

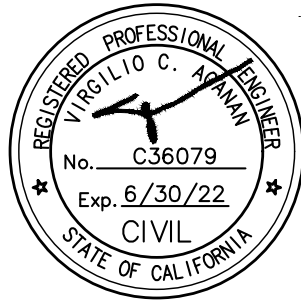
## PROJECT MANUAL

FOR

**ARROYO HIGH SCHOOL**

**GREENHOUSE**

4921 CEDAR AVENUE, EL MONTE  
EL MONTE, 91732



**DSA SUBMITTAL**

**01/17/2022**

ARCHITECT'S PROJECT NUMBER: 20175.01

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SECTION 01 1100  
SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The furnishing of all labor, materials, equipment, services, and incidentals necessary for Work of the **GREENHOUSE** located at **4921 Cedar Avenue, El Monte California 91732** as set forth in the Construction Documents which include, but are not limited to, the Drawings, Addenda and Specifications.

1.02 RELATED REQUIREMENTS:

1. Section 01 1216: Phasing of the Work.
2. Section 01 2300: Alternates (Bid Items).
3. Section 01 3113: Project Coordination.
4. Section 01 3229: Project Forms.
5. Section 01 3213: Construction Schedule.
6. Section 01 4525: Testing, Adjusting, and Balancing for HVAC.
7. Section 01 5000: Construction Facilities and Temporary Controls.
8. Section 01 7123: Field Engineering.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 USE OF PREMISES

- A. CONTRACTOR shall coordinate Work of all trades, Subcontractors, utility service providers, with OWNER and/or Separate Work Contract. CONTRACTOR shall sequence, coordinate, and perform the Work to impose minimum hardship on the operation and use of the existing facilities and/or Project site. CONTRACTOR shall install all necessary protection for existing improvements, Project site, property, and new Work against dust, dirt, weather, damage, vandalism, and maintain and relocate all protection to accommodate progression of the Work.
- B. CONTRACTOR shall confine entrance and exiting to the Project site and/or facilities to routes designated by the OAR.
- C. Within existing facilities, OWNER will remove portable equipment, furniture, and supplies from Work areas prior to the start of Work. CONTRACTOR shall cover and protect remaining items in areas of the Work.

- D. CONTRACTOR is advised school may be in session during performance of the Work. CONTRACTOR shall utilize all available means to prevent generation of unnecessary noise and maintain noise levels to a minimum. When required by the OAR, CONTRACTOR shall immediately discontinue noise-generating activities and/or provide alternative methods to minimize noise generation. CONTRACTOR shall install and maintain air compressors, tractors, cranes, hoists, vehicles, and other internal combustion engine equipment with mufflers, including unloading cycle of compressors. CONTRACTOR shall discontinue operation of equipment producing objectionable noise as required by the OAR.
- E. CONTRACTOR shall furnish, install, and maintain adequate supports, shoring, and bracing to preserve structural integrity and prevent collapse of existing improvements and/or Work modified and/or altered as part of the Work.
- F. CONTRACTOR shall secure building entrances, exits, and Work areas with locking devices as required by the OAR.
- G. CONTRACTOR assumes custody and control of OWNER property, both fixed and portable, remaining in existing facilities vacated during the Work.
- H. CONTRACTOR shall cover and protect surfaces of rooms and spaces in existing facilities turned over for the Work, including OWNER property remaining within as required to prevent soiling or damage from dust, dirt, water, and/or fumes. CONTRACTOR shall protect areas adjacent to the Work in a similar manner. Prior to OWNER occupancy, CONTRACTOR shall clean all surfaces including OWNER property.
- I. CONTRACTOR shall not use or allow anyone other than OWNER employees to use facility telephones and/or other equipment, except in an emergency. CONTRACTOR shall reimburse OWNER for telephone toll charges originating from the facility except those arising from emergencies or use by OWNER employees.
- J. CONTRACTOR shall protect all surfaces, coverings, materials, and finished Work from damage. Mobile equipment shall be provided with pneumatic tires.
- K. CONTRACTOR is advised OWNER will award Separate Work Contracts at this Project site.
- L. CONTRACTOR shall not permit the use of portable and/or fixed radio's or other types of sound producing devices including walkmans and similar devices.

### 3.02 PROPERTY INVENTORY

- A. Property, OWNER intends to remove; will be removed by OWNER before a room or space is vacated for the Work. Before performing Work in each room or space, OAR and CONTRACTOR shall prepare a detailed initial written inventory of OWNER property remaining within, including equipment and telephone instruments and the condition thereof. OAR and CONTRACTOR shall retain a signed copy of the inventory dated and signed by both parties. Prior to subsequent OWNER occupancy of each such room or space, OAR and CONTRACTOR shall perform a final inventory of OWNER

property and all discrepancies between the initial inventory and final inventory shall be the responsibility of CONTRACTOR.

3.03 FURNITURE, FIXTURES AND EQUIPMENT (MATERIALS) OWNER FURNISHED CONTRACTOR INSTALLED (OFCI)

- A. Certain materials identified in the Contract Documents as OWNER Furnished CONTRACTOR Installed, OFCI, will be delivered to the Project site by the OWNER.
- B. If designated in the Contract Documents to be OWNER furnished CONTRACTOR installed, (OFCI), CONTRACTOR shall unload, store, uncrate, assemble, install, and connect OWNER supplied materials.
- C. One-Hundred and Twenty days before the date the CONTRACTOR needs to have the OFCI materials on site, CONTRACTOR shall notify OWNER of the scheduled date for needed OFCI materials. Upon delivery to Project site, CONTRACTOR shall store OFCI materials inside rooms and/or protected spaces and will be responsible for security of OFCI materials until Substantial Completion. OAR will sign receipt or bill of lading as applicable.
- D. CONTRACTOR shall install OFCI materials in the locations and orientation as indicated in the Contract Documents. CONTRACTOR shall verify exact locations with OAR before final installation of OFCI materials.
- F. If required, OAR will furnish setting and or placement drawings for OFCI materials.
- G. CONTRACTOR shall install OFCI materials by proper means and methods to ensure an installation as recommended by the manufacturer. CONTRACTOR shall furnish and install all necessary fasteners and required blocking to properly install OFCI materials.
- H. CONTRACTOR shall install OFCI materials with manufacturer recommended fasteners for the type of construction to which the OFCI materials are being fastened and/or anchored.
- I. CONTRACTOR shall provide final connections of any electrical, signal, gas, water, waste, venting and/or similar items to OFCI materials. CONTRACTOR shall, prior to final connection, verify the operating characteristics of OFCI materials are consistent with the designated supply.

3.04 FURNITURE, FIXTURES AND EQUIPMENT (Materials) - OWNER furnished, OWNER installed (OFOI)

- A. Certain materials are identified in the Contract Documents as OWNER Furnished, OWNER Installed (OFOI)
- B. On dates and during times designated by OWNER, CONTRACTOR shall provide clear off-loading, receiving, protected storage, and OWNER'S dumpster space areas for the use of OWNER or OWNER'S third party OFOI installation contractors. At such times, CONTRACTOR shall also make clear routes and access available to all rooms and spaces to receive OFOI materials.

- C. On dates and during times designated by OWNER, CONTRACTOR shall provide access to the elevators for use of OWNER or OWNER'S third party OFOI installation contractors.
- D. CONTRACTOR shall cooperate fully with OWNER or OWNER'S third part OFOI installation contractors.
- E. CONTRACTOR may be requested by OWNER to provide supplemental labor and equipment to support OFOI activities. Such requests must be submitted in accordance with the change order clauses of Contract.
- F. Immediately prior to mobilization of OWNER or OWNER'S third party OFOI installation contractors, OWNER shall document the condition of the Work in areas to be utilized for OFOI activities.
- G. CONTRACTOR shall not be responsible for damage caused by OWNER or OWNER'S forces. OWNER shall document the condition of the Work and report to CONTRACTOR any damage in areas utilized for OFOI activities.

END OF SECTION



SECTION 01 1216  
PHASING OF THE WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Requirements for phasing of Work include logistics, phasing, and completion of designated phases prior to commencement of subsequent phases.

