daily prior to storage. The following general conditions shall apply to respirator use:

1. All respirators used must be certified by NIOSH and a respirator program shall be established and implemented.

2. Respirators shall be used whenever airborne lead concentrations will exceed, or are likely to exceed, 50 µg/m3, and for any of the Trigger Tasks which have not been demonstrated to be below the PEL by initial monitoring, and for all operations involving the removal of LCP or welding on surfaces with paint or lead contamination regardless of airborne lead concentrations.
3. Prior to initial monitoring, the level of protection shall follow CAL/OSHA requirements for the specific Trigger Task. Otherwise, the respirators worn shall be selected based on measured or reasonably expected airborne concentrations of lead as follow:
    a. Half face negative pressure air purifying respirator: up to 500 µg/m3
    b. Powered air purifying respirators: up to 50,000 µg/m3
    c. Type C supplied air respirator full face piece pressure demand mode: up to 100,000 µg/m3
4. Disposable respirators are not acceptable at any time. It is always permissible to upgrade to a more protective type of respirator.
5. During all segments of LCP removal and cleanup activities and hot work on LCP coated surfaces, respirator usage shall be required of all persons within the designated Work Areas at all times regardless of airborne lead concentrations.

B. The Contractor is responsible for determination of airborne lead concentration levels for the Contractor's personnel and for providing and enforcing use of appropriate personnel respirator protection based upon airborne lead concentrations and this specification.

C. Respirators shall not be removed inside the Work Area. Workers shall proceed to the designated washing area and clean the external surface of the respirator body before removing the respirator.

2.10 TOOLS AND EQUIPMENT

A. Provide suitable tools for the removal of LCP and LCCM contamination including required HEPA exhaust systems, HEPA exhausted portable welding fume control systems, HEPA vacuums, ground fault circuit interrupters (GFCIs), ladders, scaffold, garden sprayers and portable eyewash systems. All tools and equipment brought onsite shall be clean and free of lead and other hazardous material contaminants. HEPA vacuums shall be labeled with a lead warning label and dedicated to LCP work to prevent commingling of lead wastes with asbestos or other wastes. HEPA filtered exhaust systems shall be DOP tested on site to verify 99.97% effectiveness as an installed system and shall have accurate magnahelic gages to indicate filter performance while in use. Provide sufficient back up equipment for use in the event of equipment failure. Ensure all equipment has been fitted with any necessary feasible noise attenuators to meet occupational and environmental noise standards for building occupants.

B. Provide enough support equipment, including but not limited to, lumber, nails, hardware, shower stalls, hoses, plumbing, drain pans, sump pumps, and waste water storage drums to construct and operate the required hand washing system and portable Wash Room with showers. The number of showers shall be sufficient for the number of workmen scheduled on the job. The water hose used to connect the drain to the showers will not be used for any other purpose. The supply side water hose shall have a check valve to prevent back-flow under any circumstance.

PART 3 - EXECUTION

3.1 GENERAL

A. Public Warning and Safety Information to be Posted
1. Post signs at all approaches to the lead Work Area entrance to read "Caution Lead Hazard - Keep Out Unless Authorized." In addition, post the CAL/OSHA Lead Hazard Warning Poster at the immediate Work Area entrance.
2. A list of phone numbers for the local hospital and for emergency squad, the local fire department, a representative of the Contractor who may be reached 24 hours a day, the District's Observation Service, and District Representative and any other professional Consultants directly involved in the project.

3.2 GENERAL PREPARATION FOR INTERIOR LEAD REMOVAL AND LEAD-RELATED CONSTRUCTION

A. Move all non-fixed objects out of the Work Areas. Such items shall be moved at least five (5) feet from Work Areas.

B. Pre-clean entire floor area and all horizontal surfaces inside and within five (5) feet of the Work Area using HEPA vacuums and wet methods.

C. Cover all non-moveable objects within five (5) feet of the Work Area with six (6) mil polyethylene sheeting and seal with duct tape.

D. Cover all floors within the Work Area with two layers of six (6) mil polyethylene sheeting and seal with duct tape. Shut down, lock out, isolate the HVAC systems that supply, exhaust or pass through the lead control area. All heater vents and registers shall be sealed with two (2) layers of six (6) mil plastic sheeting and duct tape or equivalent.

E. Provide, at minimum, 10-foot candle illumination lighting to the Work Area.

F. Install lead caution signage at each approach to the lead related construction Work Area and lead warning signage just outside each Work Area entry/exit point.

G. When Work Area preparation is complete, notify the District's Observation Service and request an inspection. No work is to proceed in any Work Area until the general Work Area preparation materials, methods, and procedures have been inspected and approved by the District's Observation Service.

3.3 GENERAL PREPARATION OF LEAD REMOVAL OR LEAD-RELATED CONSTRUCTION

A. Cordon off the Work Area extending at a minimum of 10 feet horizontally beyond the area of lead related construction with barrier tape and warning signs as specified herein.

B. Protect windows, doors, and openings within the regulated area adjacent interior areas of the building with a minimum of one layer of 6-mil poly.

C. Where LCP or LCCM components are likely to generate airborne dust or paint chips, devise a suitable containment to contain such dust and prevent dispersal.

D. Provide a designated entry/exit point to exterior Work Areas suitable for workers to properly decontaminate and exit from the Work Area as specified herein. Install lead caution and warning signage as specified above.

E. Notify the District's Observation Service when the Work Area is ready for inspection at the startup of each lead related construction process not previously evaluated and approved by the District's Observation Service. Lead related construction work shall not initially proceed until the Observation Service has checked and approved Work Area preparations.

3.4 WORKER PROTECTION AND DECONTAMINATION PROCEDURES

A. The Contractor shall use only workers medically qualified and trained for lead-related construction, LCP removal, hot work on LCCM surfaces, and respirator usage.

1. Medically qualified shall mean that the worker has had an occupational medical exam for lead exposure and respirator usage within 12 months of abatement start up.
2. The contents of the exam must be in conformance with Title 8 CCR 1532.1.
3. Each abatement worker shall have successfully completed formal documented training in lead hazards and lead abatement methods meeting Title 17 California Department of Public Health (DPH) requirements. Non-abatement workers performing lead-related construction work shall have documented lead training in accordance with Title 8 CCR 1532.1.
4. The Contractor's Competent Person for lead-related construction involving paint removal shall have received at least 40 hours of formal training by a Recognized Training Education Institution in lead hazards and lead abatement.

5. The Contractor shall ensure that no worker is allowed onsite to perform lead removal or lead-related construction work until the District's Observation Service has received and approved all of the worker's medical, training and fit testing certifications.
6. Each worker and Authorized Visitor shall, upon entering the job site, enter the designated clean change room area and put on full body reusable or disposable coveralls, booties or shoe covers, respirator with HEPA filters, and gloves before entering the Work Area.
7. Each worker and Authorized Visitor shall HEPA vacuum contamination from protective clothing and then remove shoe covers before leaving one Work Area for another Work Area inside the same building unless the Work Areas have been interconnected with a secured plastic sheet runway at least three feet wide.
8. When exiting a Work Area, proceed to vacuum off all reusable work clothing and dispose of outer disposable protective clothing as suspect lead waste. Proceed to a designated wash area, remove and clean the respirator and store in a clean container.
9. At the end of the work day, all workers are to do the following in addition to those procedures described above: Place disposable outer garments and shoe covers in separate labeled waste containers dedicated to PPE for proper waste characterization; remove inner disposable clothing and place in waste containers; clean protective gear including respirator, shower or wash hands and face at minimum, and put on clean street clothes in the clean room area.
10. All tools and equipment shall be decontaminated by HEPA vacuuming and wet wiping prior to being taken out of the Work Area. Tools and equipment with inaccessible internals shall be externally wet wiped, bagged and sealed prior to being removed from the Work Area.
11. Workers shall not eat, drink, smoke, or chew gum or tobacco at the work site within 20 feet of any Work Area as specified by the District or the District's Observation Service.

3.5 REMOVAL OF LEAD CONTAINING PAINT BY CHEMICAL REMOVAL

A. Removal of LCP using Chemical Removal system shall be approved for use by the District's Representative and District's Observation Service.

B. The Contractor shall provide additional security measures as necessary to ensure occupants cannot gain access to chemicals and chemically treated surfaces.

C. Safety data sheets for each chemical substance and product used shall be onsite at all times and available for review by the workers, the District's Representative, and District's Observation Service.

D. The Competent Person shall review the contents of the safety data sheets and the safe removal procedures with the workers prior to chemical removal.

E. Workers shall wear chemical goggles, face shields, impervious gloves, aprons, and booties over the standard protective clothing prior to starting chemical removal.

F. Stage or install a temporary emergency eyewash capable of providing a 15-minute flush within the immediate Work Area if corrosive organic or corrosive inorganic paint removal (stripping) products are used. In addition, an emergency shower shall be available onsite within 50 feet of the removal operation.

G. Chemical stripping agents (and neutralizers) shall be applied in accordance with the recommendations of the manufacturer. Remove all paint down to the bare substrate. Ensure that the chemicals used, and the associated removal methods leave a clean and smooth surface capable of accepting a suitable primer/sealer coating after final cleaning. No paint or chemical residue shall be visible on the bare metal surfaces to be welded. All chemical residues shall be removed from surface applied.

H. Containerize all paint and chemical waste in impervious containers labeled as hazardous waste.

I. Package all contaminated rags and protective equipment, and disposable cleaning items and plastic sheets in labeled impervious containers and transfer waste containers to secure waste storage units. The Contractor shall assume all such waste to be hazardous unless proven otherwise by objective waste characterization data.

J. Clean and decontaminate the Work Area in accordance with the procedures outlined herein.

K. Decontaminate all tools and equipment before removing them from the Work Area. Seal or bag-up such equipment for transfer to the next Work Area or operation.

3.6 REMOVAL OF LCP BY MECHANICAL REMOVAL

A. All mechanical removal equipment and systems shall be approved by the District's Representative and District's Observation Service. Such equipment includes but is not limited to abrasive blast (all methods), needle guns, abrasive wheels, and rotopeen equipment.

B. All power tools shall be designed and equipped with effective HEPA filter exhaust systems.

C. The Contractor shall submit a separate work plan for containment of lead dust and debris emissions released by vacuum assisted power tools.

D. Work Area preparation and LCP removal shall be in accordance with the approved work plan.

3.7 CLEANING AND DECONTAMANATION OF REMOVAL WORK AREAS

A. Daily Clean up: Perform the following clean up procedures daily.

1. Clean Work Areas until they are free of loose dust and debris to the satisfaction of the District's Observation Service and/or District Representative using HEPA and/or wet wiping after pick up of large debris.
2. Wet debris with a fine mist of water and collect material. All material to be properly segregated, bagged in 6-mil plastic bags, sealed, and moved to a designated, secure, waste storage area for waste characterization.
3. At the end of each work day the Contractor's Competent Person shall inspect work performed that day to ensure the work has been completed and no dust or residue remains on the areas removed and/or in the Work Area. The District's Representative shall be included in that inspection process when and if they request inclusion.

B. Final Clean up and Decontamination of Abatement Work Areas: At completion of abatement perform cleaning as follows:

1. Remove all visible dust and debris as specified above.
2. Clean all Work Areas where abatement was performed by vacuuming all surfaces with a HEPA vacuum followed by wet wiping with a high phosphate (trisodium phosphate) wash or equivalent. The Contractor shall spray surfaces with a 5-10 percent trisodium phosphate (or approved equivalent) cleaning solution applied with a garden sprayer and wipe or mop surfaces with frequently changed clean towels, rags or mops. Exception: Removal of varnish from wood flooring.
3. Disassemble and remove containment barriers at each Work Area location after cleaning as specified above. Place polyethylene sheeting and tape into waste bags and remove to the temporary waste storage area.
4. Remove six (6) mil polyethylene sheeting on immovable objects and floors (where present) after misting with a high phosphate wash and wet wiping. Place polyethylene sheeting and waste rags in segregated six (6) mil plastic bags, seal and store in a designated, secure, waste storage area for waste characterization.
5. The cleaning procedure used shall prevent spread of contamination and effectively clean surfaces while producing minimal waste.
6. All tools and equipment shall be sealed in six (6) mil plastic bags after being decontaminated using a high phosphate wash and wet wiping prior exiting the Work Area
7. Liquid cleaning wastes shall be filtered prior to containerizing for temporary storage pending hazardous waste characterization. Filter systems shall be able to remove particulate two microns and larger in diameter. Permits, if required, are the responsibility of the Contractor.
8. At least eight hours prior to completion of the first Work Area and again upon completion of final clean up and decontamination, notify the District's Observation Service to obtain a final clearance inspection and testing.

3.8 FINAL CLEARANCE INSPECTION AND TESTING OF REMOVAL WORK AREAS

A. Interior Clearance Inspection and Testing.
   1. After the final cleanup of each Work Area by the Contractor, the District's Observation Service will conduct a visual inspection to ensure that all visible dust and debris has been removed.
   2. If the results of the final visual inspection are satisfactory, the District's Observation Service may proceed to collect clearance dust wipe samples in building areas that will be reoccupied.
   3. If the Work Area is not visibly clean, as determined by the District's Observation Service, the Contractor shall re clean and decontaminate the Work Area.
   4. The visibly clean Work Area shall not contain surface lead contamination at or in excess of 400 micrograms of lead per square foot of surface sampled (µg/ft2) for rough surfaces or 10 µg/ft2 for smooth finish surfaces and 100 µg/ft2 for window sills. Dust wipe samples will be taken using the HUD sampling protocol by the District's Observation Service subsequent to the lead paint removal or lead related construction activities to assess adequacy of the Contractor's cleaning and decontamination procedures.
   5. Dust wipe samples will be collected using commercial wipes moistened with a non-alcohol wetting agent. Areas of approximately one square foot will be selected from horizontal surfaces below or adjacent to where LCCM's components or paint has been removed.
   6. At a minimum, one dust wipe sample will be collected per representative abated area and sent under proper chain of custody protocol to an AIHA or ELLAP accredited laboratory or equivalent.
   7. All dust wipe samples will be analyzed for lead using either AAS or ICP AES for lead and results will be provided to the Contractor within two days of receipt of sample results.
   8. The Contractor's cleaning and decontamination shall be deemed adequate when all collected and analyzed dust wipe sample results from the Work Area are below the following levels of lead:
      a. Smooth floors and horizontal surfaces: 10 micrograms per square foot (µg/ft2)
      b. Window sill: 100 µg/ft2
      c. Window trough, rough floors and exterior surfaces 400 µg/ft2.
   9. If any of the dust wipe samples exceed the clearance criteria, the entire Work Area must be cleaned and re-tested until the clearance criteria are met.
   10. If a Work Area fails the clearance criteria specified above, the Contractor shall re clean the entire Work Area.
   11. Building areas scheduled for demolition do not require final dust wipe testing.

3.9 LEAD-RELATED CONSTRUCTION WORK

A. Where the Contractor's work requires demolition of lead containing materials, disturbance of materials coated with LCP, or removal/installation of architectural, electrical, plumbing, or mechanical components from/to existing LCP coated systems, the Contractor shall take the following precautions:
   1. Cordon off the work area with caution tape and lead warning signs.
   2. Protect workers in conformance with Title 8 CCR1532.1.
   3. Place a plastic drop cloth below the area where LCP paint chips or dust is likely to be released.
   4. Clean up all resulting LCP chip dust and debris by wet wiping or HEPA vacuuming before moving the drop cloth to the next area. Dispose of paint chip and contaminated cleaning materials as specified herein.

B. Where the Contractor's work involves the removal of LCP components such as painted plaster, drywall, concrete, and/or materials such as resilient flooring, ceramic tile, window putty the Contractor shall take the following precautions:
   1. Prepare Interior Work Areas as specified for removal.
   2. Remove components using wet methods and/or HEPA vacuuming to control dust generated by mechanical cutting and/or disassembly. If torch cutting is required, remove the existing paint on all surfaces back at least 12 inches or more in each direction from the hot work as specified herein.

3. Clean up lead containing paint chips, dust, and debris as the removal proceeds and at the completion of work using HEPA vacuums and/or wet wiping. Clean all tools and equipment prior to removing them from the Work Area. Clean all polyethylene sheeting and horizontal surfaces prior to removing the sheeting.
4. Special precautionary controls shall be used as necessary to prevent lead dust, debris or fume from being carried or blown out of the controlled area by wind or air currents. Torch cutting of components with inaccessible paint shall be done with HEPA filtered local exhaust ventilation to capture fumes unless monitoring data reviewed and accepted by the Contractor's Observation Service and District's Representative indicates local exhaust is not necessary.
5. Each removed LCCM component shall be carefully removed from the work areas. Clean up dust and debris as removal proceeds.

3.10 LEAD CONTAMINATION OF BUILDING INTERIOR OR ENVIRONMENT

A. In the event that removed LCCM paint, dust, or debris is not properly contained within the Work Area and thereby escapes, bypasses or penetrates established barriers, the Contractor shall stop work immediately, notify the District's Observation Service and District's Representative immediately, and commence clean up and decontamination procedures as described herein or directed by the District's Representative.

3.11 WASTE STORAGE, SEGREGATION, AND CHARACTERIZATION

A. The Contractor shall provide for secure onsite temporary storage of LCP or LCCM related waste. Waste storage location, equipment, containers and methods are subject to prior approval by the District's Representative.

B. All lead related waste streams and waste categories shall be considered hazardous until proven otherwise through testing by the Contractor. The Contractor shall be responsible for segregating waste into the below listed categories at minimum. If the Contractor allows different waste stream to become co-mingled, the waste will be classified as hazardous if any single component waste stream is hazardous.
   1. LCP removed by chemical stripping.
   2. Painted demolition debris to be landfilled including, plaster, concrete, and metal with lead containing paint.
   3. Lead containing resilient flooring, ceramic tile and window putties.
   4. Paint (LCP) chips, dust and debris, HEPA vacuum waste.
   5. Plastic sheeting and tape.
   6. Disposable Protective Clothing and Equipment (PPE).
   7. Cleaning Rags.