1.02 RELATED REQUIREMENTS

- A. Section 01 1100: Summary of Work.
- B. Section 01 1219: Phasing of Work – Appendix A.
- C. Section 01 3300: Submittal Procedures.
- D. Section 01 3113: Project Coordination.
- E. Section 01 3213: Construction Schedule.
- F. Section 01 5000: Construction Facilities and Temporary Controls.
- G. Section 01 7700: Contract Closeout.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 SUBMITTALS

- A. CONTRACTOR shall submit a Project site logistics plans in accordance with and as required by this Section.

3.02 LOGISTICS

- A. Prior to commencement of Work, CONTRACTOR shall prepare and submit to OAR, a detailed Project site logistic plan, in same size and scale of Drawings, setting forth CONTRACTOR plan of Work relative to following, but not limited to, items:

- 1 Hauling route shall be in accordance with local ordinances a truck access route to and from Project site.
2. The identification of any overhead wire restrictions for power, street lighting, signal or cable.
3. Local sidewalk access and street closure requirements.
4. Protection of sidewalk pedestrians and vehicular traffic.
5. Project site fencing and access gate locations.
6. Construction parking.
7. Material staging or delivery areas.

8. Material storage areas.
  9. Temporary trailer locations.
  10. Temporary service location and proposed routing of all temporary utilities.
  11. Location of temporary or accessible fire protection.
  12. Trash removal and location of dumpsters.
  13. Concrete pumping locations.
  14. Crane locations.
  15. Location of portable sanitary facilities.
  16. Mixer truck wash out locations.
  17. Traffic control signage.
  18. Perimeter and site lighting.
  19. Storm Water Pollution Prevention Plan – SWPPP.
  20. Stockpile or lay down areas.
  21. Security lighting
- B. Revised Project site logistic plan may be required by OAR for separately identified phases of Work as set forth in this Section.
- C. CONTRACTOR is responsible for securing and/or obtaining all approvals and permits from authorities having jurisdiction relative to any activities set forth in Article 3.02.A.

### 3.03 PHASING OF THE WORK

- A. Project will be constructed in separate Milestone increments, as identified or as described in this Section or Contract Documents. Phasing will also delineate Work to be completed in each designated phase. Unless otherwise approved or directed by OWNER, each phase shall be completed according to approved Baseline Schedule prior to commencement of next subsequent phase. CONTRACTOR shall incorporate and coordinate Work of Separate Work Contracts relative to this Project into the Phasing and Construction Schedule.
- B. CONTRACTOR shall install all necessary Work for, but not limited to, power, lighting, signal, HVAC, drainage, and plumbing systems in phased Work before completion of designated phase. All valves, pull boxes, stub outs, temporary capping, and other Work necessary for phased completion and operation of all necessary systems shall be provided whether or not such Work is specifically identified in Contract Documents.

### 3.04 PHASING OF THE WORK – GENERAL

- A. CONTRACTOR shall prepare Construction Schedule in order to complete Work and related activities in accordance with phasing plan as established in Appendix

“A”. CONTRACTOR shall include all costs to complete all Work within Milestones or Contract Time.

- B. OWNER will be seriously damaged by not having all Work completed within Milestones or Contract Time. It is mandatory Work be complete within Milestones or Contract Time.

3.05 PHASING OF THE WORK – SPECIFIC

- A. CONTRACTOR shall prepare Construction Schedule, and shall complete following, but not limited to Milestones, as shown in Section 01 1219 – Appendix A and within designated phases in accordance with following:

1. Phase 1 Mobilization – ( # of days ) calendar days: Milestones 1 & 3.
2. Phase 2 Construction – ( #days ) calendar days: Milestone 2, 4-28.
3. Phase 3 Administrative Closeout – ( # of days ) calendar days: Milestone 29.

- B. The Contract Time shall be a total of ( # days ) calendar days from date of commencement of Contract Time.

END OF SECTION

SECTION 01 2100  
ALLOWANCES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements governing Contract allowances.
  - 1 Allowances as set forth in the Specifications are to be used as compensation for items as set forth in this Section. The amounts listed in the schedule or Specifications are to be included in the base bid and shall be listed separately in the Schedule of Values and Application for Payment.
- B. Type of allowances includes the following:
  - 1. B-Permit as per Specification Section 01 3596.
  - 2. Sewer assessment facility fee as per Supplementary Conditions, Section 00 7300.
  - 3. Field Office Supplies as per Division 01 Section 01 5000, 3.11.

1.02 RELATED REQUIREMENTS

- A. Section 01 2973: Schedule of Values.
- B. Section 01 2976: Progress Payment Procedures.
- C. Section 01 3213: Construction Schedule.
- D. Section 01 3229: Project Forms.
- E. Section 01 5000: Construction Facilities and Temporary Controls.
- F. Divisions 02-49: Specifications.

1.03 ALLOWANCES

- A. Use the allowances only as authorized for OWNER purposes and only by an approved allowance disbursement form that indicate the amounts to be charged to the respective allowance amount.
- B. At Substantial Completion of the Work or at any time designated by the OAR, credit unused amounts remaining in the allowances to the OWNER by Change Order.

1.04 ALLOWANCE DISBURSEMENT

- A. CONTRACTOR shall submit a request for allowance disbursement on an allowance disbursement form. Include all substantiating and/or required data along with the request. Utilize the allowance disbursement authorization form as set forth in the Project Forms Section 01 3229.
- B. The request shall have the requested amount listed as an allowance disbursement without CONTRACTOR overhead and markup.

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- C. Once the OAR has accepted the disbursement, ARCHITECT and OAR will sign the allowance disbursement form.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 SCHEDULE OF ALLOWANCES

- A. Include in the base bid the following allowances in the following amounts:

<u>Section</u>	<u>Description</u>	<u>Amount</u>
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END OF SECTION

SECTION 01 2300

ALTERNATES

(Bid Items)

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. This Section specifies administrative and procedural requirements governing alternate bid items.

1.02 RELATED REQUIREMENTS:

- C. Section 01 1100: Summary of Work.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.01 SPECIFIC:

- A. Bid item is an amount proposed by bidder and stated on the Bid and Acceptance Form for certain Work defined in the Bidding Documents that may be added to or deducted from the base bid amount if OWNER decides to accept a corresponding change in either the amount of Work to be completed, the Contract Documents, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. The amount added or deducted from the base bid is the net addition to or deducted from the base bid to incorporate bid item Work into the Work. Unless noted otherwise, no other adjustments are made to the Contract Amount, Milestones or the Contract Time.

3.02 PROCEDURES:

- A. CONTRACTOR shall modify or adjust affected adjacent Work as necessary to completely and fully integrate OWNER accepted bid item Work.
  - 1. Include as part of each bid item, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the bid item.
- B. Accepted bid items are subject to the same terms and conditions as other Work of the Contract Documents.
- C. OWNER reserves the right to accept bid items for a period of ninety days after bid opening date.

- D. Schedule: A schedule of bid items is included at the end of this Section. The Contract Documents referenced in the schedule identify necessary requirements to complete the Work described as specified for each bid item.

3.03 SCHEDULE OF BID ITEMS: (See the Bidding Documents for Additional Information)

- A. Alternate Bid Item 1: **No water connection line to the greenhouse**
- B. Alternate Bid Item 2:
- C. Alternate Bid Item 3:
- D. Alternate Bid Item 4:
- E. Alternate Bid Item 5:

END OF SECTION

SECTION 01 25 13  
PRODUCT PROCEDURES FOR SUBSTITUTION AND “OR EQUAL”

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for handling requests for substitutions and “or equal” submitted pursuant to Article 6.14 of the General Conditions.

1.02 RELATED REQUIREMENTS

- A. Section 01 3229: Project Forms.
- B. Section 01 3300: Submittal Procedures.
- C. Section 01 6000: Product Requirements.
- D. Section 01 7700: Contract Closeout.

1.03 APPLICATION

- A. OAR will review CONTRACTOR proposed changes in products or materials required by the Contract Documents.
  - 1. Substitutions: OAR will consider requests for substitution if a product is no longer manufactured or the OAR and ARCHITECT, after a diligent search have verified that product or material is not available to CONTRACTOR. The following are not considered to be valid requests for substitutions:
    - a. Revisions to the Contract Documents requested by OAR or ARCHITECT.
    - b. Specified options of products included in the Contract Documents.
    - c. Substitutions requested on a “or equal” basis.
  - 2. “Or Equal”: OAR will consider requests for “or equal” if submitted within the time indicated in Article 6.14 of the General Conditions.

1.04 SUBMITTALS

- A. Transmit submittals as described in related Sections for each request for substitution or “or equal”.
  - 1. Identify the product to be replaced in each request. Include related Specification Section and Drawing number.
  - 2. Provide complete documentation denoting compliance with the requirements for substitutions, and the following information, as appropriate.



- a. A detailed comparison of significant qualities of the proposed substitution with those specified in the Contract Documents. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
  - b. Product Data, including Drawings, descriptions of products, fabrication, and installation procedures.
  - c. Samples, where applicable or requested.
  - d. CONTRACTOR certification the proposed substitution or “or equal” conforms to requirements of the Contract Documents in every respect and is appropriate for the applications indicated.
  - e. CONTRACTOR waiver of rights to an increase in the Contract Amount, Milestones and/or Contract Time.
3. If required, OAR and ARCHITECT will request additional information or documentation for evaluation.
  4. ARCHITECT will review requests for substitutions and “or equals” and provide a recommendation to OAR.
  5. If ARCHITECT accepts proposed substitutions or “or equals” OAR will forward submittals to the OWNER’s Maintenance and Operations Technical Unit for review. OAR will notify CONTRACTOR of acceptance or rejection of the substitution.
  6. Where a proposed substitution or “or equal” involves and/or affects more than one Subcontractor, CONTRACTOR shall ensure each Subcontractor cooperates with the other Subcontractor involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of all products.
  7. CONTRACTOR submittal and ARCHITECT review of Shop Drawings, Product Data, material lists or Samples do not constitute an acceptable or valid request for substitutions or “or equals”.

2. PART 2 - PRODUCTS (Not used)

3. PART 3 - EXECUTION

END OF SECTION

SECTION 01 2613  
REQUEST FOR CLARIFICATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Procedure for requesting clarification of the intent of the Contract Documents.

1.02 RELATED REQUIREMENTS

- A. Section 01 1100: Summary of Work.
- B. Section 01 3113: Project Coordination.
- C. Section 01 3213: Construction Schedule.
- D. Section 01 3229: Project Forms.
- E. Section 01 7700: Contract Closeout.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 PROCEDURE

- A. CONTRACTOR shall prepare a Request for Clarification on the form provided in Section 01 3229. CONTRACTOR shall transmit the Request for Clarification to ARCHITECT with a concurrent copy to the OAR.
- B. ARCHITECT response is a clarification of the intent of the Contract Documents and does not authorize changes in the Contract Amount, Milestones and/or Contract Time.
- C. A Request for Clarification may be returned with a stamp or notation "Not Reviewed," if:
  - 1. The requested clarification is ambiguous or unclear.
  - 2. The requested clarification is equally available to the requesting party by researching and/or examining the Contract Documents.
  - 3. CONTRACTOR has not reviewed the Request for Clarification prior to submittal.
- D. Allow a minimum of nine days for review and response time, after receipt by ARCHITECT and OAR. CONTRACTOR shall verify and is responsible in verifying ARCHITECT and OAR receipt of a Request for Clarification.
- E. Changes or alterations to the approved drawings or specifications shall be made by means of addenda or change orders as per section 4-338 of the California Building Standards Commission's, California Administrative Code.

END OF SECTION

SECTION 01 2973  
SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Procedure for submission of a certified Schedule of Values for review and approval by the OAR.

1.02 RELATED REQUIREMENTS

- A. Section 01 2100: Allowances.
- B. Section 01 2300: Alternates (Bid Items).
- C. Section 01 2976: Progress Payment Procedures.
- D. Section 01 3113: Project Coordination.
- E. Section 01 3213: Construction Schedule.
- E. Section 01 3229: Project Forms.
- F. Section 01 3300: Submittal Procedures.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 PREPARATION

- A. Upon receipt of the Notice of Intent to Award, CONTRACTOR shall commence preparation of a Schedule of Values in accordance with the form included in Section 01 3229.
- B. CONTRACTOR shall coordinate the preparation of a Schedule of Values with preparation of the Construction Schedule as set forth in Section 01 3213. The corresponding values from the specification division totals on cost loaded schedule shall match with the approved Schedule of Values.
- C. Include the following Project identification on a certified Schedule of Values:
  - 1. Project name and location.
  - 2. Project Number.
  - 3. Contract #.
  - 4. CONTRACTOR name.
  - 5. Date of Submittal.
- D. The Schedule of Values shall be in tabular form with separate columns and shall include the following items:

1. Related Specification Section and Division.
  2. Description of Work.
  3. Name of Subcontractor, manufacturer or supplier.
  4. Dollar value, quantity and unit of measure of each line item.
  5. Percentage of Contract amount to nearest one-hundredth percent, adjusted to total 100 percent.
- E. Round amounts to the nearest whole dollar; the total shall equal the Contract Amount.
- F. Provide a breakdown of the Contract Amount in enough detail acceptable to OAR to facilitate continued evaluation of Application for Payment and progress reports. Coordinate with the Project Manual table of content and Schedule of Values form under Section 01 3229. Provide line items for subcontract amounts, where appropriate.
- G. Provide separate line items for items in the Schedule of Values for total installed value of that part of the Work.
- H. Provide separate line item for labor and material when required by the OAR.
- I. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item except the amounts shown as separate line items as indicated under Schedule of Values form under Section 01 3229.
- J. Temporary facilities and other cost items that are not direct cost of actual work-in-place shall be shown as separate line items as indicated under Schedule of Values form under Section 01 3229.
- K. An approved certified Schedule of Values shall serve as the basis for the monthly certified Application for Payment.
- L. If at any time, OWNER determines, in its reasonable discretion, that the schedule of Values does not approximate the actual cost being incurred by CONTRACTOR to perform the Work, CONTRACTOR shall prepare, for OAR approval, a revised Schedule of Values, which then shall be used as the basis for future progress payments. Without changing the Contract Amount, OWNER reserves the right to require CONTRACTOR:
1. To increase or decrease amounts within the line items in the Schedule of Values; and,
  2. To conform the price breakdown to OWNER accounting practice.

### 3.02 SUBMITTAL

- A. CONTRACTOR shall submit five certified copies of a Schedule of Values for review and approval by the OAR at least 14 days before the first Application for Payment.
- B. OAR will review and if necessary, return the submitted Schedule of Values with summary comments noting items not in compliance with the requirements of the Contract Documents. CONTRACTOR shall revise the submitted Schedule of Values and return five copies within three days of receipt of summary comments.

- C. Signature by OAR shall constitute acceptance of the submitted Schedule of Values.
- D. An approved copy of the Schedule of Values by OAR will be transmitted to CONTRACTOR, and Inspector.

END OF SECTION

SECTION 01 2976  
PROGRESS PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. This Section specifies administrative and procedural requirements for a certified Application for Payment.
  - 1. Coordinate the certified Schedule of Values and certified Application for Payment with, but not limited to, the Construction Schedule, submittal log, and list of Subcontractors.

1.02 RELATED REQUIREMENTS:

- A. Section 01 2100: Allowances.
- B. Section 01 2300: Alternates (Bid Items).
- C. Section 01 2973: Schedule of Values.
- D. Section 01 3213: Construction Schedule.
- E. Section 01 3229: Project Forms.
- F. Section 01 7700: Contract Closeout.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 APPLICATION FOR PAYMENT

- A. Each certified Application for Payment shall be consistent with previous applications and payments as reviewed by OAR, paid for by OWNER, and:
  - 1. The initial Application for Payment and Final Application for Payment at time of Substantial Completion involve additional requirements.
- B. Payment Application Times: The period of Work covered by each Application for Payment is payment date for each progress payment as specified in the General Conditions. The period covered by each Application for Payment is previous month.
- C. Payment Application Forms: Use OWNER provided forms for the Application for Payment.
- D. Application Preparation: Complete every entry on the form. Include execution by a person authorized to sign legal documents on behalf of CONTRACTOR. OAR will return incomplete applications without action.