C. The following materials are known California hazardous waste streams with respect to lead:
   1. Not applicable

D. Intact LCP components: Architectural and mechanical equipment debris with intact LBP shall be considered hazardous until proven otherwise through testing.

E. All lead containing waste streams must be verified for federal hazardous waste characteristics for lead prior to landfill disposal.

F. Each lead related waste produced shall be placed in properly segregated, labeled and sealed, impervious containers.

G. Removed intact LCP components shall be properly segregated, wrapped in six mil polyethylene sheeting, labeled and securely sealed with duct tape or placed in a lined bin.

H. All waste containers, bags, and packaged waste shall be stored in a designated, secure, locked waste storage area and be labeled with the following information:
   1. Waste Category: Lead
   2. Date Accumulated: (Insert Date)

3. Name, address: (Insert Facility Name and Address)
4. Origin of waste: (Insert Waste Stream Name, i.e. Paint Chips, Vacuum Bags)

I. HEPA vacuum and wet wipe the exterior of all waste containers prior to removing them from the Work Area to the designated storage area.

J. Each category of waste, except components with intact paint, will be tested and characterized by the Contractor using one or more of the following testing protocols:
   1. CAL/EPA testing protocol: Criteria
      a. Total Threshold Limit Concentration (TTLC): 1,000 ppm lead
      b. Soluble Threshold Limit Concentration (STLC): 5 ppm lead
   2. Federal EPA testing protocol:
      a. Toxicity Characteristic Leaching Procedure (TCLP): 5 ppm lead

K. Based on the testing protocols, any waste greater than or equal to five (5) ppm lead using STLC or TCLP tests or any waste greater than or equal to 1,000 ppm lead using the TTLC test shall be considered a hazardous waste.

L. When the TTLC test result is less than 50 ppm lead, no further testing is required for that waste category sampled unless the waste stream or waste generating process changes. A minimum of four samples will be taken to represent each category of waste generated. It will be the responsibility of the District's Observation Service to ensure representative samples are taken by the Contractor from each category of segregated waste.

M. The Contractor shall package, store, handle, transport and dispose of each category of waste generated based on the testing results unless specific written direction is provided by the appropriate regulatory agency and reviewed and approved by the District's Observation Service. In all cases, the landfill shall be subject to approval by the District's Representative.

N. Upon verbal request of the District's Observation Service, the Contractor shall provide samples of lead-related waste to the District's Observation Service. The Contractor shall provide samples within full view and presence of the District's Observation Service and District's Representative upon request.

O. The cost of any further waste characterization or waste profiling required by the approved landfill will be the responsibility of the Contractor.

P. In the event that District's Observation Service has determined that waste is not properly segregated, additional waste testing may be conducted of the mixed waste stream. The Contractor shall be responsible for the costs associated with this additional testing.

Q. The Contractor shall bear full responsibility for additional costs associated with waste disposal and characterization if waste is not properly segregated as required herein.

3.12 HAZARDOUS WASTE DISPOSAL

A. Site Storage and Handling:
   1. The Contractor shall pay strict attention to the requirements of 40 CFR 262 and 265 and Title 22, Chapter 30 for the onsite handling of lead waste/debris, with special attention given to the time of storage, amount of material stored at any one time, use of proper containers, and personnel training. All waste shall be stored in secure, locked, labeled, sealed impervious containers and not placed on the unprotected ground. All containers shall be shielded adequately to prevent dispersion of the debris by wind or rain and shall be labeled as hazardous waste. Any evidence of improper storage shall be cause for immediate shutdown of the project until a corrective action is taken.

B. Transportation and Disposal of Waste:

1. The Contractor shall arrange to have the LCP waste and debris transported from the site in accordance with the requirements of 40 CFR 263 and 264 and disposed of properly in accordance with 40 CFR 268, GISO 8 CCR Articles 40 and 41, 49 CFR Parts 172, 173, 178, and 179 and Title 22, Chapter 30, Articles 5, 6, 6.5 and 8.
2. The Contractor shall submit to the District and the District's Observation Service the Name, Class, and EPA I.D. Number of the waste disposal site(s) to be used for each waste category which has been determined by testing to exceed the hazardous waste thresholds provided herein.
3. The Contractor shall prepare waste shipping manifests for review by the District's Representative. Upon waste or material pickup by the selected waste transporter, manifests shall be signed by the District's Representative and copies retained to verify that all steps of the handling and disposal process have been completed properly.
4. Copies of the landfill weight tickets shall be provided to the District's Representative to verify the amount of waste disposed of at that site. The Contractor shall be responsible for all costs associated with transportation and disposal of all wastes generated at the result of this work.

C. No waste characterized as hazardous waste shall be stored onsite for more than 90 days prior to being properly transported for disposal.

D. All equipment, materials, and waste generated on this project must be removed offsite to their proper locations by the Contractor within 14 calendar days from removal and lead related construction work completion.

E. Containers to be loaded for transportation from the storage area must be removed by workers who have entered from uncontaminated areas, dressed in clean coveralls.

3.13 STOP WORK ORDERS

A. The District and/or the District's Observation Service has the authority to stop work if it is determined that conditions or procedures are not in compliance with the specifications and/or applicable regulations; to the extent of potential endangerment of building users, workers, building occupants, District employees, the public or environment. The work stoppage shall remain in effect until conditions have been corrected and corrective measures have been taken to the satisfaction of the District's Representative and the District's Observation Service. All standby time and testing costs required to correct the above-mentioned problems shall be borne solely at the Contractor's expense. Examples of such conditions that might result in a work stoppage include but are not limited to:

1. Uncontrolled visible emissions which escape the established Work Area or breach physical protective barriers within the Work Area; and/or,
2. Ambient airborne levels of lead outside the construction area at more than 15 micrograms per cubic meters of air (µg/m3) of lead averaged over an eight-hour work period or 5.0 µg/m3 for any 24-hour period. Measurements of the ambient airborne lead levels shall be made outside the immediate Work Area and at the nearest occupied areas.
3. Unsecured Waste Storage Area and/or improper containment of lead abatement waste or LCP contamination.

3.14 CLOSEOUT

A. Prior to approval of payment request, the Contractor must provide the following information:

B. Copies of hazardous waste manifest, profile sheets and weight tickets for all hazardous waste and for all nonhazardous waste or waste recycle receipts.

C. All surface damages during the work must be restored to their original condition except those surfaces scheduled for demolition as part of the renovation project.

END OF SECTION

Table I - Lead Containing Paints and Materials

Sample No.	Material Description	Sample Location	Lead Concentration (ppm)
PS Buildings			
Pb-01	White Paint on Drywall Ceiling System	Room 14 of the Structure	ND<60
Pb-02	Brown Paint on Metal Door	Room 16 of the Structure	750
Pb-03	Brown Paint on Wooden Wall System	1st Floor of the Structure at Building Exterior	ND<70
Pb-04	Brown Paint on Wooden Wall System	2nd Floor of the Structure at Building Exterior	ND<60
Pb-05	Grey Paint on Wooden Trim	2nd Floor of the Structure at Building Exterior	ND<60
Honors Portable Structure			
Pb-01	Brown Paint on Metal ADA Handrail Assembly	Building Exterior	ND<60
Pb-02	Brown Paint on Metal Door	Building Exterior	ND<70
Pb-03	Brown Paint on Wooden Wall System	Building Exterior	ND<60

ppm = parts per million, ND = Not Detected

ATTACHMENT A
LEAD-RELATED WORK PLAN OUTLINE

In accordance with the contract documents, Cal-OSHA Lead in Construction Standard (Title 8 CCR 1532.1) and DPH (17 CCR Division 1, Chapter 8), the Contractor is required to prepare a written, site-specific Lead Compliance Plan, and submit to the District for approval prior to start of work. This plan is required for the contractor to meet Cal-OSHA and DPH requirements as well as the contract documents and shall describe work procedures and control methods that will protect the District's facilities and the environment. All contractors performing lead-related construction work shall prepare plans.

I. Location of Work:
The work to be completed under this work plan will be completed at:
(Building name)
(Location within building)

II. Description of Work:
Describe the anticipated work scope, including:
A. Paint removal (list paints or coatings, and locations)
B. Paint stabilization or encapsulation (list paints or coatings, and locations)
C. Removal and/or replacement of lead-coated components (list components and locations)
D Removal of lead containing bulk materials
E. Dust/residue removal or decontamination (list materials and locations)
F. Demolition of lead-coated components
G. Any other activities that will or may result in worker exposures to lead

III. Schedule:

Phase/Task	Anticipated Date(s)
Mobilization	_____
Set-up of work area(s), containments	_____
Lead-related construction	_____
Final Cleaning	_____
Visual Inspection	_____
Final Clearance (visual and sampling)	_____
Teardown	_____
Demobilization	_____

The competent person, _____, will conduct worksite visual inspections on a daily basis, or more often as necessary.

IV. Equipment and Materials
List all equipment and materials to be used, such as the following:

HEPA Vacuums	Negative air filtration units
Scrapers	Manometers
Power saws	Shower facilities
Pry bars	Airless sprayers/compressors
Cutting shears	Cleaning detergents
Other hand tools	Solvents (must be approved by District)
Encapsulants/sealants	Roller/brushes
Gloves	Disposable coveralls
Respiratory protection	Eye & foot protection

V. Crew

List all workers and supervisors with emergency contact names and phone numbers.

Clearly identify the supervisor and competent person who have authority for all safety and health.

VI. Control Measures and Work Practices

Describe in narrative format specific work procedures, exposure/contamination controls, and engineering controls. This description should include, but not be limited to, the following:

Location, size, layout & detail of work
Negative pressure enclosure
Respiratory protection
Vacuum assisted blasting
Containment (i.e., poly barriers)
Methods to assure safety of bldg. occupants
Removal method to reduce lead dust generation
Wet methods
Local exhaust ventilation for tools
HEPA vacuums
General room ventilation
Interface of trades involved
Pollution control

VII. Technology to Be Used in Meeting the OSHA PEL

List all or any specialized equipment to be used to meet the PEL.

VIII. Respiratory Protection and Protective Clothing/Personal Protective Equipment

List all respiratory protection including types and manufacturers which are anticipated for this project. Identify the phases of the project for which respirators will be required or likely to be required. List all personal protective equipment anticipated to be used on the project.

IX. Decontamination/Hygiene Facilities

Identify the types and locations of decontamination or hygiene facilities to be used on this project. Specify use of disposable towels, soap, hot and cold water, and other supplies. Specify the required use of the facilities, including use of the facilities prior to eating, drinking, smoking and before leaving the project site. Describe handling or treatment of lead-contaminated solid waste and wastewater.

X. Air Monitoring Data

Identify general worker air monitoring protocols to be followed on this project, including worker category classifications, frequency of monitoring, anticipated laboratory to be used for analysis, pump calibration techniques, etc. Identify the competent person responsible for conducting personal air monitoring.

XI. Medical Surveillance Program

SECTION 02 84 00
PCB CONTAINING MATERIALS ABATEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The General Conditions and Division I General Requirements shall be included in and made part of this Section.

B. Examine all other Sections of the Specifications for requirements therein affecting the work of this Section of the Specifications.

1.2 COMPLIANCE AND INTENT

A. This Section specifies requirements for abatement of Polychlorinated Biphenyl (PCB) containing materials. The Contractor shall coordinate all abatement work with the specifications. During all work, provide monitoring and worker protective equipment in accord with the California Occupational Safety and Health Administration (Cal-OSHA) and as required by this section and all other sections of the Specifications. Where there is conflict, the most stringent requirement shall apply.

B. The work covered by this specification includes the removal of PCB containing materials including, but not limited to, light ballasts and building envelope sealants. Remediation will also be required of porous building contact surfaces with PCB sealants including brick and stucco. All contact metal surfaces must be thoroughly decontaminated prior to recycling or disposal.

C. All work shall comply with Environmental Protection Agency (EPA) rules and regulations governing PCBs: 40 CFR 761, as published in the most recent edition of the Federal Register. Additionally, all work and work-related practices shall comply with applicable federal, state and local rules and regulations including, but not limited to, the California Department of Industrial Relations, California Code of Regulations (CCR) Title 8; Department of Health Services, CCR Title 22 and California Health and Safety Code, Division 20. Where conflicts occur, compliance shall be based upon the most stringent requirements.

D. Workers involved in the removal of PCBs shall have received specific training on the hazards, appropriate personal protection and decontamination procedures associated with PCBs.

E. Furnish all labor, materials, facilities, equipment, services, employee training, medical monitoring, permits and agreements necessary to perform the work required for PCB abatement in accordance with this section of the Specifications, other sections of the Specifications and other documents included in the contract.

F. Perform all work specified herein with competent persons trained, knowledgeable and qualified in state-of-the-art techniques relating to hazardous materials abatement, handling, and the subsequent cleaning of contaminated areas.

G. Perform appropriate waste profile testing for all PCB contaminated waste as required by the Specifications, the regulations, and the selected landfill(s). All testing shall be done in the presence of the District or District's designated representative. Chain-of-custody forms shall be provided to the District within one (1) day following sample delivery to the laboratory.

H. During removal activities, the Contractor shall protect against contamination of soil, water, plant life, and adjacent building areas and shall ensure that there is no release of hazardous materials and dusts. The District or District's designated representative may collect air and wipe samples in adjacent areas to evaluate the Contractor's performance.

I. It is the Contractor's responsibility to determine the quantities of hazardous materials impacted by the planned demolition.

J. Hazardous materials removed during the abatement activities shall be handled, transported and disposed of in accordance with all applicable federal, state and local regulations.

K. Gross abatement of PCB containing materials and materials contaminated with PCBs shall be conducted using containments and decontamination units unless otherwise specified. Evidence of the release of PCBs above the background level will necessitate additional controls including but not limited to an enclosure.

1.3 DEFINITIONS

A. Certificate of Disposal: The document provided to the generator certifying that the PCB wastes were disposed of in strict accordance with all applicable federal, state, and local regulations.

B. Chain-of-Custody: A legal concept involving documentation of the physical possession of a sample/samples from the moment it is collected, transported, analyzed, and ultimately stored in an archive.

C. Competent Person: One who is capable of identifying existing and predictable hazards and who has the authority to take prompt corrective measures.

D. Decontamination Area: Area which is constructed to provide the means for workers to store clothing, equipment and other articles, and to properly remove contamination upon concluding work activities that result in exposure to these hazardous materials.

E. DOP: Dioctylphthalate, the challenge aerosol used to perform on-site leak testing of HEPA filtration equipment.

F. Decontamination Unit: Refers to system of airlocks used to decontaminate personnel, waste bags, equipment, etc. when exiting the work area. A decontamination unit shall be set up for each containment area.

G. Equipment Decontamination Enclosure System: A decontamination enclosure system for materials and equipment, typically in a designated area of the work area, and including a washroom, a holding area, and an uncontaminated area.

H. HEPA: High Efficiency Particulate Air filter capable of filtering out airborne particulate 0.3 microns or greater in diameter at 99.97 percent efficiency.

I. Manifest: The document authorized by both federal and state authorities for tracking the movement of PCB containing wastes.

J. PCB Liquid Waste: Any liquid identified to contain PCB through laboratory analysis at a concentration equal to or exceeding 500 PPM.

K. PCB Soild Waste: Any solid that comes in direct contact with PCB liquids which cannot be decontaminated and any solid materials generated as the result of PCB Spill clean-up operations.

L. PCB-Contaminated Liquid Waste: Any liquid identified to contain PCB through laboratory analysis at a concentration greater than or equal to 50 PPM and less than or equal to 499 PPM or those liquids the USEPA requires to be assumed at 50-499 PPM in the absence of testing.

M. PCB Contaminated Solid Waste: Any solid that comes into direct contact with PCB Contaminated liquids which cannot be decontaminated and any solid materials generated as the result of PCB Contaminated spill clean-up operations.

N. PCB Containing Wastes: Any wastes either tested and found to contain PCB greater than or equal to 50 PPM or those requiring assumption under 40 CFR 761. These wastes include both PCB and PCB-contaminated liquids (including all flushing wastes) and solids.

O. PCB Bulk Product Waste: Materials (such as sealants) and porous contact surfaces impacted by leaching and found to contain PCBs greater than or equal to 500 PPM.

P. PCB Spill: The intentional and/or unintentional spills, leaks, and other uncontrolled discharges where the release results in any quantity of PCB, running off or about to run off the external surface of the equipment; and the contamination resulting from those releases.

Q. Polychlorinated Biphenyl (PCB): Any chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contains such substance.

R. Powered Air Purifying Respirator (PAPR): A full facepiece respirator that has the breathing air powered to the wearer after it has been purified through a filter.

S. Respirator: A device designed to protect the wearer from the inhalation of harmful atmospheres.

T. Returned Manifest: An original duplicate copy of the manifest provided to the PCB Waste generator within forty-five (45) days of the transport date which acknowledges the receipt of the material at the disposal facility.

U. Visual Inspection: A visual inspection of the work area under adequate lighting to ensure removal of all PCB materials, contaminated waste, and that the work area is free of visible material, debris, and dust.

1.4 PCB CONTAINING MATERIALS

A. The following suspect-PCB containing, and contaminated materials must be removed prior to building demolition:

MATERIAL	GENERAL LOCATION	Estimated Quantity
PS Building		
Fluorescent Light Ballasts not labeled “No PCBs”	Interior lighting fixtures	120 ea
Honors Trailer		
Fluorescent Light Ballasts not labeled “No PCBs”	Interior lighting fixtures	20 ea

ea – each, sf = square feet, lf = linear feet, cu. ft. – cubic feet

B. Provide a detailed removal work plan to be included with submittal per 40 CFR 761.61(a)(3)(C) and approved by the EPA Region IX administrator based upon proposed abatement strategy.

1.5 SUBMITTALS PRIOR TO START OF WORK

A. The reviews by the District or District’s designated representative are intended to be only for general conformance with the requirements. The District or the District’s designated representative assumes no responsibility for permits, licenses, notices, materials and methods, equipment or temporary construction required to execute the work described in this Section of the Specification or in other Sections of the Specification or in other documents included in the contract documents.