- E. Transmittal: Submit a minimum of four signed and original copies of each certified Application for Payment to OAR. All copies shall be complete, including releases and similar attachments.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to OAR.
- F. Initial Application for Payment within 60 days of issuance of Notice to Proceed: Administrative actions and submittals, that must precede or coincide with submittal for first certified Application for Payment include, but are not limited to, the following:
1. Certified Schedule of Values.
  2. Performance and payment bonds.
  3. List of principal suppliers and fabricators.
  4. Worker Compensation certificates, if applicable.
  5. Auto Insurance, if applicable.
  6. Hazardous Material Insurance Certificates, if applicable.
  7. Construction Schedule.
  8. Submittal Schedule.
  9. Emergency Contact List.
  10. Copies of authorizations and licenses from governing authorities for performance of Work.
  11. Certified Payroll (Submitted directly to Labor Compliance in electronic format as specified by OWNER including hard copy).
  12. Storm Water Pollution Prevention Plan (SWPPP).
  13. Certification of Compliance with CEQA Mitigations.
- G. Applications for Payment: Administrative actions and submittals that must precede or coincide with submittal of Progress Applications for Payment include, but are not limited to, the following:
1. Certified Payroll (submitted directly to Labor Compliance in electronic format as specified by OWNER including hard copy).
  2. Updated and current Project Record Drawings (as-built).
  3. Monthly Construction Schedule (updated, submitted and approved).
  4. Approved Schedule of Values.
  5. List of Subcontractors (Payments Summary).
  6. Storm Water Pollution Prevention (SWPP) – Site Monitoring Report.

7. Certification of Compliance with CEQA Mitigations.
- H. Final Application for Payment at Substantial Completion: Following OAR issuance of certificate of Substantial Completion, submit an Application for Payment:
1. Administrative actions, submittals and/or Work that shall precede or coincide with this application include:
    - a. Occupancy permits and similar approvals by authorities having legal jurisdiction over Work..
    - b. Removal of temporary facilities and services.
    - c. Testing, adjusting and balance records.
    - d. Removal of surplus materials, rubbish, and similar elements.
    - e. Meter readings.
    - f. Start-up performance reports.
    - g. OWNER training and orientations.
    - h. Operating and maintenance instruction manuals.
    - i. Preliminary Warranties, guarantees and maintenance agreements.
    - j. Delivery of extra materials, products and or stock.
    - k. Change over information related to OWNER occupancy, use, operation, and maintenance.
    - l. Final cleaning.
    - m. Ensure that Work is completed.
    - n. Advise on shifting insurance coverage.
    - o. List of defective Work, recognized as exceptions to certificate of Substantial Completion.
    - p. Change of door locks, including keys, to OWNER system.
    - q. Certified Payroll (submitted directly to Labor Compliance in electronic format as specified by the OWNER including hard copy).
    - r. Certification that all benefit contributions due and owing to appropriate union trusts has been paid by CONTRACTOR and Subcontractors, as specified by the Project Stabilization Agreement (PSA) and Article 6.49 of the General Conditions.
    - s. Storm Water Pollution Prevention – Site Monitoring Reports, SWPP revisions, compliance certifications, and Notice of Termination (NOT) (see Section 01 7416).
    - t. Certification of Compliance with CEQA Mitigations.
    - u. Waivers and releases for CONTRACTOR.



END OF SECTION

SECTION 01 3113  
PROJECT COORDINATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements necessary for coordinating Work operations including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.

1.02. RELATED REQUIREMENTS

- A. Section 01 1216: Phasing of the Work.
- B. Section 01 3213: Construction Schedule.
- C. Section 01 3300: Submittal Procedures.
- D. Section 01 4523: Test and Inspection.
- E. Section 01 4525: Testing, Adjusting, and Balancing for HVAC.
- F. Section 01 7700: Contract Closeout.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 COORDINATION

- A. CONTRACTOR shall coordinate operations included in various sections of Contract Documents to assure efficient and orderly installation of each part of Work. Coordinate Work operations included under related sections of Contract Documents that depend on each other for proper installation, connection, and operation of Work, including but not limited to:
  - 1. Schedule construction operations in sequence required where installation of one part of Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
  - 3. Provide provisions to accommodate items scheduled for later installation.
  - 4. Prepare and administer provisions for coordination drawings.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required in notices, reports, attendance at meetings, and:

1. Prepare similar memoranda for OAR and Separate Work Contract where coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of Work. Such administrative activities include, but are not limited to, following:
1. Preparation of schedules.
  2. Installation, relocation, and removal of temporary facilities.
  3. Delivery and processing of submittals.
  4. Progress meetings.
  5. Project closeout activities.
- D. Conservation: Coordinate Work operations to assure operations are carried out with consideration given to conservation of energy, water, materials, and:
1. Salvage materials and equipment involved in performance of, but not actually incorporated into Work.

## 3.02

## SUBMITTALS

- A. Coordination Drawings: CONTRACTOR shall prepare coordination drawings to coordinate the installation of products and materials fabricated, furnished and installed by separate entities, under different parts of the Contract. CONTRACTOR shall notify OAR and ARCHITECT of all major conflicts in writing in a timely manner so that the design team can respond without construction delays. Coordination drawings shall address the following at a minimum:
1. Limitations in available space for installation or service. CONTRACTOR shall overlay plans of each trade and verify space requirements and conflicts between trades. Minor changes and adjustments that do not affect design intent shall be made by CONTRACTOR and shall be highlighted for ARCHITECT'S review.
  2. Incompatibility between items provided under different trades (such as difference in voltage between equipment specified under Divisions 22 and 23 and electrical power provided under Division 26.)
  3. Inconsistencies between drawings, specifications and codes (between trades and within each trade).
  4. Additional items required for existing facilities construction projects shall be designed and prepared from available as-built drawings that are verified through non-invasive and non-destructive, visual observation only. CONTRACTOR shall field verify actual existing conditions during and upon completion of demolition work and incorporate findings into preparation of co-ordination drawings. Minor changes and adjustments that do not affect design intent shall be made by Sub-Contractor and shall be highlighted for OAR and ARCHITECT'S reviews.

- B. Prepare coordination drawings in CAD with each trade on a separate layer, in specified color and scale. CONTRACTOR and each Subcontractor shall provide and forward reproducible copies and CAD drawing files in the order described here:
1. Structural shop drawings shall indicate location and sizes of columns, beams and other structural members, as well as wall, roof and slab penetrations, and will be provided to mechanical, electrical, low voltage and plumbing Sub-contractors for co-ordination. Structural items shall be indicated using black lines.
  2. HVAC Subcontractor will indicate all ductwork, piping and equipment complete with installation and dimensioned service clearances, duct and pipe sizes, fitting types and sizes, top or bottom of duct and pipe elevations, distances of ducts, pipes and equipment from building reference points and hanger and support locations. Minor changes and adjustments that do not affect design intent shall be made by Subcontractor and shall be highlighted for OAR and ARCHITECT'S reviews. Forward drawings to plumbing Subcontractor for further co-ordination. HVAC items shall be indicated using orange lines.
  3. Plumbing Subcontractor will indicate all plumbing lines, and equipment complete with installation and dimensioned service clearances, pipe sizes, fitting types and sizes, top or bottom of pipe elevations, distances of pipes and equipment from building reference points and hanger/support locations. Co-ordinate with HVAC Subcontractor. Minor changes and adjustments that do not affect design intent shall be made by Sub-contractor and shall be highlighted for OAR and ARCHITECT'S reviews. Upon completion drawings shall be forwarded to Fire Sprinkler Subcontractor for further co-ordination. All Plumbing items shall be indicated using blue lines.
  4. Fire sprinkler Subcontractor will indicate fire sprinkler piping and equipment complete with installation and dimensioned service clearances, pipe sizes, fitting types and sizes, top or bottom of pipe elevations, distances of pipes and equipment from building reference points and hanger or support locations. Co-ordinate with Plumbing and HVAC Subcontractors. Minor changes and adjustments that do not affect design intent shall be made by sub-contractors and shall be highlighted for OAR and ARCHITECT'S reviews. Upon completion drawings shall be forwarded to Electrical CONTRACTOR for further co-ordination. Fire sprinkler equipment shall be indicated using red lines.
  5. Electrical and Low Voltage Subcontractors will indicate service and feeder conduit runs and other electrical equipment complete, including low voltage with installation and dimensioned service clearances, sizes, top or bottom of conduit and rack elevations, distances of conduits and equipment from building reference points and hanger and support locations. Co-ordinate with Fire Sprinkler, Plumbing and HVAC Subcontractors. Minor changes and adjustments that do not affect design intent shall be made by sub-contractors and shall be highlighted for OAR and ARCHITECT'S reviews.