B. The following items shall be submitted to, and approved by, the District or District’s designated representative before commencing work involving the PCB abatement.
   1. Provide a detailed work plan for PCB abatement and disposal.

2. Provide a site safety plan for PCB abatement prior to project initiation. The site safety plan shall deal with, at a minimum: Personal protective equipment; Site safety and health hazards; PCB Spills; control of water leakage or discharge within and/or from the work area; medical emergency; materials handling procedures; Contractor's internal administrative and inspection procedures; earthquakes and/or fire emergency procedures; protocol for responding to complaints or questions from interested parties; 24-Hour emergency telephone numbers for individuals with authority to respond to emergencies.
3. Notification is required a minimum of thirty (30) days prior to sealant abatement work to the EPA Regional Administrator for the intent to remove PCB caulking and PCB contaminated building materials. Any proposed changes to the approved abatement plan must be completed in writing 14 days prior to implementation.
4. Workers: Demonstrate education and specialized training
5. Respiratory Protection Program (RRP) in compliance with Title 8 CCR 5144.
6. Proof of Respirator Fit Testing: Provide proof of respirator fit testing. Fit testing records must be less than eleven (11) months old and document testing on the type of respiratory protective equipment used for this project. Fit testing records must be signed by the Competent Person.
7. Licenses: Submit copies of state and local licenses, evidence of Cal-OSHA registration and permits necessary to carry out the work of this contract.
8. Safety Data Sheets (SDSs)/Specification Sheets: The Contractor shall submit SDSs and Specification Sheets for all chemicals, encapsulants, etc. to be used for this project.

1.6 SUBMITTALS AT THE COMPLETION OF THE PROJECT

A. Upon completion of on-site work, Contractor shall provide a detailed project summary that will include each of the items listed below. The project Summary shall be submitted and approved by the District's representative and shall include the following:
   1. Copies of the Security and Safety Logs showing names of persons entering the work areas. The logs shall include date and time of entry and exit, supervisor's record of any accident (detailed description of accident).
   2. Emergency evacuations and any other safety or health incident.
   3. Waste manifests including Land Disposal Restrictions Notice and Certification.
   4. Project Summary including, but not limited to, the following: location and approximate quantity of PCBs removed, hazardous waste hauler certifications, waste disposal/recycling facilities, dates of commence and completion of on-site work.

PART 2 - PRODUCTS

2.1 SIGNS AND LABELS:

A. Warning signs for work areas shall be approximately 18 inches square with yellow background and 1-inch black letters. Signs shall read “DANGER – KEEP OUT – TOXIC CHEMICAL WORK AREA”.

B. Location of Caution Signs and Labels: Provide bilingual caution signs at all approaches to work areas in languages used by the Contractor’s employees. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area.

2.2 PLASTIC SHEETING:

A. Use fire-retardant (FR) polyethylene (poly) film manufactured by PolyAmerica, Grand Prairie, Texas 75051, or equal.
   1. Thickness - 6-mil, minimum, NO EXCEPTIONS.
   2. Flame Resistance/Flame Spread Rate <25.
   3. Conforms to NFPA #701 and Tested in accordance with ASTM E-84.
   4. Spray adhesive for sealing polyethylene to polyethylene shall contain no methylene chloride or methyl chloroform (1,1,1-trichloroethane) compounds.

2.3 VACUUM EQUIPMENT:

A. All vacuum equipment used in the work area shall use HEPA filtration systems and be of the wet-dry type. The Contractor shall provide on-site independent DOP testing to document the effectiveness of the vacuum units. The test results shall be signed by the individual performing the testing.

B. All filter media must be disposed as PCB-contaminated waste at the end of filter life and at conclusion of the PCB remediation work at the site.

2.4 LOCAL EXHAUST AND VENTILATION EQUIPMENT:

A. Sufficient High Efficiency Particulate Absolute (HEPA) ventilation units shall be used to maintain negative pressure in each work area and a minimum of four (4) air changes per hour for all dust producing work.

B. Contractor shall provide onsite independent DOP testing to document the effectiveness of the air filtration units. The test results shall be signed by the individual performing the testing. Provide documentation to the Owner or Owner's designated representative.

C. All filter media must be disposed as PCB-contaminated waste at the end of filter life and conclusion of the PCB remediation work at the site.

2.5 OTHER TOOLS AND EQUIPMENT:

A. The Contractor shall provide other suitable tools for the removal and disposal activities.

B. All PCB fluids, PCB-contaminated fluids, including flush and cleaning solvents and mixtures, shall be stored in sealed DOT 17E closed top drums or other waste container approved for storage of these materials.

C. All PCB solid wastes and items including disposable items used in the course of the work such as rags, absorbents, protective clothing, etc., shall be stored in sealed DOT 17C open type drums or other waste container approved for storage of these materials.

D. Any PCB Article Container, other than approved DOT drums, specified in this specification, intended for storage, shall be submitted to the District or District's designated representative for approval.

E. For removal of PCB fluids or residual material on non-porous surfaces use an appropriate solvent in which PCBs are shown to be at least 5-percent soluble by weight. Solvents specified by the U.S. EPA include kerosene, diesel fuel, terpene hydrocarbons and mixtures of terpene hydrocarbons and terpene alcohols. Care should be taken to limit the complexity of the waste stream. In all cases where solvents are used in the course of work, proper ventilation shall be provided by the Contractor to ensure that resulting fumes/vapors are not dispersed to areas beyond the work area. The manufacturer's recommendations for application and requirements of Cal-OSHA shall be strictly observed.

F. Use an appropriate cleaning agent in which PCBs are shown to be at least 5-percent soluble by weight. Care should be taken to limit the complexity of the waste stream. Numerous, non-toxic, cleaning agents shown to meet or exceed the solubility requirement above are commercially available. In all cases where cleaners are used in the course of work, proper ventilation shall be provided by the Contractor to ensure that resulting fumes/vapors are not dispersed beyond the work area. The manufacturer's recommendations for application and requirements of Cal-OSHA shall be strictly observed.

G. Absorbents: "Safestep" as manufactured by Andesite of California, Inc., or approved equal.

PART 3 - EXECUTION

3.1 SAFETY PROCEDURES AND WORKER PROTECTION

A. Take all precautions and measures required to protect employees, inspection personnel, District's on-site personnel and the general public from exposure to PCB solids, liquids and vapors.
   1. All personnel authorized for entry in work areas shall be instructed in the proper procedures for working with or around electrical hazards and PCB containing/contaminated materials.
   2. All electrical equipment upon which PCB related activities are to be performed shall be de-energized, locked out/tagged out and permanently disconnected from any power source prior to the commencement of the work.
   3. Consumption of food or tobacco products shall not be permitted in any of the project work areas where PCBs, volatile solvents and/or other hazardous materials are present. Additionally, no open flames will be permitted in these same areas. Signage to this effect shall be provided for each work area.
   4. The Contractor performing the work of this Contract shall develop, together with applicable subcontractors, a contingency plan covering accidental spills and work exposure to PCBs. The plan shall be submitted to the District or District's designated representative prior to commencing PCB-related work. The submittal shall also include a separate section to describe the hauler's spill contingency plan and avoidance procedures.

B. Work Area Protection and Marking: Prior to commencing any PCB-related work activities provide barricades and warning signs to clearly identify and effectively guard against unauthorized entry into the work areas. The District or District's designated representative will inspect and approve all containment setups before any abatement is undertaken. If a containment area is breached (failure of polyethylene seals, visible dust emission, etc.), the Contractor shall take immediate action to control the breach and clean the area to the satisfaction of the District or District's designated representative. Clearance for any contaminated areas will be determined by the District or District's designated representative and may include sampling.
   1. Place barricades to maintain a minimum of 25 feet from all perimeters of the work being conducted to the barricades, where feasible.
   2. All equipment such as tools, containers, etc., shall be confined to the work area until work is complete, containers are sealed and equipment properly decontaminated and safely stored for transport.

C. Protective Clothing and Equipment: At all times when suspect PCB fluids or mixtures in any volume are not sealed in drums, containers or electrical equipment, workers shall wear:
   1. Gloves impermeable to both PCBs and the solvent and/or clean up agent in use.
   2. Disposable, full body suit, impermeable to both PCBs and the solvent and/or clean up agent in use.
   3. Appropriate eye protection to ensure that eyes are protected from liquid splatter or exposure to concentrated vapors or fumes.
   4. Respiratory protection appropriate for the concentration of the hazardous material(s) and atmosphere present. Supplied air must meet requirements for Grade D air, at a minimum. Establish a respiratory protections program as outlined by ANSI and required by Cal-OSHA. Select respirators from those approved by the National Institute for Occupational Safety and Health (NIOSH). Respirators selected must be approved by the Competent Person. Submit program for review a minimum of five (5) working days prior to the commencement of abatement activities.
      a. The Contractor shall provide protective clothing, eye protection, and breathing apparatus as required for authorized inspection personnel upon request.
      b. Pre-cleaning, containment set-up, and containment removal work: NIOSH-approved, half-face respirators with double stack Organic Vapor/HEPA cartridges.
      c. All interior/exterior PCB work: NIOSH-approved, half-face respirators with double stack Organic Vapor/HEPA cartridges.

D. Personnel Protection and Procedures: The PCB work area shall at no time be left unattended from the commencement of remediation work and until all PCBs and incidentals have been sealed in approved containers. If immediate transportation to the PCB storage facility or disposal facility is not feasible the work area must be secured in a manner approved by the District or District's designated representative.
   1. During work procedures and at all times when PCB containing materials/contaminated fluids in any volume are not sealed in drums, containers or electrical equipment, all personnel entering the regulated work area must don protective clothing and equipment. Upon exiting the work area, all disposable protective clothing shall be placed in appropriate waste storage drums and sealed, for subsequent transportation to the on-site storage facility or disposal facility.
   2. Workers with cuts or scratches shall seal these wounds sufficiently to prevent accidental contact of the hazardous materials within the regulated work area prior to entering the regulated work area. Similarly, workers who accidentally incur minor cuts or scratches in the course of work activities shall immediately leave the work area, cleanse the wound with medical grade soap and seal the wound before returning to the work area.

3.2 PERSONNEL PROTECTION

A. Informed Workers:
   1. All workers shall be informed of the hazards of PCBs and any other hazardous materials exposure. Workers shall also be instructed in the use and fitting of respirators, protective clothing, decontamination procedures, and all other aspects associated with the abatement work.

B. Personal Hygiene Practices:
   1. The Contractor shall enforce and follow good personal hygiene practices during the abatement of hazardous materials. These practices will include but not be limited to the following:
   2. No eating, drinking, smoking or applying cosmetics in the work area. The Contractor shall provide a clean space, separated from the work area, for these activities.
   3. If data gathered by the District or District's designated representative in areas adjacent to the work areas shows exposure to PCBs or other hazardous materials exceeding Cal-OSHA criteria, that area will become regulated and workers must wear protective clothing and approved respirators and must have a shower facility provided to them.

3.3 PCB REMOVAL

A The Contractor shall remove all light ballasts not labeled as "No PCBs" from lighting fixtures throughout the buildings.

3.4 CLEARANCE INSPECTIONS

A Initial Visual Inspection: Contractor shall notify the Owner or Owner's designated representative when the decontamination process in each containment area is complete. Evidence of dust or debris will require additional clean up by the Contractor. Contractor shall be responsible for re-cleaning all areas found to be deficient.

B If the Owner or Owner's designated representative determines that the work area is sufficiently clean, the Contractor may proceed. If the Owner or Owner's designated representative determines that certain areas require additional cleaning, the Contractor shall re-clean the work area and request a second inspection of the recleaned area. All costs incurred by the Owner for inspections required after the second inspection will be charged to the Contractor.

3.5 HAZARDOUS MATERIALS DISPOSAL

A. It is the responsibility of the Contractor to coordinate waste handling, labeling, transportation, and disposal with the District's waste transportation and disposal vendor. The Contractor must comply fully with these Specifications, local, state, and federal regulations and provide documentation of the same.

B. All sealants must be disposed as PCB containing bulk product waste.

C. PCB impacted building materials in contact with sealant, cleaning supplies, filters, and PPE may be must be disposed as PCB bulk product waste. If solvents are used, additional characterization for hazardous properties will be required.

D. Contractor shall provide at minimum three (3) day advance notification to the District when signatures are required on manifest(s). The Contractor shall ensure that the Hazardous Waste Manifest is correctly filled out. The Contractor shall give the appropriate copies to the District.

END OF SECTION

ATTACHMENT A
PCB WORK PLAN OUTLINE

In accordance with the contract documents, the Contractor is required to prepare a written, site-specific PCB Work Plan, and submit to the Owner for approval prior to start of work. This plan is required for the contractor to meet Cal-OSHA requirements as well as the contract document and shall describe work procedures and control methods that will protect the Owner's facilities and the environment.

I. Location of Work:
The work to be completed under this work plan will be completed at:
(Building name)
(Location within building)

II. Description of Work:
Describe the anticipated work scope

III. Schedule (days and hours of operations):

Phase/Task	Anticipated Date(s)
Mobilization	_____
Set-up of work area(s), containments	_____
Abatement	_____
Final Cleaning	_____
Visual Inspection	_____
Teardown	_____
Demobilization	_____

IV. Equipment and Materials
List all equipment and materials to be used, such as the following:

HEPA Vacuums	Gloves
Hand tools	Cleaning Agents
Solvents	Respiratory Protection
Absorbents	Disposable coveralls
Eye & foot protection	

V. Crew
List all workers and supervisors with emergency contact names and phone numbers.

Clearly identify the supervisor and competent person who have authority for all safety and health.

VI. Control Measures and Work Practices

Describe in a narrative format specific work procedures, exposure/ contamination controls, and engineering controls.

VII. Respiratory Protection and Protective Clothing/Personal Protective Equipment

List all respiratory protection including types and manufacturers which are anticipated for this project. Identify the phases of the project for which

respirators will be required or likely to be required. List all personal protective equipment anticipated to be used on the project.

VIII. Decontamination/Hygiene Facilities

Identify the types and locations of decontamination or hygiene facilities to be used on this project. Specify use of disposable towels, soap, hot and cold water, and other supplies. Specify the required use of the facilities, including use of the facilities prior to eating, drinking, smoking and before leaving the project site. Describe handling or treatment of solid waste and wastewater.

IX. Air Monitoring Data

Identify general worker air monitoring protocols to be followed on this project, including worker category classifications, frequency of monitoring, anticipated laboratory to be used for analysis, pump calibration techniques, etc. Identify the competent person responsible for conducting personal air monitoring.

X. Containment Diagram

Include a diagram (hand written is acceptable) of the containment(s) showing the containment perimeter in relation to the surrounding areas and decontamination areas.

XI. Waste

Describe how all waste on this project will be packaged, labeled, stored, transported, manifested and dispose. Provide name of transportation vendor and disposal vendor, location of disposal vendor if not specified by the Owner.

XII. Preparation of PCB Work Plan

Date Prepared and Prepared By (signature, name and title)

SECTION 02 87 00
UNIVERSAL WASTE (UW) REMOVAL AND DISPOSAL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The General Conditions and Division I General Requirements shall be included in and made part of this Section.

B. Examine all other Sections of the Specifications for requirements therein affecting the work of this Section of the Specifications.

1.2 COMPLIANCE AND INTENT

A. This Section specifies requirements for removal of Universal Waste (UW). The Contractor shall coordinate all work with the specifications and drawings. During all work, provide monitoring and worker protective equipment in accord with the California Occupational Safety and Health Administration (Cal-OSHA) and as required by this section and all other sections of the Specifications. Where there is conflict, the most stringent requirement shall apply.

B. The work covered by this specification includes the removal of UW including, but not limited to fluorescent light tubes, compact fluorescent bulbs, batteries and regulated refrigerants.

C. All work shall comply with Environmental Protection Agency (EPA) rules and regulations governing UW: 40 CFR 273, as published in the most recent edition of the Federal Register. Additionally, all work and work-related practices shall comply with applicable federal, state and local rules and regulations including, but not limited to, the California Department of Industrial Relations, California Code of Regulations (CCR) Title 8, Division 1, Chapter 4; Department of Health Services, CCR Title 22, Division 4.5 and California Health and Safety Code, Division 20. Where conflicts occur, compliance shall be based upon the most stringent requirements.

D. Workers involved in the removal of UW shall have received specific training on the hazards, appropriate personal protection and decontamination procedures associated with UW.

E. Furnish all labor, materials, facilities, equipment, services, employee training, medical monitoring, permits and agreements necessary to perform the work required for UW removal and disposal in accordance with this specification.

F. Perform all work specified herein with competent persons trained, knowledgeable and qualified in state-of-the-art techniques relating to UW removal/disposal and the subsequent cleaning of any potentially contaminated areas.

G. Perform appropriate waste profile testing for all UW waste as required by this specification, the regulations, and the selected disposal/recycling facility. All testing shall be done in the presence of the District or District's designated representative. Chain-of-custody forms shall be provided to the District within one (1) day following sample delivery to the laboratory.

H. During removal activities, the Contractor shall protect against contamination of soil, water, plant life, adjacent building areas, and shall ensure that there is no release of hazardous materials.

I. It is the Contractor's responsibility to determine the quantities of UW required for removal to facilitate the planned demolition.

J. UW removed during the abatement activities shall be handled, transported and disposed/recycled in an approved manner complying with all applicable federal, state, and local regulations.

1.3 DEFINITIONS

A. Certificate of Disposal: The document provided to the generator certifying that the UW wastes were disposed/recycled in strict accordance with all applicable federal, state and local regulations.

B. Chain-of-Custody: A legal concept involving documentation of the physical possession of a sample/samples from the moment it is collected, transported, analyzed, and ultimately stored in an archive.

C. Competent Person: One who is capable of identifying existing and predictable hazards and who has the authority to take prompt corrective measures to eliminate them.