Upon completion drawings shall be forwarded to CONTRACTOR for further co-ordination. Electrical work shall be indicated in dark green lines. Low voltage work shall be indicated in light green lines.

6. CONTRACTOR will be responsible for the overall coordination review. As each coordination drawing is completed, CONTRACTOR will meet with OAR to review and resolve all conflicts on coordination drawings.
7. Coordination meetings will be held in Project field office of CONTRACTOR. CONTRACTOR is required to distribute Shop Drawings, cut sheets and submittals to Subcontractors where appropriate. Reviewed coordination drawings will be maintained in Project field office of CONTRACTOR. Meeting minutes shall be developed by CONTRACTOR and submitted to OAR within 5 days.

END OF SECTION

SECTION 01 3119  
PROJECT MEETINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements for Project meetings, including but not limited to, the following:
  - 1. Job start meeting.
  - 2. Pre-installation conferences.
  - 3. Progress meetings.
  - 4. Meetings as required by OAR.

1.02 RELATED REQUIREMENTS

- A. Section 01 1216: Phasing of the Work.
- B. Section 01 3113: Project Coordination.
- C. Section 01 3213: Construction Schedule.
- D. Section 01 3229: Project Forms.
- E. Section 01 3300: Submittal Procedures.

PART 2 – PRODUCTS (Not used)

PART 3 - EXECUTION

3.01 JOB START MEETING

- A. In accordance with General Conditions Article 2.6, OAR will schedule a job start meeting before starting the Work, at a time and date determined by OAR. Meeting shall be held at the Project site or another location as determined by OAR. Meeting will be held in order to review responsibilities, procedures, and other administrative requirements contained within the Contract Documents.
- B. Authorized representatives of OWNER, INSPECTOR, ARCHITECT, CONTRACTOR and other parties shall attend the meeting. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda items shall include significant items which could affect progress of the Work, including, but not limited to the following:
  - 1. Preliminary Construction Schedule.
  - 2. Critical work sequencing.
  - 3. Designation of responsible personnel.

4. Identification of OAR.
  5. Procedures for processing field decisions.
  6. Request for Proposal.
  7. Request for Clarification.
  8. Construction Directive and Change Order.
  9. Procedures for processing Applications for Payment.
  10. Prevailing wages.
  11. Submittal and review of Shop Drawings, Product Data, material lists, and Samples.
  12. Preparation of project record documents.
  13. Use of the Project site and/or premises.
  14. Parking availability.
  15. Office, work, and storage areas.
  16. Equipment deliveries and priorities.
  17. Safety procedures.
  18. First Aid.
  19. Security.
  20. Housekeeping.
  21. Working hours.
  22. Contract Compliance Officer.
  23. Insurance Services including OCIP.
  24. Environmental Health and Safety.
  25. Substantial Completion, Administrative Closeout and Contract Completion requirements and procedures.
  26. Procedures for Mandatory Dispute and Claim Resolution.
  27. Storm Water Pollution Prevention Plan (SWPPP).
  28. CEQA Compliance.
- D. OAR shall prepare and issue meeting minutes to attendees and interested parties no later than five calendar days after the meeting date.

### 3.02 PRE-INSTALLATION CONFERENCES

- A. CONTRACTOR shall coordinate and conduct pre-installation conferences at the Project site as required by related Sections of the Contract Documents.
- B. CONTRACTOR, manufacturers, and fabricators involved in or affected by the installation and its coordination or integration with other pre-ceding and/or

subsequent installations of Work shall attend the meeting. CONTRACTOR shall advise OAR, INSPECTOR, and ARCHITECT of scheduled meeting dates in order to secure their attendance.

1. CONTRACTOR shall review the progress of construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for the following:
  - a. Contract Documents.
  - b. Options.
  - c. Related Construction Directives and Change Orders.
  - d. Purchases.
  - e. Deliveries.
  - f. Shop Drawings, Product Data, and quality-control samples.
  - g. Review of mockups.
  - h. Possible conflicts.
  - i. Compatibility problems.
  - j. Time schedules.
  - k. Weather limitations.
  - l. Manufacturer's recommendations.
  - m. Warranty requirements.
  - n. Compatibility of materials.
  - o. Acceptability of substrates.
  - p. Temporary facilities.
  - q. Space and access limitations.
  - r. Governing regulations.
  - s. Safety.
  - t. Inspecting and testing requirements.
  - u. Required performance results.
  - v. Recording requirements.
  - w. Protection.
2. CONTRACTOR shall record significant discussions and directives received from each conference. CONTRACTOR shall, within three (3) calendar days after the meeting date, distribute the minutes of the meeting to all concerned parties, including but not limited to, OAR, INSPECTOR, and ARCHITECT.

### 3.03 PROGRESS MEETINGS

ARROYO HIGH SCHOOL  
GREENHOUSE

DSA SUBMITTAL 01/17/20  
PROJECT MEETINGS  
01 3119-3



- A. Progress meetings will be held at the Project site at regular intervals, typically weekly, as determined by the OAR.
- B. In addition to representatives of CONTRACTOR, OWNER, and ARCHITECT, each Subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of the Work shall, if requested by OAR, be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude all matters relating to the Work.
- C. Failure of CONTRACTOR to be so represented at any progress meeting which is held at a mutually agreed time or for which a written notice is given, shall not relieve CONTRACTOR from abiding by any and all OAR determinations or directives issued at such meeting.
- D. OAR will review and correct or approve minutes of the previous progress meeting and will review other significant items affecting progress. Topics for discussion as appropriate to the status of the Project include but are not limited to:
  - 1. Interface requirements.
  - 2. Construction Schedule.
  - 3. Sequence and coordination.
  - 4. Status of submittals / RFCs.
  - 5. Deliveries.
  - 6. Off-site fabrication.
  - 7. Access.
  - 8. Site utilization.
  - 9. Temporary Construction Facilities and Controls.
  - 10. Hours of work.
  - 11. Hazards and risks.
  - 12. Housekeeping.
  - 13. Quality of materials, fabrication, and execution.
  - 14. Unforeseen conditions.
  - 15. Testing and Inspection.
  - 16. Defective Work.
  - 17. Construction Directive.
  - 18. Request for Proposal.
  - 19. Change Order Proposals and Change Orders.
  - 20. Documentation of information for payment requests.
  - 21. Application for Payment.

- 22. Other items as required or as brought forth..
  - 23. Initial Notice of Start of Issue, Event, Condition, Circumstance, or Cause of Perceived Delay, Disruption, Interference, Hindrance, Acceleration. (Article 12.2.1 of the General Conditions).
  - 24. Final Notice of End of Issue, Event, Condition, Circumstance, or Cause of Perceived Delay, Disruption, Interference, Hindrance, Acceleration (Article 12.2.2 of the General Conditions).
  - 25. Storm Water Pollution Prevention.
  - 26. CEQA Compliance.
- E. No later than three (3) calendar days after each progress meeting, OAR will prepare and distribute minutes of the meeting to each present and absent party. Include a brief summary, in narrative form, of progress, decisions, directives, actions taken, and all other issues since the previous meeting and report.
- 1. Schedule Updating: CONTRACTOR shall revise the Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized, and issue the revised schedule at the next scheduled progress meeting.

3.04 ADDITIONAL MEETINGS

- A. OAR, upon giving notice to the intended parties and without further obligation, may require additional meetings to discuss Work and/or Project related activities.

3.05 OWNER'S RIGHT TO RECORD

- A. CONTRACTOR agrees on behalf of itself and all its subcontractors that the OWNER may audiotape or videotape any meetings, training and any work at any time during the Project

END OF SECTION

## SECTION 01 3129

## PARTNERING

## PART 1 – GENERAL

## 1.01 SECTION INCLUDES

- A. The furnishing of labor, materials, equipment, services, and incidentals necessary for a Partnering Agreement process.
- B. This specification requires the use of a formal Partnering process between OWNER and CONTRACTOR. Partnering is a collaborative effort and a long-term commitment between two or more organizations for the purpose of achieving specific project objective by maximizing the efficiency and effectiveness of each organizations participation in meeting specific project requirements. This effectiveness requires changing traditional “individualized” relationships to “shared culture” relationships without regard to organizational boundaries. The partnering relationship is based upon trust, dedication to common goals, understanding of each other’s individual expectations and values, and a full commitment to success. Benefits include improved communications, efficiency and cost effectiveness, increased opportunity for innovation, and the continuous improvement of product quality and services.
- C. The OWNER’S Partnering process applies these concepts to the delivery of new facilities. By using partnering in this contract, the OWNER seeks to maximize the opportunity to achieve project success measured by how well the project meets the operational requirements for the school, financial constraints for the parties, the school schedule constraints, safety, quality, functional requirements of the project, and the need to employ appropriate levels of risk management throughout the project.

## 1.02 SUBMITTALS

- A. CONTRACTOR shall, upon Notice of Intent to Award, begin arranging for the Partnering workshop. CONTRACTOR shall provide a list of CONTRACTOR employees, subcontractors, and other personnel the CONTRACTOR anticipates will attend the meeting. The attendee list shall include the job title of each person, an email address, telephone and fax number
- B. CONTRACTOR shall propose at least three facilitators and submit their names to the OWNER for review and mutual agreement with OWNER as to a facilitator for the project Partnering process. CONTRACTOR shall provide resumes of the proposed facilitators as well as information about each facilitator’s business including, but not limited to years in business, references and proposed agenda.

- C. CONTRACTOR shall recommend a location and a date for the initial workshop for mutual agreement between CONTRACTOR and OWNER.
- D. At the completion of the initial Partnering workshop, and any follow up meetings, within 15 days thereafter the Facilitator shall provide to CONTRACTOR and OWNER the following:
  - 1. Copies of meeting minutes for attendees in accordance with the agenda detailing the issues addressed, actions required and comments made by all parties. The summary shall be provided in electronic format in MS Word for email distribution.
  - 2. Partnering Charter in sufficient quantities for attendees and file copies for primary parties involved.
  - 3. Proposal for follow up meetings if required.

## PART 2 - PRODUCTS - (Not Used)

## PART 3 – EXECUTION

### 3.01 PARTNERING PROCEDURES

- A. Initial Partnering Meeting: The initial Partnering Workshop shall be an all day meeting or as mutually agreed between OWNER and CONTRACTOR. The initial meeting may be prior to or combined with the pre-construction conference, but shall occur no later than the Notice to Proceed. The number of follow up meetings will be as required in Article 3.01.C below. OWNER and CONTRACTOR shall:
  - 1. Mutually agree upon the scope, agenda, attendees, and a location for the meeting.
  - 2. Use a facilitator to organize and conduct the meetings:
    - a. The facilitator is to act as a neutral party. There must be no conflict of interest on the part of the facilitator in favor of OWNER, CONTRACTOR or ARCHITECT.
    - b. OWNER and CONTRACTOR will provide the Facilitator with a list of attendees. OWNER will be approximately # **(OAR insert the number of people as appropriate)** people in attendance.
    - c. The meeting arrangements (meeting space, audio visual equipment etcetera) will be the responsibility of the Facilitator.
    - d. CONTRACTOR and OWNER will be responsible for expenses incurred by their respective employees, including to not limited to meals, travel and lodging.

- e. The Facilitator should contact OWNER and CONTRACTOR at least three weeks prior to the workshop, and have a conference call with the parties at least 10 calendar days prior to the workshop to discuss ideas and to finalize the agenda. The agenda will be based on the needs of the project delivery team, and may be as specific as deemed necessary. The Facilitator is responsible for developing the full agenda in conjunction with both parties.
- B. Participation in Partnering: It is the responsibility of OWNER and CONTRACTOR to compile a list of and invite the key project personnel to participate in the partnering workshops, as well as key representatives of interested parties in attendance. Examples include, but are not limited to ARCHITECT, DSA, Project Inspector, subcontractors, material suppliers, city and county officials, local jurisdictions, and utility companies. CONTRACTOR and OWNER shall encourage staff to attend and actively participate in the partnering process. CONTRACTOR and OWNER agree that the personnel identified and attending the workshop will be assigned to the project.
  - C. Payment: The cost of the initial partnering workshop will be paid by CONTRACTOR. CONTRACTOR will be responsible for arranging the partnering workshop (meeting room, audio visual equipment, supplies, cost of facilitator, etcetera). Expenses for miscellaneous incidentals shall be paid for out of this cost.
    - 1. CONTRACTOR shall allow for # **(OAR insert number of follow up meetings anticipated)** follow up meetings. Follow up meetings shall be **(OAR to select length of follow up sessions by size of contract. If contract will be less than \$25 million, use half day session. If Contract value is greater than \$25 million, use full day sessions.)** half or full day meetings as mutually agreed by OWNER and CONTRACTOR. These meetings shall be conducted in accordance with this specification.

**OR**

- 1. Follow up partnering meeting would be scheduled on a quarterly basis. These meetings will generally be “executive” level involving CONTRACTOR, ARCHITECT, Project Inspector and OWNER only. The cost of these meetings shall be borne by CONTRACTOR. For planning purposes, these meetings will generally be one one-half days in duration and may be held at the jobsite of other facility available to CONTRACTOR.

END OF SECTION

SECTION 01 3213  
CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Required procedures, preparation, submittals, reviews, updates, and revisions to the cost/schedule integrated construction schedule. The purpose of this section is to:
1. Ensure adequate planning and execution of the Work by CONTRACTOR.
  2. Establish a standard against which satisfactory completion of the Project can be measured by OWNER.
  3. Assist CONTRACTOR and OAR in monitoring progress.
  4. Aid in assessing the impact of any changes to the Contract.
  5. Provide justification for progress payments.

1.02 RELATED REQUIREMENTS

- A. Section 01 1100: Summary of Work.
- B. Section 01 1216: Phasing of the Work.
- C. Section 01 2300: Alternates (Bid Items).
- D. Section 01 2973: Schedule of Values.
- E. Section 01 2976: Progress Payment Procedures.
- F. Section 01 3113: Project Coordination.
- G. Section 01 3300: Submittal Procedures.
- H. Section 01 4523: Testing and Inspection.
- I. Section 01 4525: Testing, Adjusting, and Balancing for HVAC.
- J. Section 01 5000: Construction Facilities and Temporary Controls.
- K. Section 01 7700: Contract Closeout.
- L. Section 01 7836: Warranties.

PART 2 – PRODUCTS

2.01 SCHEDULING SOFTWARE

- A. CONTRACTOR shall utilize Primavera Scheduling Software (P6) to employ the Critical Path Method (CPM) in the development and maintenance of the construction schedule. If the version of Primavera Scheduling Software (P6) used is greater than Version 15.1, the CONTRACTOR shall save & export schedules in Version 15.1 before submitting to OWNER for review. The scheduling software

shall be capable of being resource loaded with manpower, costs and materials. It shall also be capable of generating time-scaled logic diagrams, resource histograms and profiles, bar charts, layouts and reports with any and/or all activity detail.