D. Decontamination Area: Area which is constructed to provide the means for workers to store clothing, equipment and other articles, and to properly remove contamination upon concluding work activities that result in exposure to these hazardous materials.

E. DOP: Dioctylphthalate, the challenge aerosol used to perform on-site leak testing of HEPA filtration equipment.

F. Decontamination Unit: Refers to system of airlocks used to decontaminate personnel, waste bags, equipment, etc. when exiting the work area. A decontamination unit shall be set up for each containment area.

G. Equipment Decontamination Enclosure System: A decontamination enclosure system for materials and equipment, typically in a designated area of the work area, and including a washroom, a holding area, and an uncontaminated area.

H. HEPA: High Efficiency Particulate Air filter capable of filtering out airborne particulate 0.3 microns or greater in diameter at 99.97 percent efficiency.

I. Manifest: The document authorized by both federal and state authorities for tracking the movement of hazardous wastes.

J. Powered Air Purifying Respirator (PAPR): A full facepiece respirator that has the breathing air powered to the wearer after it has been purified through a filter.

K. Respirator: A device designed to protect the wearer from the inhalation of harmful atmospheres.

L. Returned Manifest: An original duplicate copy of the manifest provided to the waste generator within forty-five (45) days of the transport date which acknowledges the receipt of the material at the disposal facility.

M. Visual Inspection: A visual inspection by of the work area under adequate lighting to ensure removal of all UW and that the work area is free of visible material, debris, and dust.

1.4 UNIVERSAL WASTE

A. The following UW must be removed prior to demolition of lighting fixtures, emergency egress equipment, and mechanical equipment. Estimated quantities for lighting equipment below.

MATERIAL	GENERAL LOCATION(S)	ESTIMATED QUANTITY
High Intensity Discharge (HID) Lights	PS Building	23
	Honors Trailer	2
Fluorescent Light Tubes - Interior Lighting Fixtures (2'-8' length)	PS Building	190
	Honors Trailer	40
Batteries – Emergency Egress Lighting & Exit Signs	PS Building	2

MATERIAL	GENERAL LOCATION(S)	ESTIMATED QUANTITY
R-22 Refrigerants	PS Building & Honors Trailer	6 HVAC units

1.5 SUBMITTALS PRIOR TO START OF WORK

A. The reviews by the District or District's designated representative are intended to be only for general conformance with the requirements. The District or the District's designated representative assumes no responsibility for permits, licenses, notices, materials and methods, equipment or temporary construction required to execute the work described in this Section of the Specification or in other Sections of the Specification or in other documents included in the contract documents.

B. The following items shall be submitted to and approved by the District or District's designated representative before commencing work involving the UW and regulated waste.

1. Provide a detailed work plan for UW removal, temporary storage, and disposal.
2. Provide a site safety plan for UW removal prior to project initiation. The site safety plan shall deal with, at a minimum: personal protective equipment; site safety and health hazards; UW and regulated waste spills; control of water leakage or discharge within and/or from the work area; medical emergency; materials handling procedures; Contractor's internal administrative and inspection procedures; earthquakes and/or fire emergency procedures; protocol for responding to complaints or questions from interested parties; 24-hour emergency telephone numbers for individuals with authority to respond to emergencies.
3. Workers: Demonstrate education and specialized training in the handling of regulated and UW.
4. Licenses: Submit copies of state and local licenses, evidence of Cal-OSHA registration and permits necessary to carry out the work of this contract.
5. Safety Data Sheets (SDSs)/Specification Sheets: The Contractor shall submit SDSs and Specification Sheets for all materials and equipment to be used for this project.

1.6 SUBMITTALS AT COMPLETION OF PROJECT

A. Upon completion of on-site work, the Contractor shall provide a detailed project summary that will include each of the items listed below. The project Summary shall be submitted and approved by the District or District's representative and shall include the following:

1. Copies of the Security and Safety Logs showing names of persons entering the work areas. The logs shall include date and time of entry and exit, supervisor's record of any accident (detailed description of accident).
2. Emergency evacuations and any other safety or health incident.
3. Waste disposal documents.
4. Project Summary including, but not limited to, the following: location and approximate quantity of UW removed, waste hauler certifications, waste disposal/recycling facilities, dates of commence and completion of on-site work.

PART 2 - PRODUCTS

2.1 SIGNS:

A. Warning signs for work areas shall be approximately 18 inches square with yellow background and 1-inch black letters. Signs shall read "DANGER – KEEP OUT – TOXIC CHEMICAL WORK AREA".

B. Location of Signs: Provide bilingual Signs at all approaches to work areas in languages used by the Contractor's employees. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area.

2.2 PLASTIC SHEETING:

A. Use fire-retardant (FR) polyethylene (poly) film.
   1. Thickness - 6-mil, minimum, NO EXCEPTIONS.
   2. Flame Resistance/Flame Spread Rate <25.
   3. Conforms to NFPA #701 and Tested in accordance with ASTM E-84.
   4. Spray adhesive for sealing polyethylene to polyethylene shall contain no methylene chloride or methyl chloroform (1,1,1-trichloroethane) compounds.

2.3 VACUUM EQUIPMENT:

A. All vacuum equipment used in the work area shall use HEPA filtration systems and be of the wet-dry type. The Contractor shall provide on-site independent DOP testing to document the effectiveness of the vacuum units. The test results shall be signed by the individual performing the testing.

B. HEPA-rated vacuums **shall not** be used for mercury spill cleanup unless equipment with an activated charcoal filter. Vacuum exhaust must be monitored with a direct read mercury vapor meter to verify the air quality of the vacuum discharge air.

2.4 MATERIALS AND EQUIPMENT:

A. Storage Containers:
   1. All UW fluids, UW-contaminated fluids, including flush and cleaning solvents and mixtures, shall be stored in sealed DOT 17E closed top drums or other waste container approved for storage of these materials.
   2. All UW solid wastes and items including disposable items used during the work such as rags, absorbents, protective clothing, etc., shall be stored in sealed DOT 17C open type drums or other waste container approved for storage of these materials.
   3. Any UW Article Container, other than approved DOT drums, specified in this specification, intended for storage, shall be submitted to the District or District's designated representative for approval.

B. Solvents, Cleaning Agents and Absorbents:
   1. Solvents: An appropriate solvent in which UWs are shown to be soluble in. Care should be taken to limit the complexity of the waste stream. In all cases where solvents are used during work, proper ventilation shall be provided by the Contractor to ensure that resulting fumes/vapors are not dispersed beyond the work area. The manufacturer's recommendations for application and requirements of Cal-OSHA shall be strictly observed.
   2. Cleaning Agents: An appropriate cleaning agent in which UWs are shown to be soluble in. Care should be taken to limit the complexity of the waste stream. Numerous, non-toxic, cleaning agents shown to meet or exceed the solubility requirement above are commercially available. In all cases where cleaners are used during work, proper ventilation shall be provided by the Contractor to ensure that resulting fumes/vapors are not dispersed beyond the work area. The manufacturer's recommendations for application and requirements of Cal-OSHA shall be strictly observed.
   3. Absorbents: "Safestep" as manufactured by Andesite of California, Inc., or approved equal.

PART 3 - EXECUTION

3.1 SAFETY PROCEDURES AND WORKER PROTECTION

A. Take all precautions and measures required to protect employees, inspection personnel, District's on-site personnel, and the public from exposure to regulate waste and UW solids, liquids and vapors.

1. All personnel authorized for entry in work areas shall be instructed in the proper procedures for working with or around electrical hazards, regulated waste, and UW containing/contaminated materials.
2. All electrical equipment upon which UW related activities are to be performed shall be de-energized, locked out/tagged out and permanently disconnected from any power source prior to the commencement of the work.
3. Consumption of food or tobacco products shall not be permitted in any of the project work areas where regulate waste, UWs, volatile solvents and/or other hazardous materials are present. Additionally, no open flames will be permitted in these same areas. Signage to this effect shall be provided for each work area.
4. The Contractor performing the work of this Contract shall develop, together with applicable subcontractors, a contingency plan covering accidental UW spills and work exposure to UWs. The plan shall be submitted to the District or District's designated representative prior to commencing UW-related work. The submittal shall also include a separate section to describe the hauler's spill contingency plan and avoidance procedures.

B. Work Area Protection and Marking: Prior to commencing any UW-related work activities provide barricades and warning signs to clearly identify and effectively guard against unauthorized entry into the work areas.
   1. Place barricades to maintain a minimum of 25 feet from all perimeters of the work being conducted to the barricades, where feasible.
   2. All equipment such as tools, containers, etc., shall be confined to the work area until work is complete, containers are sealed and equipment properly decontaminated and safely stored for transport.

C. Protective Clothing and Equipment: At all times when regulated waste and UW fluids or mixtures in any volume are not sealed in drums, containers or electrical equipment, workers shall wear:
   1. Gloves impermeable to the specific regulated waste or UWs and the solvent and/or clean up agent in use.
   2. Disposable, full body suit, impermeable to both UWs and the solvent and/or clean up agent in use.
   3. Appropriate eye protection to ensure that eyes are protected from liquid splatter or exposure to concentrated vapors or fumes.
   4. Respiratory protection appropriate for the concentration of the hazardous material(s) and atmosphere present. Supplied air must meet requirements for Grade D air, at a minimum.
      a. The Contractor shall provide protective clothing, eye protection, and breathing apparatus as required for authorized inspection personnel upon request.
      b. Cleanup of broken mercury containing products such as light tubes and thermometers (mercury vapor producing materials): NIOSH-approved, half-face respirators with double stack Mercury Vapor/HEPA cartridges.

D. Personnel Protection and Procedures: The regulated waste or UW work area shall at no time be left unattended from the commencement of removal work and until all UWs and incidentals have been sealed in approved containers. If immediate transportation to the regulated waste or UW storage facility or disposal facility is not feasible the work area must be secured in a manner approved by the District or District's designated representative.
   1. During work procedures and at all times when regulated waste or UW containing/ contaminated fluids in any volume are not sealed in drums, containers or electrical equipment, all personnel entering the regulated work area must don protective clothing and equipment. Upon exiting the work area, all disposable protective clothing shall be placed in appropriate waste storage drums and sealed, for subsequent transportation to the on-site storage facility or disposal facility.
   2. Workers with cuts or scratches shall seal these wounds sufficiently to prevent accidental contact of the hazardous materials within the regulated work area prior to entering the regulated work area. Similarly, workers who accidentally incur minor cuts or scratches during work activities shall immediately leave the work area, cleanse the wound with medical grade soap and seal the wound before returning to the work area.

3.2 SPILL CLEAN-UP, CONTAINERIZATION AND MARKING

A. Clean-up of Work Area, UW Articles and Spills:
   1. Equipment and Tools: After the last regulated waste or UW has been removed and all fluids and solids cleaned from fixture, all tools and equipment used in the work shall be decontaminated and properly stored for reuse. All tools that may have come in contact with regulated or UW at any concentration shall be thoroughly double washed/rinsed with an appropriate cleaning agent, wiped clean and properly stored.
   2. UW Contaminated Articles: All exterior surfaces of equipment that may have come in contact with UW or regulated waste or contaminated solids or fluids either during work activities or due to past leaks shall be double washed/rinsed, at a minimum, with an appropriate cleaning agent and wiped clean.
   3. Solid Impenetrable Surfaces: All metal surfaces and surfaces with impervious liners which have come in contact with regulated waste, UW or UW mixtures in the course of the work or as a result of past leaks shall be thoroughly cleaned using a combination of absorbents and solvents or cleaning agents. Minimum cleaning requirements for these surfaces include removal of bulk material and two rinses with the cleaning agent of the surfaces, which come in contact with UW or UW mixtures during the work or as a result of past leaks. The work area shall be effectively ventilated during operations such that vapors used in decontamination and cleaning are not vented to occupied building areas. Upon completion of UW-related activities, if fumes or vapors are still present in levels, which could impede breathing or be considered toxic under state and/or NIOSH standards, the Contactor shall provide additional ventilation to accelerate drying. Auxiliary breathing apparatus may only be used by personnel trained in the use of this equipment and experienced in conducting electrical work while wearing equipment, which could impede safe work practices.
   4. Soils and Porous Materials: The U.S. EPA, Region IX, regards soil, asphalt, wood, cement and concrete as porous materials that absorb UW. Where practicable, these materials must be removed when they are within the spill or contamination boundary.
   5. Decontamination Verification: Completion of decontamination activities will be verified by the District or District's designated representative.

B. Containerization and Marking:
   1. All liquid generated as a result of work activities and cleanup operations shall be placed in appropriate waste containers and the containers sealed.
   2. All solids such as absorbents, rags, disposable protective clothing, soils, and other incidentals shall be placed in appropriate waste containers and the containers sealed.
   3. All drums shall be permanently marked as to specific contents and dated. In addition, each drum (and container) shall be marked with the standard EPA, UW, ML label (40 CFR 273) and hazardous waste label (40 CFR 262).

3.3 HANDLING AND TRANSPORTATION TO STORAGE FACILITIES

A. Drums: All closed and open top drums must be permanently sealed and marked prior to loading on transport vehicle. Filled drums shall be loaded on the transport vehicle by any of the following methods.
   1. Hoist or lift truck utilizing a two-point drum lifter
   2. Hoist or lift truck provided with a band-around type drum lifter
   3. Lift truck lifting the drums from underneath by a pallet attached to the drum by a banding arrangement.

B. Drums shall not be lifted by the following methods.
   1. Any rope, chain or cloth slings tied about the drum.
   2. Placement of drums on bare lift truck forks.
   3. Forcing drums between forks of a lift truck.
   4. Any commercial drum lifters exerting force of the sides of a drum.

C. All drums or article containers shall be secured to the transport vehicle to prevent movement in transport.

3.4 TRANSPORTATION TO DISPOSAL FACILITY

A. General: All regulated waste and UW Articles removed and all drums containing liquids, solids and incidentals shall be transported to the off-site regulated waste/UW approved and permitted recycling/disposal facility.
   1. The Contractor performing the work of this section shall be licensed for the transportation and hauling of extremely hazardous wastes. The Contractor shall provide a route plan, which clearly identifies the routes proposed while transporting UW items from the work site to the off-site facilities.
   2. A minimum of two operators shall be in attendance at all times when UW items are being transported, loaded, and unloaded.

B. The rules in this section apply to each motor carrier engaged in the transportation of hazardous materials by a motor vehicle, which must be marked or placarded in accordance with DOT 177.

C. Every motor vehicle transporting or storing Articles and items containing regulated or UWs or hazardous materials must be operated in compliance with the laws, ordinances and regulations of the state jurisdiction of which it is being operated in, unless they are at variance with specific regulations of the Department of Transportation which are applicable to the operation of that vehicle which impose a more stringent obligation or restraint.

D. Unless there is no practicable alternative, a motor vehicle which contains regulated or UWs or hazardous materials must be operated over routes which do not go through or near heavily populated areas, places where crowds are assembled, tunnels, narrow streets, or alleys. Operating convenience is not a basis for determining whether it is practicable to operate a motor vehicle in accordance with this paragraph.

E. No person may smoke within 25 feet of any Contractor's vehicles, which contains flammable materials (flushing solvents), or an empty tank motor vehicle, which has been used to transport flammable materials.

F. When a motor vehicle, which contains hazardous materials is being fueled its engine must not be operated.

G. Motor vehicles transporting regulated, UWs, or hazardous materials must have all containers properly secured in place to ensure that no equipment items or containers can be loose or unsafely placed into the transport vehicle. This may include chaining, roping or strapping and winching. Any equipment, drums or other Articles carried in an open, flatbed or stake type truck shall be covered with a tarp to protect it from the elements.

H. A motor carrier that transports hazardous waste must furnish the driver of each motor vehicle in which the waste is transported with the following documents.
   1. A document containing instructions on procedures to be followed in the event of accident or delay. The documents must include the names and telephone numbers of persons to be contacted, and the substances of the hazardous wastes being transported, and the precautions to be taken in emergencies such as fires, accident or leakages.
   2. Manifest and permit documents described in this specification and required for waste transport.

I. A motor vehicle being operated must be marked if that vehicle is transporting UWs or hazardous materials of a kind that require the vehicle to be marked or placarded in accordance with DOT 177.

3.5 UW DISPOSAL

A. The Contractor shall treat and dispose of all collected UW wastes collected and generated during the execution of this Contract including Articles, fluids, etc. set forth in Section 1.04 of this specification.

B. Except as may be otherwise specifically directed by the District or District's designated representative, the Contractor shall treat and dispose of regulated and UW materials as governed by 40 CFR 273, California State regulations, local regulations and subsequent amendments.
   1. By incineration or recycling at a facility approved for such use by the U.S. EPA, and all other controlling regulatory agencies and bodies of the state, county and municipality of that facility's location all UW fluids, flushing fluids, and other UW contaminants. If the Contractor so elects, waste contaminated solids may also be incinerated as suitable and allowed for this type of disposal.

C. All UW and regulated wastes generated as part of these operations will be disposed of by the Contractor in a legal manner.

D. The Contractor shall not sell, transfer or recover any material from the wastes received from the state without their prior written consent.

3.6 MANIFESTS AND RECORDS

A. The Contractor shall provide the District or District's designated representative with a compliance certificate verifying that all waste received by it has been properly treated and disposed.

B. The Contractor shall provide the District or District's designated representative copies of all manifests, permits or other documents currently in effect relating to the specific UW wastes to be transported, treated and disposed hereunder except as otherwise stated in this Section. The Contractor shall also promptly furnish to the District or District's designated representative copies of all new or renewal permits or other documents applicable to this agreement as soon as the Contractor receives same.

C. The Contractor shall furnish complete State of California Hazardous Waste Manifests (or the Uniform Manifest – 40 CFR Parts 260, 262, 271 – if effective at time of preparation) for all UW Articles to be collected from the facility at which the removal and decontamination occurred. The District or District's designated representative shall sign the manifests. These manifests shall accompany the waste loads to disposal and be properly completed by the hauler and disposal agent as required by federal and state hazardous waste management law. The final manifest shall then be returned by registered mail to the District or District's designated representative within the designated time period specified by Federal law.