- B. All schedule calculation rules, auto cost rules and resource calculation rules shall be in a format acceptable to OAR. When schedule calculations are performed, the “Retained Logic” setting shall be used. CONTRACTOR shall use the zero “Decimal Places” setting.

## PART 3 – EXECUTION

### 3.01 SUBMITTALS

- A. CONTRACTOR shall retain a construction scheduler to work in enough capacity to perform all of the requirements outlined in this Section. CONTRACTOR shall submit a resume of the proposed Scheduler for review and acceptance prior to the preparation of any Schedule. The resume shall demonstrate the proposed scheduler’s capability to plan, coordinate, execute, and monitor a cost/resource loaded CPM schedule as required for this Project and have a minimum of five years direct experience using Primavera Project Planner. Scheduler will cooperate with OAR and shall be available on site for monitoring, maintaining and updating schedules in a timely manner. OAR has the right to refuse to accept the Scheduler based upon a lack of experience as required by this Section or based on lack of on-site performance and timeliness of schedule submittals. If OAR does not accept the proposed Scheduler, CONTRACTOR shall within one week of disapproval, propose another scheduler who meets the experience requirements stated above.
- B. CONTRACTOR shall submit two color originals and three copies of all bar charts, reports and/or other required schedule data as outlined in this Section. CONTRACTOR shall electronically deliver the schedule file in its original format at the time of submittal.
- C. CONTRACTOR shall attend a pre-construction scheduling conference with OAR within 7 days after Notice of Award. Contractor shall then develop and submit the Preliminary Construction Schedule within 14 days after Notice of Award. .
- D. CONTRACTOR shall submit the Proposed Baseline Schedule no later than thirty days from the Notice to Proceed (or as stipulated in the milestones under Section 01 1219 Phasing of the Work Appendix A).
- E. CONTRACTOR shall submit the Monthly Schedule Updates, Four-Week Rolling Schedules, and Recovery Schedules as required.

### 3.02 PRELIMINARY CONSTRUCTION SCHEDULE

- A. The purpose of the cost-loaded Preliminary Construction Schedule is to provide a interim mechanism in which to measure performance on individual activities and to validate the CONTRACTOR’S monthly Application for Payment on work performed (starting with month one) during the first three months of the job until the complete Baseline Schedule is approved by the OAR.

- B. CONTRACTOR shall develop and submit a cost loaded Preliminary Construction Schedule as required by this Section. It shall be submitted in computer generated network format and shall be organized by Activity Codes representing the CONTRACTOR'S intended sequencing of the Work. The Preliminary Construction Schedule shall include activities for the first 90 calendar days following the NTP such as mobilization, preparation of submittals, specified review periods, procurement items, fabrication items, milestones, and detailed construction activities.
- C. Upon OAR'S acceptance of the Preliminary Construction Schedule, CONTRACTOR shall update the accepted Preliminary Construction Schedule each month (beginning with month 1) and submit these updates until CONTRACTOR'S Baseline Schedule is fully developed and accepted. Since updates to Preliminary Construction Schedule are the basis for payment to CONTRACTOR during the first three-month period, submittal and acceptance of such updates shall be a condition precedent to making of monthly payment, as referenced in General Conditions.
- D. Provide a written narrative describing CONTRACTOR'S approach to mobilization, procurement, and construction during the first 90 calendar days including crew sizes, equipment and material delivery, site access, submittals, and permits.
- E. Submit Bar Charts, Tabular Reports, a Cost flow Histogram, Electronic Data, and Plots in accordance with Article 3.04-L.
- F. If the project is of a short duration and it would be more beneficial for the CONTRACTOR to forego the preliminary 90 day schedule, then upon CONTRACTOR request and OAR written Approval, the CONTRACTOR may go straight into development of the Baseline Schedule for the entire project. This will need to be implemented expeditiously in order to not impede the processing of the monthly pay applications. Approval of the Baseline schedule and first monthly update is precedent of the monthly pay application.

### 3.03 SCHEDULE OF VALUES

- A. CONTRACTOR shall cost load activities in the Construction Baseline Schedule and allocate costs to the cost accounts of all activities. The cost accounts shall match the CSI sections listed in the Table Of Contents of the Specifications. The format shall be coordinated with Specification Section 01 2973 (Schedule of Values), Specification Section 01 3229 (Project Forms), and Specification Section 01 2976 (Progress Payment Procedures).
- B. Submit a computer generated report from the Construction Baseline Schedule using the P6 scheduling software. The report shall contain the following data for each activity: Cost Account Number (by CSI section), Cost Account Description, Cost Account Budget, Cost to Date, Cost this Period, and Cost to complete. Total costs shall be organized and totaled by CSI section. This report shall be the source of the data CONTRACTOR reports on the Schedule of Values.
- C. The cost loading associated with the activities shall be based on CONTRACTOR estimates of costs that CONTRACTOR will incur performing the specific



activities. If OAR determines that the costs are front loaded and/or the distribution of costs is unreasonable, CONTRACTOR shall revise accordingly and resubmit the Schedule of Values within five (5) days for OAR review.

### 3.04 BASELINE SCHEDULE CPM NETWORK

- A. No later than thirty days from the Notice to Proceed (or as stipulated in the milestones under Section 01 1219 Phasing of the Work Appendix A), CONTRACTOR shall submit a detailed Proposed Baseline Schedule that covers the entire duration of the Project. This schedule shall convey CONTRACTOR'S plan for organizing, managing, and executing the Work.
- B. The Proposed Baseline Schedule shall include activity descriptions, sequencing, logic relationships, duration estimates, cost loading by CSI section in accordance with Article 3.03, resource loading of manpower, and other information as set forth in this Section.
  - 1. The Proposed Baseline Schedule shall include all Milestones stipulated in Specification Section 01 1219, Phasing of the Work, Appendix A, as well as all activities required to achieve timely completion of the Milestones.
  - 2. The Proposed Baseline Schedule shall include activities for: all construction activities, the NTP, Milestones, submittals, coordination drawings, re-submittals, procurement of materials and equipment, manufacturing, fabrication & delivery, owner furnished contractor installed items (OFCI), access restrictions, work restrictions, phased occupancy, testing, start-up, and contract closeout activities. The Proposed Baseline Schedule shall allow a period for OAR and ARCHITECT to review each submittal, as required by Section 01 3300 and other sections which require additional time for OWNER reviews and deferred submittal reviews by Division of the State Architect (DSA).
  - 3. The Proposed Baseline Schedule shall include start and completion dates for: temporary facilities, construction of mock-ups, prototypes, samples, punch list, OWNER interfaces and furnishing of items, separate work contracts, regulatory agency approvals, and permits required for performance of the Work.
  - 4. The Proposed Baseline Schedule shall allow for all foreseeable factors and risks which affect performance of the Work. Include allowances for weather conditions in accordance with Article 3.04-J, applicable laws, transportation, traffic, air quality, noise, or any other applicable regulatory requirements, regulations or collective bargaining agreements pertaining to labor.
  - 5. The Proposed Baseline Schedule shall include an activity with a minimum review period of one hundred days for all Deferred Approvals required by DSA. In addition, as a predecessor to this activity, a separate 18 day OWNER review period shall be included in the Proposed Baseline Schedule.