D. It shall be the responsibility of the District or District's designated representative to finalize their UW records regarding the removal and final disposition of UW.

E. The contract work will not be considered complete until the District or District's designated representative receives certifications of incineration (for fluids), disposal, and/or recycling.

3.7 PLACEMENT IN STORAGE AND RECORDS

A. Transport vehicles shall be unloaded utilizing the same equipment and methods as for loading.

B. Drums and Articles shall be placed in the storage facility in locations as directed by the District or District's designated representative.
   1. Articles shall be placed such that ample clearance is provided around equipment to facilitate future inspection.
   2. Drums shall be placed on pallets of sufficient strength to withstand double stacking. Drums shall not be stacked at time of storage unless space is limited as determined by the District or District's designated representative. Where stacking of drums is necessary, pallets shall be placed between the drum layers.
   3. Immediately following unloading of the regulated or UW transport vehicle, the cargo area shall be inspected to check for fluid leaks. If any fluids are found, the source of the leaking drum or items shall be identified and sealed. The contamination cargo area shall be thoroughly double washed/rinsed clean with absorbents, solvents and liquid cleaner. Cleaning agents, solvents and solids shall be placed in proper drums for disposal.

C. Records: Upon completion of all regulated and UW work related activities the Contractor shall provide a complete record of such activities and storage data to the District or District's designated representative. The record shall include the following data:

1. Name of the firm performing the work of this Section and technician in charge.
2. Drum sizes (30 or 55 gallon)
3. Identification of contents (liquids, flushing solvent, cleaning solvents for solids, rags, absorbents, soil, etc.)
4. Weight in kilograms and gallons of contents of each drum or container.
5. Date placed in storage.

END OF SECTION

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes metal fabrications not classified as "structural steel", and not specified in other Sections.
B. Related requirements:

1. Division 05 for the following:

a. Architectural metal fabrications.

C. Work installed but furnished in Division 32: Gate hardware.

1.2 ADMINISTRATIVE REQUIREMENTS

1.3 SUBMITTALS

A. Data:

1. Specifications and installation instructions for manufactured items.
2. Manufacturer's literature, including engineering data for anchors.

B. Shop Drawings:

1. Large scale, dimensioned Shop Drawings of metal fabrications indicating in detail methods of fabrication and assembly, weight, materials, holes, lugs, inserts, finishes and other pertinent data.
2. For components to be embedded in concrete and masonry work, furnish templates supplemented by dimensioned Shop Drawings to trades placing those components in their work. Assist in location of these components where so requested by those trades.

C. Samples: The following Samples, at least 6 inches long.

1. Welded connection between the following components showing proposed weld quality and finish.

a. Pipe to pipe.
b. Pipe to bar.
c. Tube to tube. (railing)
d. Tube and bar.

1.4 QUALITY ASSURANCE

A. Qualifications for welding work:

1. Qualify welding procedures and welding operators in compliance with AWS "Qualification" requirements of AWS D1.1.
2. Examine that welders to be employed in this work have satisfactorily passed AWS qualification tests.
3. If recertification of welders is required, retesting shall be Contractor's responsibility.
4. Submit certificates of compliance to demonstrate compliance with the above requirement.
5. Costs for fabricator tests, inspections and quality control shall be borne by the Contractor.

B. Special inspections:

1. Except where otherwise specified, special inspections by Owner's testing laboratory, prescribed by Code, will not be required where work is performed on the premises of a licensed fabricator, registered and approved by authorities having jurisdiction to perform such work without special inspection.
2. Submit certificates of compliance to demonstrate compliance with the above requirement.
3. Costs for fabricator tests, inspections and quality control shall be borne by Contractor.

1.5 HANDLING

A. Store metal fabrications above ground, under cover.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal movements: Provide exterior assemblies with expansion joints spaced so that no distortion or damage occurs when subjected to a surface temperature of plus 180 degrees and a temperature swing of 160 degrees (plus 20 to plus 180 degrees).

1. Make joints as small as possible but sufficiently wide to meet the design criteria.
2. Show joint spacing on Shop Drawings.
3. Space joints equally and symmetrically. Joint locations are subject to relocation at no additional cost to the Owner.

B. Loads: In the absence of specific design loads on the Drawings and in the Specifications, the provisions of ASCE/SEI 7-10 "Minimum Design Loads for Buildings and Other Structures" apply to the work of this Section.

C. Deflection: Limit deflection under uniform load to L/360; L/120 under concentrated load; or 1/4-inch maximum, whichever is more restrictive.

2.2 MATERIALS

A. Metal surfaces - general: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and absence of surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.

B. Steel plates, shapes, and bars: ASTM A 36.

C. Steel tubing:

1. Cold-formed steel tubing: ASTM A 500, Grade A or B, as required for design loading, unless otherwise indicated.
2. Hot-formed steel tubing: ASTM A 501. For exterior installations and where otherwise specified, provide tubing with hot-dip galvanized coating in compliance with ASTM A 53.

D. Steel pipe/tubing:

1. Railing: One of the following.

a. Welded and Drawn Over Mandrel (DOM), ASTM A 513, Type S.
b. Cold Drawn Seamless (CDS), ASTM A 519.
c. Hot Finished Seamless (HFS), ASTM A 519, machined to match the finish of the DOM steel above.

2. Elsewhere: ASTM A 53; finish, type, and weight class as follows.

a. Galvanized finish for exterior installations and where specified, black finish elsewhere.

b. Type S, Grade A, standard weight (schedule 40), unless another grade or weight or both required by design loading.

E. Uncoated structural steel sheet: Product type (manufacturing method), quality, and grade, as follows.

1. Cold-rolled structural steel sheet: ASTM A 1008, Grade A, unless otherwise required by design loading.
2. Hot-rolled structural steel sheet: ASTM A 1011, Grade 30, unless otherwise required by design loading.

F. Uncoated steel sheet: Commercial quality, product type (method of manufacture) as follows.

1. Cold-rolled steel sheet: ASTM A 1008.
2. Rolled steel floor plate (Checkered): ASTM A 786, Pattern No. 1, 4 or 5. Use same pattern throughout the Project.
3. Hot-rolled steel sheet: ASTM A 1011.

G. Galvanized steel sheet:

1. Structural quality: ASTM A 653 SQ, Grade 33, G90 designation, unless another grade required for design loading.
2. Commercial quality: ASTM A 653 CQ, G90 coating designation.

H. Concrete inserts:

1. Threaded or wedge type galvanized ferrous castings, either malleable iron complying with ASTM A 47, or cast steel complying with ASTM A 27.
2. Provide bolts, washers, and shims as required, hot-dip galvanized in compliance with ASTM A 153.

I. Welding rods and bare electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

J. Fasteners: Provide zinc-coated fasteners for exterior use or where built into exterior walls, elsewhere fasteners may be uncoated. Select fasteners for type, grade, and class required.

1. Bolts and nuts: Regular hexagon-head bolts, ASTM A 307, Grade A, Property Class 4.6; with hex nuts, ASTM A 563; and flat washers, unless otherwise indicated.
2. Anchor bolts: ASTM F 1554, Grade 36.
3. Machine screws: ASME B18.6.3, ASME B18.6.7M.
4. Plain washers: Round, carbon steel, ASME B18.22.1.
5. Lock washers: Helical, spring type, carbon steel, ASME B18.21.1.
6. Drilled-in expansion anchors:

a. Expansion anchors complying with FS FF-S-325, Group VIII (anchors, expansion, [non-drilling]), Type I (internally threaded tubular expansion anchor); and machine bolts complying with FS FF-B-575, Grade S, by Hilti, Inc., or ITW Ramset/Red Head.
b. Select anchors with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in masonry and equal to 4 times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E 488.

7. Chemical anchors:

a. Set by Simpson Strong-Tie Co., Inc., or HY-150 by Hilti, both used with machine bolts complying with FS FF-B-575, Grade S.

b. Select drilled-in and chemical anchors to resist loads imposed thereon with a safety factor of 4 minimum for static loads, and 10 minimum for dynamic and overhead loads.

8. Lock washers: Helical spring type carbon steel, FS FF-W-84.

K. Grout: Pre-packaged, non-shrink, non-metallic grout, non-staining, nongaseous grout complying with ASTM C 1107.

L. Cement (expansive): Factory-prepared with accelerators quick-setting hydraulic cement complying with ASTM C 595.

M. Shop primer for ferrous metal:

1. Interior surfaces: Tnemec “10-99,” or “Unibond” (basis of design), or equal fast-curing, lead-free, universal modified alkyd primer selected for compatibility with finish paint systems specified in Section 09 90 00, and complying with performance requirements equal to or better than the basis of design.
2. Exterior surfaces: As specified in Section 09 96 00.

N. Galvanizing repair (zinc-rich) paint: “94-H20 Hydro-Zinc” by Tnemec Co., or equal.

O. Bituminous paint: Cold-applied asphalt mastic complying with SSPC Paint 12 but containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION - GENERAL

A. Comply with the reference standards and the following.

B. Engineer, fabricate and install exterior components to allow for expansion and contraction for a temperature range of 150-degree F without causing buckling, excessive opening of joints, and over-stressing of welds and fasteners.

C. Drill holes for bolts and screws. For screws exposed to view in finished surfaces use FHCS type with screw slots filled and finished flush and smooth with adjacent surfaces.

D. Form exposed work true to line and level with accurate angles and surfaces, and straight, sharp edges, so assembling can be done without filler pieces.

E. Shear and punch metals cleanly and accurately. Remove burrs.

F. Remove sharp or rough areas on exposed surfaces. Projecting edges are not permitted. Ease exposed edges to a radius of approximately 1/32-inch.

G. Weld corners and seams continuously to comply with AWS recommendations and the following:

1. Do not use stitch, spot or tack welds on exposed surfaces.
2. For work exposed to view, provide weld quality and finish equal to NOMMA Finish #1. Elsewhere provide weld quality and finish equal to NOMMA Finish #4.
3. Use materials, methods and welding sequence that minimize distortion and develop strength and corrosion resistance of base metals.
4. Obtain fusion without undercut or overlap.
5. Remove welding flux immediately.
6. At exposed connections, undercut edges of components to be welded, weld and finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
7. Where welds will be exposed to the elements, weld connections between various pieces continuously to prevent water intrusion in the weld area, or seal welded parts, after weld is ground, with silicone sealant specified in Section 07 92 00.

H. Form bent metal corners to the smallest radius possible without causing grain separation or otherwise impairing the strength of the material.

I. Form exposed connections with flush, hairline joints, using concealed fasteners wherever possible. Cope intersections of rails and posts, weld joints, and grind smooth; butt weld end-to-end joints of railings or use welding connectors.

J. Bend pipe without collapsing or deforming its walls, to produce a smooth, uniform curved section and to maintain uniform sectional shape.

K. Fabricate joints that will be exposed to the weather with weep holes where water or condensation may accumulate.
L. Fabricate items to be galvanized in accordance with ASTM A 385. Limit use of vent and drain holes and locate where concealed from view in the finish work.
M. Cut, reinforce, drill, punch, thread and tap metal work as required to receive finish hardware and similar items of work.
N. Fabricate items in the largest Sections practical to minimize field jointing.
O. Provide supplementary parts necessary to complete each item of metal fabrication even though such parts may not be shown or specified. Provide all anchors, brackets, and sleeves for securing metal work to adjacent construction.
P. Remove blemishes by grinding before cleaning, treating, and applying specified finishes.

2.4 WELDING

A. Weld shop and field connections continuously in compliance with AWS D1.1, Structural Welding Code - Steel, and AWS D1.3, Structural Welding Code - Sheet Steel, unless bolted connections are specifically shown.
B. Grind welds that will remain exposed, smooth and flush to match and blend with parent metal surfaces. Match approved weld Samples.

2.5 FABRICATION TOLERANCES

A. Squareness: 1/8-inch maximum difference in diagonal measurements.
B. Maximum offset between components at joints: 1/16-inch except that at welded joints no offset is allowed.
C. Maximum misalignment of adjacent members: 1/16-inch.
D. Maximum bow: 1/8-inch in 48-inches.
E. Maximum deviation from plane: 1/16-inch in 48-inches.

2.6 GALVANIZING

A. Follow procedures outlined in ASTM A 143 to safeguard against and test for possible embrittlement.

1. Exterior: Steel cleaning and preparation followed by hot-dip galvanizing all in accordance with the American Galvanizers Association’s recommendations and Section 09 96 00 in the Specifications.

B. Unless fabricated from galvanized materials, after fabrication hot-dip galvanize exterior ferrous metal items and items installed in exterior walls, which will be concealed when the work is completed and which are totally or partially exposed to the weather, in compliance with ASTM A 123 or A 153, as applicable
C. Excessive dross, rough surfaces, blisters, lumpiness, runs, edge tears, spikes, and chromate quenching are unacceptable.
D. Safeguard assemblies against steel embrittlement in compliance with ASTM A 143, and against distortion in compliance with ASTM A 384.
E. Coating weight shall conform to Table 1 of ASTM A 123, or ASTM A 153, as applicable.
F. Plug vent holes with lead or silicone sealant after galvanizing.
G. If necessary to prevent humid storage staining, quench freshly galvanized steel in a passivating solution.

2.7 SHOP PRIMING

A. Do not shop prime galvanized surfaces.
B. Surfaces exposed in the Work comply with : SSPC SP6 followed by application of zinc-rich primer.
C. Surfaces concealed from view: SSPC SP3 followed by rust inhibitive shop primer.

D. Shop prime metal assemblies as follows, unless otherwise specified in Section 09 96 00:

1. Prepare surfaces as specified above.
2. Remove loose mill scale, rust, cutting and punching burrs, oil, grease and other deleterious materials before priming.
3. Immediately after surface preparation, apply primer in compliance with its manufacturer's instructions to provide a uniform dry film thickness of not less than 1-1/2 mils per coat for rust-inhibitive primer and 3.5 to 3.5 mils for zinc-rich primer. Use painting methods that will result in full coverage of joints, corners, edges and all exposed surfaces.
4. Apply primer to completely cover all exposed surfaces as well as surfaces concealed after assembly. Stripe paint corners, crevices, bolts, welds, and sharp edges.
5. Allow paint to dry thoroughly before handling.
6. Apply one coat of primer to surfaces exposed in the finished work, and 2 coats to surfaces that will be inaccessible after their assembly or erection.

2.8 PROTECTIVE COATINGS

A. Apply a heavy coat of bituminous paint to metal surfaces that will be in contact with cementitious materials. Do not apply on exposed surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.
B. Correct detrimental conditions before proceeding with installation.

3.2 INSTALLATION

A. Corrosion prevention: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials using heavy bituminous paint at least 10 DFT, hard plastic spacers, Teflon tape, or silicone or neoprene gaskets.
B. Fastening:

1. Provide anchorage devices and fasteners required for attaching metal fabrications to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors required.
2. Dry-pack metal fabrications supported on concrete and masonry as specified in Section 03 30 00 to provide firm, level bearing surfaces.

C. Cutting, fitting and placing:

1. Perform all cutting, drilling and fitting required for installation of metal fabrications.
2. Set items accurately in their proper location, alignment and elevation, plumb, level, true and free of rack as measured from established lines and levels.
3. Provide temporary bracing or anchors for items to be built into concrete, masonry or similar construction.
4. Fit exposed connections accurately to form flush, hairline joints.
5. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and flush with parent metal.

D. Field welding: Comply with AWS Code for procedures of manual shielded arc welding, appearance and quality of welds made, and methods used to correct faulty welds.
E. Installing metal bollards.

1. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.

    a. Do not fill removable bollards with concrete.

2. Anchor bollards to existing construction with expansion anchors. Provide four 3/4-inch bolts at each bollard unless otherwise indicated.

    a. Embed anchor bolts at least 4 inches in concrete.

3. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
4. Fill bollards solidly with concrete, mounding top surface to shed water.

F. Prefabricated units: Install as specified, and in compliance with their manufacturer's instructions.

G. Installation tolerances: Adjust metal fabrications for squareness, alignment, twist, levelness and plumbness to the following tolerances.

1. Squareness where applicable: Plus or minus 1/16-inch, measured on the diagonal.
2. Alignment: Plus or minus 1/16-inch where fabrications are separated by one inch or more; where components join or are separated by less than one inch, components shall be aligned; no deviations permitted.
3. Twist: Plus or minus 1/16-inch, except that deviation shall be such that joined panelized components are flush at joints; no deviations permitted.
4. Plumbness: Plus or minus 1/16-inch, except that deviation shall be such that joined panelized components are flush at joints; no deviations permitted.
5. Levelness: 1/8-inch from level, except where tighter tolerances are required for joining or alignment with adjacent work.
6. Deviation from theoretical location in plan: 1/4-inch, except where tighter tolerances are required for joining or alignment with adjacent work.

3.3 FIELD QUALITY CONTROL

A. Extent and Testing Methodology: Owner’s Testing agency may randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Railings will be tested according to ASTM E 894 and ASTM E 935 for compliance with performance requirements.

1. Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and will comply with specified requirements.
2. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

B. Touchup:

1. General: Immediately after erection, clean field welds, bolted connections and abraded areas, and proceed as follows.
2. Damaged primer: Clean the damaged area, sand smooth, re-clean and spot-prime with the same paint as that used for shop priming applied to the same dry film thickness as the undamaged primer; minimum thickness of 2 dry mils.
3. Damaged zinc coating:

    a. Clean abraded area in accordance with SSPC-SP11, “Power Tool Cleaning” to bare metal all welds and damaged zinc coating. Extend cleaning 2 inches past damaged area.

b. Spot prime damaged area with Tnemec “94-H20 Hydro-Zinc” applied at 2.5 to 3.5 Mils DFT.

4. Where galvanized surface will remain exposed in the Work, repair damaged areas with zinc-based solder in accordance with ASTM A 780, regardless of the width of the abrasion (not limited to 3/16-inch).

END OF SECTION

SECTION 26 00 10 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Table of Contents, Division 26 - Electrical:

SECTION NO.	SECTION TITLE
26 00 10	BASIC ELECTRICAL REQUIREMENTS
26 00 90	ELECTRICAL DEMOLITION
26 05 19	BUILDING WIRE AND CABLE
26 05 31	CONDUIT
26 05 33	BOXES

B. Work included: This Section includes general administrative and procedural requirements for Division 26. The following administrative and procedural requirements are included in this Section to supplement the requirements specified in Division 01.

1. Quality assurance.
2. Definition of terms.
3. Submittals.
4. Coordination.
5. Excavation.
6. Rough-in.
7. Electrical installation.
8. Cutting, patching, painting, and sealing.

C. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete and operable installation.

1. General and supplementary conditions: Drawings and general provisions of Contract and Division 01 of the Specifications, apply to all Division 26 Sections.
2. Earthwork: Include trenching, backfilling, boring and soil compaction as required for the installation of underground conduit, in-grade pull boxes, vaults, lighting pole foundations, etc. Refer to Division 31, Earthwork.
3. Selective demolition: Nondestructive removal of materials and equipment for reuse or salvage as indicated. Also dismantling electrical materials and equipment made obsolete by these installations. Refer to Division 02, Selective Demolition.

1.02 QUALITY ASSURANCE

A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such

codes or standards shall be considered a part of this Specification as though fully repeated herein.

B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority for reducing the quality, requirements, or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.

C. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not:

1. California Electrical Code (CEC).
2. California Building Code (CBC).
3. California Fire Code (CFC).
4. California Mechanical Code (CMC).

D. Standards: Equipment and materials specified under this Division shall conform to the following standards where applicable:

ACI	American Concrete Institute
ANSI	American National Standards Institute
ASTM	American Society for Testing Materials
CBM	Certified Ballast Manufacturers
FS	Federal Specification
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IPCEA	Insulated Power Cable Engineer Association
NEMA	National Electrical Manufacturer's Association
UL	Underwriters' Laboratories

E. All base material shall be ASTM and/or ANSI standards.

F. All electrical apparatus furnished under this Section shall conform to NEMA standards and the CEC and bear the UL label where such label is applicable.

G. Certify that each welder performing Work has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.

1.03 DEFINITION OF TERMS

A. The following list of terms as used in the Division 26 documents shall be defined as follows:

1. "Provide": Shall mean furnish, install, and connect unless otherwise indicated.
2. "Furnish": Shall mean purchase and deliver to Project site.
3. "Install": Shall mean to physically install the items in-place.
4. "Connect": Shall mean make final electrical connections for a complete operating piece of equipment.
5. "As directed": Shall be as directed by the Owner or their authorized Representative.
6. "Utility Companies": Shall mean the company providing electrical, telephone or cable television services to the Project.

1.04 SUBMITTALS

A. Format: Furnish submittal data in electronic format for each Specification Section with a table of contents listing materials by Section and paragraph number.

B. Submittals shall consist of detailed Shop Drawings, Specifications, block wiring diagrams, "catalog cuts" and data sheets containing physical and dimensional information, performance data, electrical characteristics, materials used in fabrication and material finish. Clearly indicate by arrows or brackets precisely what is being submitted on and those optional accessories which are included and those which are excluded. Furnish quantities of each submittal as noted in Division 01.

C. Each submittal shall be labeled with the Specification Section Number and shall be accompanied by a cover letter or shall bear a stamp stating that the submittal has been thoroughly reviewed by the Contractor and is in full compliance with the requirements of the Contract Documents or provide a Specification Section line-by-line compliance response statement with detailed exception/ deviation response statements for all applicable provisions for the applicable Specification Section. Any Specification Section lines without a detailed exception/ deviation response statement shall be treated as the Contractor or Vendor is submitting in full compliance with the applicable Specification Section requirements. Cover letters shall list in full the items and data submitted. Failure to comply with this requirement shall constitute grounds for rejection of data.

D. Review of submittals is for general conformance to design concept and general compliance with the Specification Sections. Submittal Review Comments do not imply waiver of Specifications Section requirements unless specifically noted.

E. All resubmittals shall include a cover letter that lists the action taken and revisions made to each Drawing and equipment data sheet in response to Submittal Review Comments. Resubmittal packages will not be reviewed unless accompanied by this cover letter. Failure to include this cover letter will constitute rejection of the resubmittal package.

1.05 COORDINATION

A. Discrepancies:

1. In the event of discrepancies within the Contract Documents, the Engineer shall be so notified, within sufficient time, as delineated in Division 01, prior to the Bid Opening to allow the issuance of an Addendum.

2. If, in the event that time does not permit notification or clarification of discrepancies prior to the Bid Opening, the following shall apply: The Drawings govern in matters of quantity and the Specifications govern in matters of quality. In the event of conflict within the Drawings involving quantities or within the Specifications involving quantities or within the Specifications involving quality, the greater quantity and higher quality shall apply. Such discrepancies shall be noted and clarified in the Contractor's Bid. No additional allowances will be made because of errors, ambiguities or omissions that reasonably should have been discovered during the preparation of the Bid.

B. Project conditions:

1. Examination of Project site: The Contractor shall visit the Project site and thoroughly review the locale, working conditions, conflicting utilities, and the conditions in which the Electrical Work will take place. Verify all existing

conditions in the field. No allowances will be made subsequently for any costs that may be incurred because of any error or omission due to failure to examine the Project site and to notify the Engineer of any discrepancies between Contract Documents and actual Project site conditions.

2. Protection: Keep conduits, junction boxes, outlet boxes and other openings closed to prevent entry of foreign matter. Cover fixtures, equipment, devices, and apparatus and protect them against dirt, paint, water, chemical or mechanical damage, before and during construction period. Prior to final acceptance, restore to original condition any fixture, apparatus or equipment damaged including restoration of damaged factory applied painted finishes. Protect bright finished surfaces and similar items until in service. No rust or damage will be permitted.
3. Supervision: Contractor shall personally or through an authorized and competent representative constantly supervise the Work from beginning to completion and, within reason, keep the same foreman and workmen on the Project throughout the Project duration.

C. Preparation:

1. Drawings:

a. Layout: General layout indicated on the Drawings shall be followed except where other Work may conflict with the Drawings.

b. Accuracy: Drawings for the Work under this Section are essentially diagrammatic within the constraints of the symbology applied.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 EXCAVATION

A. General: Cutting and digging shall be under the direct supervision of the General Contractor and included as necessary for the Work of this Section.

B. Excavation for underground vaults and electrical structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10-foot; plus, a sufficient distance to permit placing and removal of concrete formwork, installation or services, other construction and for inspection.

1. Excavate, by hand, areas within dripline of large trees. Protect the root system for damage and dry-out. Maintain moist conditions for root system and over exposed roots with burlap. Paint root cuts of 1 inch in diameter and larger with emulsified asphalt tree paint.
2. Take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed.

C. Trenching: Excavate trenches for electrical installation as follows:

1. Excavate trenches to the uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches clearances on both side of raceways and equipment.
2. Excavate trenches to depth indicated or required.

3. Limit the length of open trench to that in which installations can be made and the trench backfilled within the same day.

4. Where rock is encountered, carry excavation below required elevation and backfill with a layer of crushed stone or gravel prior to installation of raceways and equipment. Provide a minimum of 6 inches of stone or gravel cushion between rock bearing surface and electrical installations.

D. Backfilling: Place soil materials in layers to required subgrade elevations for each area classification, using materials and methods specified in Division 31, Earthwork.

1. Under building slabs, use drainage fill materials.

3.02 ROUGH-IN

A. Contractor shall verify lines, levels and dimensions indicated on the Drawings and shall be responsible for the accuracy of the setting out of Work and for its strict conformance with existing conditions at the Project site.

B. Verify final locations for rough ins with field measurements and with the requirements for the actual equipment to be connected.

3.03 ELECTRICAL INSTALLATION

A. Preparation, sequencing, handling, and installation shall be in accordance with Manufacturer's written instructions and technical data particular to the product specified and/or accepted equal except as otherwise specified. Comply with the following requirements:

1. Coordinate connection of electrical systems with exterior underground and utilities and services. Comply with requirements of governing regulations, franchised service companies and controlling agencies. Provide required connection for each service.

2. Install systems, materials, and equipment to conform with approved submittal data, including coordination Drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are indicated only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.

3. Install systems, materials, and equipment level and plumb, parallel, and perpendicular to other building systems and components, where installed exposed in finished spaces.

4. Install electrical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

5. Install systems, materials and equipment giving right-of-way priority to other systems that are required to maintain a specified slope.

6. Conform to the National Electrical Contractors Association "Standard of Installation" for general installation practice.

3.04 CUTTING, PATCHING, PAINTING AND SEALING

A. Structural members shall in no case be drilled, bored, or notched in such a manner that will impair their structural value. Cutting of holes, if required, shall be done with core drill and only with the approval of the Architect and Structural Engineer.

B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

C. Cut, remove, and legally dispose of selected electrical equipment, components and materials as indicated, including but not limited to removal of electrical items indicated to be removed and items made obsolete by the new work.

D. Protect the structure, furnishings, finishes and adjacent materials not indicated or scheduled to be removed.

E. Patch existing surfaces and building components using experienced installers and new materials matching existing materials and the original installation. For installers' qualifications refer to the materials and methods required for the surface and building components being patched.

END OF SECTION

SECTION 26 00 90 - ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor and equipment necessary to complete the demolition required for the item specified under this Division, including but not limited to:

1. Electrical demolition

1.02 SYSTEM DESCRIPTION

A. Disconnection, removal and relocation of all wiring, luminaires, outlets, conduit, and all other types of electrical equipment as described on Drawings.

B. Purpose is to remove, relocate and extend existing installations to accommodate new construction.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment necessary for patching and extending Work, as specified in other Sections.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly review conditions in the area of demolition prior to commencing Work to ensure complete understanding of existing installation in relationship to demolition Work.

3.02 GENERAL REQUIREMENTS

A. Remove all wiring, luminaires, outlets, conduit, and all other types of electrical equipment indicated to be removed. Devices that are to be removed may require reworking conduit and wiring in order to maintain service to other devices. If removed devices are on walls or ceilings that are to remain, blank coverplates are to be installed on outlet boxes.

B. Where remodeling interferes with circuits in areas that are otherwise undisturbed, circuits shall be reworked as required.

C. Existing devices and circuiting that are indicated are indicated only for informational purposes. Contractor shall visit the Project site and shall verify conditions as they exist and shall remove, relocate, and/or rework any electrical equipment or circuits affected (whether indicated or not) due to removal of existing walls, ceilings, etc. Coordinate all Work with that of other trades.

D. All equipment, luminaires, devices, etc., which are removed shall be delivered to the Owner for disposition. All items which are removed and not wanted by the Owner and which are not reused shall become the property of the Contractor and shall be legally removed from the Project site.

E. Cutting and patching necessary for the removal of Electrical Work shall be included.

F. Remove and replace luminaires, rework, relocate or replace conduit and wiring and do other Work required by the installation of new ductwork, piping, etc., above the ceiling. Coordinate with other trades and verify the extent of the Work.

3.03 LUMINAIRES

A. Disconnect and remove abandoned luminaires. Remove conduits, wiring, boxes, brackets, stems, hangers, and other accessories.

3.04 OUTLETS

A. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

3.05 CONDUIT

A. Remove abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors and patch surfaces.

3.06 WIRING

A. Removed abandoned wiring to source of supply.

3.07 EXISTING SYSTEMS

A. Electrical distribution system: Disable system only to make switchovers and connections. Obtain permission from Owner's designated representative at least 24-hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to Work area.

B. Fire alarm system: Maintain the existing system in service. Disable system only to make temporary connections to maintain service in areas adjacent to Work area(s). Notify Owner and Fire Supervisory Service at least 24-hours before partially or completely disabling the system.

C. Telephone system: Maintain the existing system in service throughout construction. Disable system only to make temporary connections where necessary to maintain service in areas adjacent to Work area(s). Notify Owner and Telephone Utility at least 24-work week hours before partially or completely disabling the system.

3.08 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment that shall remain.

END OF SECTION

SECTION 26 05 19 - BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Building wire.
2. Wiring connections and terminations.

B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. Underwriters Laboratories, Inc. (UL):

UL 44;	Thermoset-Insulated Wires and Cables.
UL 83;	Thermoplastic-Insulated Wires and Cables.
UL 183;	Manufactured Wiring Systems.
UL 310;	Electrical Quick-Connect Terminals.
UL 486A & B;	Wire Connectors.
UL 486C;	Splicing Wire Connectors.
UL 486D;	Insulated Wire Connector Systems for Underground Use or in Damp or Wet Locations.
UL 493;	Thermoplastic-Insulated Underground Feeder and Branch Circuit Cables.
UL 510;	Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
UL 1581;	Reference Standard for Electrical Wires, Cables and Flexible Cords.
UL 2196;	Standard for Tests of Fire Resistive Cables.

2. National Electrical Manufacturer Association (NEMA):

NEMA WC-70;	Power Cables Rated 2,000 V or Less for the Distribution of Electrical Energy.

3. Institute of Electrical and Electronic Engineers (IEEE):

IEEE 82;	Test Procedure for Impulse Voltage Tests on Insulated Conductors.

IEEE 576; Recommended Practice for Installation, Termination, and Testing of Insulated Power Cable as Used in Industrial and Commercial Applications.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instructions.
4. Final test results.

1.04 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

C. Independent Testing Agency qualifications: Refer to Section 260010: Basic Electrical Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Building wire:
   a. Cerrowire
   b. General Cable
   c. Southwire Company
   d. Stabiloy (aluminum only)
   e. United Wire and Cable
2. Wiring connectors and terminations:
   a. 3M Company.
   b. Ideal.
   c. Blackburn-Holub.
   d. Burndy.
   e. Thomas & Betts Corp.
   f. Beau Barrier.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 BUILDING WIRE

A. Conductor material:

1. Provide annealed copper for all wire, conductor, and cable, unless otherwise indicated.
2. Copper wire AWG #8 and larger shall be stranded, unless otherwise indicated.
3. Copper wire AWG #10 and smaller may be solid or stranded as best suited for the installation.

B. Insulation material:

1. All insulated wire, conductor and cable shall be 600 volt rated, unless otherwise noted on the Drawings.
2. Thermoplastic-insulated building wire.
3. Rubber-insulated building wire.
4. Copper feeders and branch circuits larger than #6 AWG: Type THW, XHHW or dual rated THHN/THWN.
5. Copper feeders and branch circuits #6 AWG and smaller: Type TW, THW, XHHW or dual rated THHN/THWN.
6. Identify system conductors as to voltage and phase connections by means of color-impregnated insulation.

2.03 WIRING CONNECTIONS AND TERMINATIONS

A. Electrical spring wire connectors:

1. Provide multi-part construction incorporating a non-restricted, zinc coated square cross-section steel spring enclosed in a steel sheet with an outer jacket of plastic and insulating skirt.
2. Self-striping pigtail and tap U-contact connectors shall not be used.

B. Push-in wire connectors:

1. Multi-port push-in wire connectors for a maximum of 8-wires, as required for specific application. Connectors are manufactured to accommodate a wide range of sizes with either solid or stranded conductors, up to a maximum wire size of #10 AWG. Low insertion force required for ease of installation.
2. Housing shall be 105-degrees C and transparent for visual connection verification.
3. 600 volt maximum rating with copper contacts.
4. UL Listed to 486C and UL 467 Listed for grounding and bonding applications.

C. Splicing and insulating tape: Provide black, ultraviolet proof, self-extinguishing, 7-mil thick vinyl general purpose electrical tape with a dielectric strength of 10,000 volts suitable for temperatures from minus 18-degrees C to 105-degrees C.

D. Insulating resin:

1. Provide two-part liquid epoxy resin with resin and catalyst in pre-measured, sealed mixing pouch. Scotchcast 4 or equal for wet or underground vaults, boxes, etc. splices or terminations.

2. Use resin with a set up time of approximately 30-minutes at 21.1-degrees C and with thermal and dielectric properties equal to the insulating properties of the cables immersed in the resin.

E. Crimp type connectors:

1. Provide insulated fork or ring crimp terminals with tinned electrolytic copper-brazed barrel with funnel wire entry and insulation support
2. Fasten crimp type connectors or terminals using a crimping tool recommended by the connector Manufacturer.
3. Provide insulated overlap splices with tinned seamless electrolytic copper barrel with funnel wire entry and insulation support.
4. Provide insulated butt splices with tinned seamless electrolytic copper barrel with center stop, funnel wire entry and insulation support.

F. Cable ties: Provide harnessing and point-to-point wire bundling with nylon cable ties. All cable ties shall be installed using tool supplied by Manufacturer of ties.

G. Wire lubricating compound:

1. UL listed for the wire insulation and conduit type and shall not harden or become adhesive.
2. Shall not be used on wire for isolated type electrical power systems.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of wire and cable installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 APPLICATION

A. All wire, conductor and cable with their respective connectors, fittings and supports shall be UL listed for the installed application and ambient condition.

B. Feeders and branch circuits in wet locations shall be rated 75-degree C.

C. Feeders and branch circuits in dry locations shall be rated 90-degree C.

D. Minimum conductor size:

1. Provide minimum AWG #12 for all power and lighting branch circuits.
2. Provide minimum AWG #14 for all line voltage signal and control wiring unless otherwise indicated.

E. Color coding:

1. For 120/208 volt, 3-phase, 4-wire systems:
   a. Phase A - Black
   b. Phase B - Red
   c. Phase C - Blue
   d. Neutral - White

e. Ground - Green

2. For 277/480 volt, 3-phase, 4-wire systems:
   a. Phase A - Brown
   b. Phase B - Orange
   c. Phase C - Yellow
   d. Neutral - Gray
   e. Ground – Green
3. Switch leg individually installed shall be the same color as the branch circuit to which they are connected, unless otherwise noted.
4. Grounded neutral conductors #6 AWG or smaller must be color coded with a white or gray continuous outer finish (no taping). Grounded conductors #4 AWG or larger are allowed to be taped for identification.

3.03 WIRING METHODS

A. Install wires and cables in accordance with Manufacturer's written instructions, CEC Article 310 Part III, as indicated on Drawings and as specified herein.

B. Install all single conductors in raceway system, unless otherwise noted.

C. Provide adequate length of conductors within electrical enclosures and train the conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than #10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at the terminal.

D. 20 amp power and lighting branch circuit containing no more than four (4) current carrying conductors (phases and neutrals). Use #10 AWG conductor for 120/208 volt circuits located outside a 75-foot radius of panel source and for 277/480 volt branch circuits located outside a 200-foot radius of panel source, unless otherwise noted.

E. Provide #10 AWG pig tails on all 20 amp and 30 amp wiring devices served by #8 AWG conductors and larger.

F. Splice cables and wires only in outlet boxes, junction boxes, pull boxes, manholes or handholes. Group and bundle with tie wrap each neutral with its associated phase conductor where more than one neutral is present in a conduit.

G. Provide UL-listed factory-fabricated, solderless metal connectors of size, ampacity rating, material, type, and class for applications and for services indicated. Use connectors with temperature ratings equal to or greater than the wires that are being terminated.

H. Stranded wire shall be terminated using fitting, lugs or devices listed for the application. However, in no case shall stranded wire be terminated solely by wrapping it around a screw or bolt.

3.04 WIRING INSTALLATION IN RACEWAYS

A. Install wire in raceway in accordance with IEEE 576, Manufacturer’s written instructions, as indicated on the Drawings and as specified herein after interior of building has been physically protected from the weather and all mechanical Work likely to injure conductors has been completed. Pull all conductors into a raceway at

the same time. Exercise care in pulling conductors so that insulation is not damaged. Use UL listed, non-petroleum base and insulating type pulling compound as needed.

B. Completely mandrel all underground or concrete encased conduits prior to installing conductors.

C. Completely and thoroughly swab raceway system before installing conductors.

D. Do not use block and tackle, power driven winch or other mechanical means for pulling conductors of size smaller than #1 AWG.

E. Wire pulling:

1. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling of cables.

2. Use rope made of nonmetallic material for pulling feeders.

3. Attach pulling lines for feeders by means of either woven basket grips or pulling eyes attached directly to the conductors.

4. Pull in together multiple conductors or cables in a single conduit.

5. Pulling tensions and sidewall pressures shall not exceed 60% of the manufacturer’s recommended maximum values. Pulling tension shall be continuously monitored during the pull by a calibrated dynamometer. If pulling tension is exceeded during the pull, immediately notify the engineer to determine if the cables will be considered damaged and require contractor replacement.

F. Install and test all cables in accordance with Manufacturer's instructions and warranty.

3.05 WIRE SPLICES, JOINTS AND TERMINATION

A. Join and terminate wire, conductors, and cables in accordance with UL 486A, C, CEC and Manufacturer's instructions.

B. Thoroughly clean wires before installing lugs and connectors.

C. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.

D. Splices and terminations shall be made mechanically and electrically secure.

E. Where it's determined that unsatisfactory splice or terminations have been installed, remove the devices and install approved devices at no addition cost.

F. Insulate spare conductors with electrical tape and leave sufficient length to terminate anywhere in the panel or cabinet.

G. Encapsulate splices in exterior outlets, pull boxes and junction boxes using specified insulating resin kits. Make all splices watertight for exterior equipment.

H. Make up all splices and taps in accessible junction or outlet boxes with connectors as specified herein. Pigtails and taps shall be the same color as the feed conductor. Form conductor prior to cutting and provide at least 6-inches of tail and neatly packed in box after splice is made up.

I. Branch circuits (#10 AWG and smaller):

1. Connectors: Solderless, screw-on, reusable spring pressure cable type, 600 volt, 105-degree C. with integral insulation, approved for copper conductors.
2. The integral insulator shall have a skirt to completely cover the stripped wires.
3. The number, size and combination of conductors as listed on the Manufacturers packaging shall be strictly complied with.

J. Feeder circuits: (#6 to 750 kCMIL)

1. Join or tap conductors from #6 AWG to 750 kCMIL using bolted pressure connectors or insulate mechanical compression (hi-press) taps with pre-molded, snap-on insulating boots or specified conformable insulating pad and over wrapped with two half-lapped layers of vinyl insulating tape starting and ending at the middle of the joint.
2. Terminate conductors from size #6 AWG to 750 kCMIL copper using bolted pressure or mechanical compression lugs in accordance with Manufacturer recommendation or as specified elsewhere.
3. Field installed compression connectors for cable sizes 250 kCMIL and larger shall have not less than two clamping elements or compression indents per wire.
4. Insulate splices and joints with materials approved for the particular use, location, voltage, and temperature. Insulate with not less than that of the conductor level that is being joined.

3.06 IDENTIFICATION

A. In manholes, pull boxes and handholes, provide tags of the embossed brass type and show the cable type and voltage rating. Attach the tags to the cables with slip-free plastic cable lacing units.

END OF SECTION

SECTION 26 05 31 - CONDUIT

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Rigid non-metallic conduit and fittings.
2. Miscellaneous conduit fittings and products.

B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1. Division 01: Cutting and patching.
2. Division 31: Earthwork. Excavation and backfill for conduit and utilities on Project site.
3. Division 03: Cast-in-place concrete. Protective envelope for underground conduit installations.
4. Division 07: Sheet metal flashing and trim.
5. Division 09: Painting. Exposed conduit and other devices.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. American National Standards Institute, Inc. (ANSI):
2. Underwriters Laboratories, Inc. (UL):

UL 514B;	Conduit, Tubing and Cable Fittings.
UL 635;	Insulating Bushings.
UL 651;	Schedule 40, 80 PVC Conduit and Fittings.
UL 797;	Electrical Metallic Tubing - Steel.
UL 1242;	Intermediate Metal Conduit - Steel.

3. National Electrical Manufacturer Association (NEMA):

NEMA RN1;	PVC Externally coated Galvanized Rigid Steel Conduit.
NEMA TC 2;	Electrical Plastic Tubing and Conduit.
NEMA TC 3;	PVC Fittings for use with Rigid PVC Conduit.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instruction. Provide written instructions for raceway products requiring glues, special tools, or specific installation techniques.

1.04 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted and approved.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Nonmetallic conduit:
   a. Prime Conduit.
   b. JM Eagle.
   c. Cantex.
2. Fittings:
   a. Appleton Electric Co.
   b. OZ/Gedney.
   c. Thomas & Betts Corp.
   d. Spring City Electrical Manufacturing Co.
   e. Occidental Coating Co. (OCAL).
   f. Carlon.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 RIGID NON-METALLIC CONDUIT (PVC)

A. Conduit:

1. Rigid polyvinyl chloride, Schedule 40 or 80 conforming to NEMA TC1 and UL 651, latest edition. UL listed for exposed and direct-burial applications and for 90 degrees C conductor insulation. Conduit shall include an integral bell fitting at one end.

B. Fittings: Couplings, adaptors, transition fittings, etc., shall be molded PVC, slip on, solvent weld type conforming to NEMA TC3 for Schedule 40 or 80 and NEMA TC 9 for type EB or DB.

2.03 MISCELLANEOUS CONDUIT FITTINGS AND PRODUCTS

A. Standard products not herein specified:

1. Provide listing of standard electrical conduit hardware and fittings not herein specified for approval prior to use or installation, i.e. locknuts, bushings, etc.
2. Listing shall include Manufacturers name, part numbers and a written description of the item indicating type of material and construction.
3. Miscellaneous components shall be equal in quality, material and construction to similar items herein specified.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of conduit system installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 APPLICATION

A. Rigid non-metallic conduit (PVC): Can be used in the following applications:

1. Schedule 40 or 80 for exterior branch circuits directly buried in earth, 18" minimum below grade. PVC may be used below exterior slabs not subject to vehicular traffic.
2. PVC may be used below exterior slab subjects to vehicular traffic when encased in a minimum of 2 inches of concrete.
3. Only schedule 80 PVC may be used for above ground conduit extensions on utility poles.
4. PVC elbows shall be radius sweep type schedule 40 for bends 45°or less and large radius sweep type schedule 80 for bends 46°or greater.
5. In general, PVC may not be run exposed in concrete walls or in floor slabs unless expressly indicated on the Drawings.

3.03 PREPARATION

A. Provide all reasonably inferred standard conduits fitting and products required to complete conduit installation to meet the intended application whether noted, indicated, or specified in the Contract Documents or not.

3.04 INSTALLATION

A. Install conduit in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.

B. Minimum Conduit Size: Unless otherwise noted herein or on Drawings, minimum conduit size shall be 3/4" for exterior and underground applications.

C. All conduit sizes indicated on the Drawings are sized for copper conductors with THHN/THWN insulation. If conductor type or size is changed the Contractor shall be responsible for resizing conduits upward to meet Code.

D. In general, all conduit work shall be concealed where possible.

E. Install conduits in complete runs before pulling in cables or wires.

F. Install conduit free from dented, bruises or deformations. Remove and replace any damaged conduits with new undamaged material.

G. Conduits shall be well protected and tightly covered during construction using metallic bushings and bushing "pennies" to seal open ends.

H. Clean any conduit in which moisture or any foreign matter has collected before pulling in conductors. Paint all field-threaded joints to prevent corrosion.

I. Conduit systems shall be mechanically and electrically continuous throughout. Install code size, insulated, copper, green-grounding conductors in all conduit runs for branch circuits and feeders. This conductor is not indicated on the Drawings.

J. A run of conduit between terminations at wire pulling points shall not contain more than the equivalent of four quarter bends (360-degrees, total).

3.05 UNDERGROUND INSTALLATION

A. Perform trenching, backfilling and compaction operations as specified in Division 31: Trenching.

B. Tops of conduits shall be as follows unless otherwise noted:

1. Not less than 18-inches below finished grade.

2. Not less than 24-inches below roadways, paved parking lots, driveways or any surface subject to vehicular traffic.

3. Not less than 4 inches below building floor slab for branch circuits. Major feeders and large signal conduits (2" and greater) at not less than 18-inches.

C. Furnish and install specified underground conduit marker 12" above conduits in trenches with all buried conduits.

3.06 TERMINATIONS AND JOINTS

A. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location.

B. Raceways shall be joined using specified couplings or transition couplings where dissimilar raceway systems are joined.

C. Install cable sealing bushings or raceway seal for conduit terminations in all grade level or below grade exterior pull, junction, or outlet boxes.

END OF SECTION

SECTION 26 05 33 - BOXES

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Pull and junction boxes.

B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified.

1. American National Standards Institute/National Electrical Manufacturer Association:

ANSI/NEMA OS-2;	Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
NEMA 250;	Enclosures for Electrical Equipment (1000 volts maximum).

2. Underwriters Laboratories (UL):

UL 50;	Enclosures for Electrical Equipment, Non-Environmental Considerations.
UL 1773;	Termination Boxes.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Precast concrete boxes:

a. Oldcastle Enclosure Solutions.

b. Jensen Precast.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 PULL AND JUNCTION BOXES

A. Precast concrete boxes: Provide high density reinforced concrete pull and junction box with end and side knockouts and non-settling shoulders. Use cast iron lid with hold down bolts or use traffic rated covers in areas subject to vehicular traffic.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of box installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 INSTALLATION

A. Install boxes in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.

B. Locate electrical boxes as indicated on Drawings and as required for splices, taps, wire pulling, equipment connections and Code compliance.

C. Install junction or pullboxes where required to limit bends in conduit runs to not more than 360 degrees or where pulling tension achieved would exceed the maximum allowable for the cable to be installed. Note that these boxes are not indicated on the Drawings.

D. Provide precast concrete boxes in exterior planting areas, walkways, roads etc.

END OF SECTION

SECTION 31 20 00 - EARTH MOVING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete pavements.
5. Excavating and backfilling for utility trenches.

1.2 REFERENCES

A. Standard Specifications, latest edition, issued by California Department of Transportation (CSS).

B. Latest Edition, Greenbook: Standard Specifications for Public Works Construction.

1.3 DEFINITIONS

A. ASTM Specificatios: The latest volume of ASTM Standards (Part 19) of the American Society for Testing and Materials, latest revision.

B. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

2. Final Backfill: Backfill placed over initial backfill to fill a trench.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site (or on-site, as directed) for use as fill or backfill.

E. Degree of Compaction: The ratio, expressed as a percentage of the dry density of the fill material as compacted in the field relative to the maximum dry density for the same material as determined by Test Method Number California 231-E or ASTM D 1557.

F. Engineered Fill: Engineered fill is a fill upon which the geotechnical engineer have made sufficient tests and observations to enable them to issue a statement that, in their opinion, the fill has been placed and compacted in accordance with the specification and plan requirements and to the satisfaction of the District.

G. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by District. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by District. Unauthorized excavation, as well as remedial work directed by District, shall be without additional compensation.

H. Fill: Fill is all soil or soil/rock materials placed to fill excavation voids and/or raise the grade of the site to finish grade.

I. Import Fill: Material hauled in from off-site.

J. On-Site Material: Material obtained from the required excavations on the site.

K. Optimum Moisture Content: The moisture content at which the maximum laboratory density is achieved using the standard compaction procedure ASTM Test Designation D 1557 (AASHTO Test T-180).

L. Select Material: Soil Material meeting the requirements set forth in these specifications.

M. Soils Report: A report prepared specifically for the project by a geotechnical engineer. The Soils Report shall be made a part of these specifications by reference.

N. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

O. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

P. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 PROJECT CONDITIONS

A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.

B. Do not commence earth moving operations until plant-protection measures specified in on the contract plans or as specified in Section 01 56 39 "Temporary Tree and Plant Protection" (if included) are in place.

C. The Contractor shall be familiar with the soil conditions on the site, whether covered in a Soils Report or not, and shall thoroughly understand all recommendations associated with the grading.

1.5 QUALITY ASSURANCE

A. All work under this section will be subject to the inspection and approval of both the District and the District’s Geotechnical Engineer. Compaction testing shall be performed by a District approved independent testing laboratory under the supervision of a California registered geotechnical engineer.

B. Any fill where the site preparation, type of material, or compaction is not approved by the geotechnical engineer shall be removed and/or recompacted until the requirements are satisfied and approved by said geotechnical engineer.

C. Testing or retesting caused by unsatisfactory contract operations shall be paid for by the Contractor.

PART 2 PRODUCTS

2.1 GENERAL

A. All fill material shall be in conformance with applicable requirements of Section 19 Earthwork, of the State Standard Specifications. Imported material shall conform to the requirements for harmful contaminants test for pollutants.

2.2 SOIL MATERIALS

A. General Engineered Fill: All fill material must be approved by the geotechnical engineer. The material for fill shall be a soils or soil/rock that is free from organic matter or other deleterious substances. The material shall not contain rocks or gravel larger than 3 inches in any dimension. The CONTRACTOR shall obtain all fill material from off-site commercial or approved borrow areas on campus that are free from contamination and provide documentation from each source of fill verifying the fill to be free of contaminants. Contractor shall provide a testing report to document that the backfill material meets the required specification.

B. Select Fill Material beneath floor slabs: In addition to the requirements above, select material, when called for on the plans and for use under floor slabs, must conform to the requirements of the soils report.

C. Base Course: Class 2 aggregate base material, ¾" maximum grading, per State Standard Specifications.

D. Engineered Fill: Recycled Aggregate base, as specified by the Geotechnical Engineer.

E. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Permeable Material: Class 1 Type B permeable material per State Standard Specification Section 68-2.02F.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 EXECUTION

3.1 GENERAL

A. Work done under this Section shall meet the applicable requirements of Section 19, Earthwork, of the State Specifications. The Contractor shall cut, fill, import, or export materials as required to meet the lines and grades for subgrade or grade as shown on the plans.

3.2 PREPARATION

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

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

D. After stripping, the areas to be filled shall be over-excavated to the minimum depth called for on the plans or that is required by the geotechnical engineer. The over-excavated soil that is clean and free from organic material may be used later as engineered fill, as approved by the geotechnical engineer.

E. After stripping the surface vegetation and over-excavating to the required depths, the exposed surface shall be scarified to a minimum depth of eight inches (8”) under the proposed building pad, and a minimum of 8 inches (8”) elsewhere or as specified by the geotechnical engineer. The Contractor shall water and aerate as necessary to bring the soil to a moisture content that will permit proper compaction, and shall compact to the requirement of engineered fill as specified. Prior to placing fill, the Contractor shall obtain the geotechnical engineer’s approval of the site preparation in the area to be filled.

3.3 EXCAVATION, GENERAL

A. All excavations shall be carefully made true to the grades and elevations shown on the plans. The excavated surfaces shall be properly graded to provide positive drainage during construction and to prevent ponding of water.

B. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.4 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: As indicated.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. Over-excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material, 4 inches deeper elsewhere, to allow for bedding course, and as shown on the contract plans.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3. Cut and protect roots according to requirements in Section 01 56 39 "Temporary Tree and Plant Protection."

3.5 SUBGRADE INSPECTION

A. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by District, without additional compensation.

3.6 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by the District.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by District.

3.7 STORAGE OF SOIL MATERIALS

A. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

B. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within the percentage of optimum moisture content recommended by the Soils Report.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.8 PLACING AND COMPACTING OF FILL MATERIAL

A. Upon completion of demolition, removal, and disposal of existing building structures, including termination/removal/abandonment of utilities, removal of concrete slabs, walkways, and concrete footings, the CONTRACTOR shall backfill demolition and excavation areas with clean fill material. The CONTRACTOR shall provide all fill necessary to bring the existing grades under the demolished building to be level with the adjacent present grades. The CONTRACTOR shall compact the fill in 6-12” lifts with a vibratory compactor and left clean. No compaction testing will be required, but the CONTRACTOR shall warranty the fill material against settling at all areas for a period of one year.

B. The CONTRACTOR shall obtain all fill material from off-site commercial or approved sources that are free from contamination and provide documentation from each source of

fill verifying the fill to be free of contaminants. Contractor shall provide a testing report to document that the backfill material meets the required specification. Backfill will not be paid directly, but shall be included in the cost of various items of the contract The DISTRICT may provide the CONTRACTOR access to a limited amount of material on the “back 40” area of campus, that may be used for minor fill if needed. CONTRACTOR to verify the material is suitable to be used for backfill at site, as required by the plans and these specifications.

C. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

D. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

E. Before compaction begins, the fill shall be brought to a water content that will permit proper compaction by either aerating the material if it is too wet, or spraying the material with water if it is too dry. Each lift shall be thoroughly mixed before compaction to ensure a uniform distribution of water content.

1. Lift thickness requirements may be modified by the geotechnical engineer to suit equipment and materials or other conditions when required to assure satisfactory compaction.

2. Moisture-condition fill material by aerating or watering and thoroughly mix material to obtain moisture content permitting proper compaction.

3. Place and compact each layer of fill to indicated density before placing additional fill material. Repeat filling until proposed grade, profile, or contour is attained.

4. Suspend fill operations when satisfactory results cannot be obtained because of environmental or other unsatisfactory site conditions. Do not place fill material on muddy or frozen subgrade surface.

F. Place backfill material in uniform layers not greater than eight inches (8”) loose thickness over entire backfill area.

1. Use hand tampers or vibrating compactors at foundation walls, retaining walls, and similar locations. Do not use large rolling equipment adjacent to foundation walls and retaining walls.

2. Do not backfill against foundation walls or retaining walls until walls for bearing surfaces have reached design strength or are properly braced, and backfilling operations approved. Provide clean backfill materials or granular materials as required.

3. Provide compaction control and request testing and inspection of all fill and backfill.

4. Unless specifically approved by the geotechnical engineer, water settling, puddling, and jetting of fill and backfill materials, as a compaction method is not permitted.

5. Maintain moisture content of materials during compaction operations within required moisture range to obtain indicated compaction density.

6. Provide adequate equipment to achieve consistent and uniform compaction of fill and backfill materials.

3.9 GRADING

A. General:

1. Uniformly grade areas to a smooth surface, free of irregular surface changes.

2. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.

2. Walks: Plus or minus 1 inch.

3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

D. Re-grading of Pathway: Existing pathways shall be re-graded to be uniformly smooth for access by pedestrians and maintenance vehicles. Debris shall be removed prior to re-grading. Erosion control measures shall be implemented as described on plans.

E. The CONTRACTOR shall grade the site to ensure positive drainage and conform to the surrounding sites. Area grading shall consist of the grading of filled areas, the leveling of ground broken by demolition operations and the removal of non-draining areas. Said area grading shall be finish grade, leaving surface relatively smooth and capable of draining. Low areas which could permit the retention and pooling of water shall be filled or graded to drain so that no pooling of water can occur.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by District.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.11 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

D. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.12 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off of Owner's property.

END OF SECTION

SECTION 32 12 16 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Hot-mix asphalt patching.
   2. Hot-mix asphalt (HMA).

B. Related Requirements:

   1. Section 39 Hot Mix Asphalt, California State Standards (CSS), latest edition.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each paving material. Include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or meeting CSS requirements.

B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements local DOT for asphalt paving work.
   1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. Coarse Aggregate: ASTM D 692/D 692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag or meet CSS requirements.

B. Fine Aggregate: ASTM D 1073 sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof or meet CSS requirements.

C. Mineral Filler: ASTM D 242/D 242M rock or slag dust, hydraulic cement, or other inert material, or meet CSS requirements.

2.2 ASPHALT MATERIALS

A. Aggregate Base: CSS Section 26, ¾-inch maximum size.

B. Binder / Tack Coat: Emulsified asphalt diluted with water, CSS Sections 39 and 94, Type SS1.

C. Hot mix asphalt (HMA): CSS Section 39, Type A using aggregate with 1/2 inch maximum, medium grading or such other grading as shown on the drawings, and steam refined paving asphalt meeting requirements for PG 64-10 of CSS Section 92.

2.3 AUXILIARY MATERIALS

A. Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material; and recycled tires, asphalt shingles, or glass from sources and gradations that have performed satisfactorily in previous installations, equal to performance of required hot-mix asphalt paving produced from all new materials.

B. Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form. Products containing glyphosphate are not acceptable.

PART 3 - EXECUTION

3.1 PATCHING

A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending a minimum of eighteen (18 inches) into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.05 to 0.15 gal./sq. yd.
1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

C. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

D. Pavement Lifts: 3 inch thickness maximum, consisting of two lifts or pourings -- a binder layer of 1-1/2 and a top layer of 1-1/2 inches or as allowed per CSS.

3.2 PLACING HOT-MIX ASPHALT FOR HMA

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
1. Spread mix at a minimum temperature of 250 deg F or per CSS Section 39-2.01C.
2. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.3 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
   1. Clean contact surfaces and apply tack coat to joints.
   2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
   3. Offset transverse joints, in successive courses, a minimum of 24 inches.
   4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

3.4 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
   1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
   1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent or greater than 96 percent or per CSS.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.5 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances or per CSS:
   1. Base Course: Plus or minus 1/2 inch.
   2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
   1. Base Course: 1/4 inch.

2. Surface Course: 1/8 inch
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections, if required.

B. Replace and compact hot-mix asphalt where core tests were taken.

C. Where pavement surface slopes are less than 1.5% water test pavement to insure that no ponding occurs and that the water runs to the drainage facilities indicated on the plans. If ponding occurs, the contractor must repair pavement as necessary to insure complete runoff of surface water.

D. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.7 WASTE HANDLING

A. General: Disposal of asphalt-paving waste must be done in accordance with State and Local requirements. Asphalt-paving waste materials must be legally disposed off of Owner's property, at no cost to Owner.

END OF SECTION

SECTION 32 31 13 - CHAIN LINK FENCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Chain link perimeter fences.
2. Provide all labor, equipment and materials required for the procurement, fabrication and installation of chain link fences and gates including excavation, reinforcement, concrete materials, chain link fabric, posts and rails, tension wire, swing gates, hardware, and fittings as indicated on the Contract Drawings and as specified herein.

1.2 SUBMITTALS

A. Data: Manufacturer product data for fabric, posts and accessories

B. Shop drawings: Show fence layout, footings size and reinforcement, gate details, and typical elevations.

C. Samples:

1. Twelve-inch square samples of chain link fabric.

1.3 QUALITY ASSURANCE

A. The applicable provisions of the Chain Link Fence Manufacturers Institute (CLFMI) Product Manual govern the work of this Section.

B. This requirement does not limit manufacture of the fencing components to CLFMI members.

1.4 HANDLING

A. Handle and store components to avoid damaging the finish.

B. Store off the ground in a protected location.

PART 2 - PRODUCTS

1.5 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 10 00 Summary of Work to design chain-link fence.

B. Structural Performance: Chain-link fence shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7 and California Building Code (CBC).

1. Design Wind Load:

a. Minimum Post Size and Maximum Spacing: Determine according to CLFMI WLG 2445, based on mesh size and pattern specified.

1.6 MATERIALS

A. Framework: Top-Rail/Trussed Brace Rail with bottom tension wire as defined by CLFMI except where modified by drawings and this specification.

B. Tubular members:

1. Type II: ASTM F 1083, Group IC, having a minimum yield strength of 50,000 psi and an external zinc coating complying with Type B, zinc with polymer film, 0.90 oz./square-foot

minimum, or Type D, zinc pigmented, 81 percent nominal coating with 0.30 mils minimum thickness.

C. Finish: Zinc-coated (hot dip galvanized) with minimum zinc coating of 1.20 oz/ft2 (366g/m2)

D. Chain link fabric: Complying with CLFMI standards and the following with a Class 1 zinc coating weight classification.

1. One-piece width, 2-inch mesh, 9-gage fencing.
2. Nine-gage elsewhere.
3. Knuckled edge at both selvages.

E. Accessories, General: Galvanized chain link fabric, complying with ASTM A 153, except that the coating weight may comply with the requirements of CFLMI standards for coating thickness.

1. Polymer-Coated Steel Tension Wire: 0.177-inch- (4.5-mm-) diameter, tension wire according to ASTM F1664, Class 1 over zinc-coated steel wire.
2. Stretcher bars: One-piece length equal to full height of fabric with a minimum cross section of 3/16-inch by 3/4-inch. Provide one stretcher bar for each gate and end post, and 2 for each corner and pull post.
3. Stretcher bar bands: Heavy pressed steel to secure stretcher bars to intermediate, corner and gate posts.
4. Post tops: Steel or malleable iron designed as a weathertight closure cap. Design caps with opening to permit passage of the top rail, when rail is provided.

F. Wire ties: For tying fabric to line posts, use 11-gage steel wire clips spaced 14-inch o.c. For tying fabric to tension wire use 11-gage hog rings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify conditions and measurements affecting the work of this Section at site.

B. Correct detrimental conditions before proceeding with installation.

3.2 INSTALLATION

A. General: Comply with ASTM F 567, CFLMI and the following.

B. Posts: Provide corner, end, and intermediate posts. Erect posts plumb and level, in straight alignment, and set in concrete footings. Support and brace until concrete sets.

C. Post cap: Provide on each post.

D. Tension wire: Install before stretching fabric and tie to each post with ties or clips.

E. Fence fabric:

1. Install within 2-inch of grade or paving on security side of fencing and anchor to framework so that fabric remains in tension after pulling force is released.
2. Pull taut and tie to posts, rails, and tension wire.

F. Stretcher bars: Thread through fabric and secure to posts with steel bands.

G. Bolts: Carriage bolts used for fittings shall be installed with the head on the secure side of the fence. Bolts shall be peened over to prevent removal of the nut.

3.3 BRACING

A. Brace gates, corner, end, and pull posts to the nearest post with a horizontal brace used as a compression member and a diagonal truss rod and truss tightener used as a tension member.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to perform tests.

B. Grounding Tests: Test to verify continuity and capacity.

3.5 TOUCHUP

A. Touchup damaged galvanizing, when the results are acceptable to the Architect; otherwise remove and replace damaged components.

END OF SECTION

SECTION 33 31 00 - SANITARY UTILITY SEWERAGE PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
   1. Sanitary sewer piping.
   2. Abandoning existing sewer services.

B. Related Standards
   1. All products and work shall conform to applicable, city, and state code pertaining to the local city ordinances, for materials and installation of the Work for this Section, including, but not limited to City of Pittsburg standards, or Central Contra Costa Sanitary District (CCCSD) standards, as applicable.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

B. Field quality-control reports.

C. Coordination Documentation: Show compliance with Contra Costa County and City of Pittsburg standards, as applicable.

D. Mix design for Concrete Structures.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

A. All PVC pipe shall be joined by compression, solvent-welded, thermo-fusion welded or mechanical restrained joints as shown on the Plans.

B. Polyvinyl chloride pipe (PVC) shall conform to the requirements of ASTM D 3034, SDR-26, or AWWA C900 or C905, Class 100, 150, 165, 200, 253, or 305. Material for PVC pipe shall conform to the requirements of ASTM D 1784 for Class 12454-B or 12454-C as defined therein.

C. PVC Pipe Joints: Rubber gasketed conforming to ASTM D3212. Joints may be push-on joint or mechanical joint.

D. Gaskets: Conform to ASTM F477.

E. Fitting Bends: Long-radius unless otherwise approved by the District.

F. Pipe-to-Pipe connections: Make with 45-degree wyes and long radius bends. Tees are not permitted.

G. Caps may be used on temporary pipe closures.

H. Pipe adaptors: As recommended by pipe manufacturer, for connecting PVC pipe to manholes, and end enclosures.

2.2 CLEANOUTS

A. Plastic Cleanouts:
   1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

PART 3 - EXECUTION

3.1 INTERRUPTION OF SERVICE

A. Interruption of Existing Sanitary Sewer Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service. Notify Owner no fewer than two days in advance of proposed interruption of service. Do not proceed with interruption of service without Owner's written permission.

3.2 EXCAVATION

A. Excavation, trenching, and backfilling are specified in Section 31 20 00 "Earth Moving."

B. Conform to City standard details and the contract plans for trench excavation and backfill.

3.3 ABANDONMENTS

A. For permanent lateral abandonments, cut and fill end of lines (portion to remain) with 5 feet min of abandonment grout, per CCCSD specification section 03 60 00 – Grout, and add cap.

B. For abandonment of existing sewer manholes/sump pits: Contractor shall remove and dispose of all existing pump equipment and accessories, and abandoned all connecting pipes and conduits. Contractor shall remove top of sump box to below new finish grade a minimum of 12-inches, and shall fill void in box with compacted ¾” Class 2 AB, or as directed by District.

3.4 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

D. Install gravity-flow, nonpressure drainage piping according to the following:
   1. Install piping pitched down in direction of flow.
   2. Install piping with minimum cover per plan.
   3. Install PVC piping according to ASTM D 2321 and ASTM F 1668.

3.5 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:

1. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
2. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.6 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use PVC pipe fittings in pipes at branches for cleanouts and PVC pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in pipe.
   1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
   2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
   3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
   4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.

B. Set cleanout frames and covers in earth in cast-in-place concrete block or Class II AB compacted. Set with tops 1 inch above surrounding earth grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

D. Conform to the plans.

3.7 IDENTIFICATION

A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
   1. Use detectable warning tape over ferrous piping.
   2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.8 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
   1. Submit separate reports for each system inspection.
   2. Defects requiring correction include the following:
      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leakage into piping.
      e. Exfiltration: Water leakage from or around piping.
   3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
   4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to requirements of authorities having jurisdiction.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
   4. Submit separate report for each test.
   5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
b. Option: Test plastic piping according to ASTM F 1417.
c. Option: Test concrete piping according to ASTM C 924.

C. Perform interim cleaning and flushing in accordance with CCCSD standards, as applicable, prior to final acceptance.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

E. System Testing: In accordance with CCCSD standards, as applicable for piping systems testing.

END OF SECTION

SECTION 33 41 00 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Pipe and fittings.
   2. Cleanouts.
   3. Catch basins.
   4. Stormwater inlets.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

B. Field quality-control reports.

C. Coordination Documentation: Show compliance with Contra Costa County and City of Brentwood standards, as applicable.

D. Mix design for Concrete Structures.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

A. PVC Piping SDR26:
   1. Fittings: ASTM F 949, PVC molded or fabricated, socket type.
   2. Gaskets: ASTM F 477, elastomeric seals.

2.2 NONPRESSURE TRANSITION COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:
   1. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
   2. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Shielded, Flexible Couplings:
   1. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

D. Ring-Type, Flexible Couplings:
   1. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

2.3 CLEANOUTS

A. Plastic Cleanouts:
1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.4 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R, and the following:
1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.
1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
a. Invert Slope: 1 percent minimum through manhole.
2. Benches: Concrete, sloped to drain into channel.
a. Slope: 4 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

2.5 CATCH BASINS

A. Standard Precast Concrete Catch Basins:
1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
3. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
4. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
5. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

B. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include appropriate riser with flange for appropriate box sizes listed in plan inlet structure table.
1. Size: as indicated in plans inlet structure table.
2. Grate: flat grate with small square or short-slotted drainage openings. Grates shall be H-20 traffic load rated when in roadways. Grates shall be ADA compliant when in or adjacent to designated walkways or pedestrian travelled areas, as directed by DISTRICT.

C. Bedding: Class 2 (3/4”) Aggregate Base per State Std Spec. Section 26.

2.6 STORMWATER INLETS

A. Riprap Basins: Broken, irregularly sized and shaped, graded stone according to NSSGA's "Quarried Stone for Erosion and Sediment Control", or as directed on the plans, with flared inflow pan per plan dimensions.

2.7 PIPE OUTLETS

A. Riprap Basins: Broken, irregularly sized and shaped, graded stone according to NSSGA's "Quarried Stone for Erosion and Sediment Control" with flared outflow pan per plan dimensions.

B. Filter Stone: According to NSSGA's "Quarried Stone for Erosion and Sediment Control," No. FS-2, No. 4 screen opening, average-size graded stone.

C. Energy Dissipaters: According to NSSGA's "Quarried Stone for Erosion and Sediment Control," No. A-1, 3-ton average weight armor stone, unless otherwise indicated.

PART 3 - EXECUTION

A. Excavation, trenching, and backfilling are specified in Section 31 20 00 "Earth Moving."

B. Conform to City standard details and the contract plans for trench excavation and backfill.

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

D. Install gravity-flow, nonpressure drainage piping according to the following:
1. Install piping pitched down in direction of flow.
2. Install piping with minimum cover per plan.
3. Install PVC piping according to ASTM D 2321 and ASTM F 1668.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:
1. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
2. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use PVC pipe fittings in pipes at branches for cleanouts and PVC pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in pipe.
1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.

4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.

B. Set cleanout frames and covers in earth in cast-in-place concrete block or Class II AB compacted. Set with tops 1 inch above surrounding earth grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

D. Conform to the plans.

3.5 CATCH BASIN INSTALLATION

A. Set frames and grates to elevations indicated.

B. Installation shall conform to standard plans.

C. Construct on a minimum of 3” bedding thickness, compacted.

D. Install permanent rock inlet protection as shown on plans.

3.6 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

B. Connect nonpressure, gravity-flow drainage piping in building's storm building drains ,if required.

C. Make connections to existing piping and underground manholes.
1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
   a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
   b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

D. Pipe couplings and expansion joints with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.
   a. Unshielded flexible couplings for same or minor difference OD pipes.
   b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
   c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

3.7 IDENTIFICATION

A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
   1. Use detectable warning tape over ferrous piping.
   2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.8 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
   1. Submit separate reports for each system inspection.
   2. Defects requiring correction include the following:
      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leakage into piping.
      e. Exfiltration: Water leakage from or around piping.
   3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
   4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to requirements of authorities having jurisdiction.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
   4. Submit separate report for each test.
   5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
      a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
      b. Option: Test plastic piping according to ASTM F 1417.
      c. Option: Test concrete piping according to ASTM C 924.

C. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION

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