6. CONTRACTOR shall not use any float suppression techniques such as preferential sequencing or logic, special hidden lag time between activities or milestones, float absorption activities, or unjustifiable over-estimating of activity durations in preparing the Proposed Baseline Schedule. Finish Milestones should be constrained to a “Finish on or before” constraint. No “Zero Free Float” constraints, No “Early” Constraints, and No “Mandatory Finish” constraints shall be utilized.
  7. The Proposed Baseline Schedule shall include activity durations based on the crew sizes and equipment utilization that CONTRACTOR will maintain during the Project. No activity durations shall exceed fifteen (15) working days unless approved by the OAR. Non-construction activities such as procurement, delivery, or submittal activities are exempted. CONTRACTOR will need to perform their due-diligence to make sure that the activity man-power loading and activity durations are directly integrated.
  8. CONTRACTOR shall include with the Proposed Baseline Schedule a written narrative report sufficiently comprehensive to explain the rationale behind CONTRACTOR’S approach to the Work including but not limited to: activity durations, manpower flow, average crew sizes (by trade), equipment requirements, anticipated production rates, constraints, holidays and other non-work days, potential problem areas, permits, coordination with regulatory authorities, utilities, separate work contracts and other parties, and long lead delivery items requiring more than thirty days from the date of order to delivery to the Project site.
- C. At the OAR’S request, furnish a detailed written explanation of CONTRACTOR’S basis for specific durations, logic, phasing, or other information. Such an explanation shall include CONTRACTOR’S rationale for selecting the number of crews, crew composition, number of shifts per day, number of hours in a shift, number of work days per week, construction equipment, and similar factors.
- D. The Proposed Baseline Schedule activities shall contain the following data:
1. Activity ID numbers shall consist of a built-in intelligence scheme. Following OAR acceptance of the Baseline Schedule, Activity ID numbers shall not be changed.
  2. Activity Descriptions shall provide adequate information that readily identifies each activity, work scope, and location.
  3. At a minimum, activity codes specified in Article 3.04-G shall be applied to each activity. This is at the activity level and is different than WBS coding structure.
  4. Cost accounts (in CSI Master Format) and Resource accounts shall be applied to each activity. They shall include lump sum costs, and man-hours/man-days (where applicable).

- E. At OAR’S request, furnish a written explanation for each lead or lag relationship and each constrained date. Unjustifiable leads, lags, and constraints will result in OAR’S rejection of the Proposed Baseline Schedule.
- F. Calendar Identification: In the scheduling software, identify all activities that will require overtime shifts, double shifts, and work on weekends or holidays. Identify non-work days and holidays in the schedule calendar. All milestones stipulated in Specification Section 01 1219, Phasing of the Work, Appendix A, shall be placed on a calendar with seven days per week. No holiday or non work-day restrictions are permitted on this calendar. Within the schedule software, the CONTRACTOR shall not use Primavera Global Calendars from past projects, but rather shall use project specific calendars created for this specific contract. The Calendar coding shall be transferable and compatible with the OWNER calendars as to not distort any start/finish dates and “total float” values upon schedule re-calculation.
- G. Activity Codes: As a minimum, the Activity Codes shown in the Table 1 below shall be assigned to each activity.

Table 1

Name	Length	Description
TYPE	2	Type of activity (for example: mobilization, submittals, procurement/fabrication, construction, milestones, etcetera.)
AREA	2	Area or Building (for example: Bldg A, Building B, Courtyard, Athletic Fields, Street Work, etcetera.)
STAG	2	Stage (for example: Foundations, Superstructure, Exterior, Interior, Roof, Floor Number etcetera.)
SBST	2	Substage (a specific area within a stage such as: main electrical room, kitchen, room number, etcetera.)
RESP	7	Responsible Party (subcontractor and/or trade)
DIV	2	CSI Division
SPEC	5	CSI Specification Section number

1. OAR may require additional coding of activities. The mandatory activity code requirements listed in Table 1 are not to be construed as setting limits on CONTRACTOR’S management and coordination responsibilities, but are intended to guide CONTRACTOR in the administration of its contractual responsibilities.
- H. Milestones: are designated dates as set forth in Specification Section 01 1219, Phasing of the Work, Appendix A, in which Work or portions thereof are required to start and complete in accordance with the Contract Documents.
1. Where the term completion or similar terms are used in regards to a Milestone, it shall be construed to mean all portions of the Work in the indicated phase, area, and zone are complete and acceptable to OAR. Where the term start or similar terms are used in the designation of a Milestone, it

shall be construed to mean a portion of the Work in the indicated phase, area, or zone is required to be commenced.

2. A Proposed Baseline Schedule extending beyond the Milestones or Contract Time will not be acceptable.
  3. Finish Milestones shall be constrained with “Finish on or before” type constraints in accordance with the dates stipulated in Specification Section 01 1219, Phasing of the Work, Appendix A.
  4. In the P6 scheduling software, prior to opening the project, click the “dates” tab and place a “must finish by” date to match the Contract Completion Milestone date stipulated in Specification Section 01 1219, Phasing of the Work, Appendix A.
  5. A Proposed Baseline Schedule indicating Work completed in less time than the Milestones and/or Contract Time will not be acceptable. Rather, CONTRACTOR shall show any unused contract time as float available to the project.
  6. Milestones shall be placed on a calendar with seven days per week. No Holiday or non work-day restrictions are permitted on this calendar.
- I. The Critical Path shall be clearly indicated on all schedules submitted. An activity is defined as critical when it is shown to be on the longest path from beginning to end.
- J. CONTRACTOR shall allow for inclement weather in the Proposed Baseline Schedule by incorporating an activity titled “Rain Day Impact Allowance” as the last activity prior to the Substantial Completion Milestone. No other activities may be concurrent with it. The duration of the Rain Day Impact Allowance activity will be based on Table #2 below, and will be calculated from the Notice to Proceed until the original date of Substantial Completion.

Table 2: Cumulative Calendar Days “Rain Day Impact Allowance”:

January	6	July	0
February	5	August	0
March	5	September	1
April	4	October	1
May	1	November	3
June	0	December	5

1. When inclement weather at the Project site impacts Critical Path activities, CONTRACTOR may provide the OAR with a written request for a weather impact day describing the inclement weather delay on the Critical Path activities. The inclement weather delay must be clearly indicated by a 70 percent decrease in the field labor workforce hours on Critical Path activities on the day in question as indicated by CONTRACTOR’S Daily reports from the day in question and the scheduled work days prior to the

day in question. Upon OAR'S independent confirmation of the amount of rainfall and impact, OAR will authorize CONTRACTOR to reduce the duration of the Rain Day Impact Allowance by one day.

2. Inclement weather on non-scheduled workdays shall not be granted as weather impact days. If CONTRACTOR asks to work a specific weekend or holiday and gives OAR advanced, written notification of critical path work to be performed and a substantial amount of precipitation occurs that prevents the work from being performed, then that day can be claimed as a weather impact day. If the effects of inclement weather from a non-scheduled work day carry forward to a scheduled work day and impacts the Critical Path as noted above, then the scheduled work day will be considered impacted by weather. Any unused rain day allowance at the end of the project will be shown as available float to the Substantial Completion Milestone. Excusable, non-compensable time extensions will be granted for inclement weather to Substantial Completion milestone only after the weather impact area affecting the critical path work has exhausted the allotted cumulative Rain Day Impact Allowance. On projects that have multiple phases with defined start & finish dates, the cumulative rain impact allowance may be split up (pro-rated) into their designated phases upon OAR Approval.

K. Cost loaded Activities:

1. Each activity included in the Proposed Baseline Schedule shall be assigned the cost CONTRACTOR estimates it will incur performing that activity. Each activity's assigned cost will be inclusive of overhead and profit so CONTRACTOR'S total overhead and profit is distributed over all activities on a pro rata basis. The sum of the costs assigned to activities shall equal the total contract value. No activity costs shall be assigned to manufacturing or delivery activities unless approved by OAR. If OAR finds that the costs are front loaded and the distribution of costs is unreasonable, CONTRACTOR shall re-distribute the costs and resubmit the revised Schedule of Values within five days for OAR backcheck.
2. CONTRACTOR shall cost load activities in the Proposed Baseline Schedule and allocate costs to related resource/cost accounts associated with each activity. The cost accounts shall match the CSI sections listed in the Table of Contents of the Specifications. The format shall be coordinated with Specification Section 01 2973 (Schedule of Values), Specification Section 01 3229 (Project Forms), and Specification Section 01 2976 (Progress Payment Procedures). All cost-loaded activities shall roll-up to their designated CSI sections and shall be the basis for the data reported in the Schedule of Values (Section 01 2973), Project Forms (Section 01 3229), and Progress Payment Procedures (Section 01 2976).
3. Submit computer generated reports using the scheduling software which will be the basis for the approved Schedule of Values. The reports shall contain the following data for each activity: Cost/Resource Account

Number (by CSI section), Cost/Resource Account Description, Cost/Resource Account Budget, Cost to Date, Cost this Period, and Cost at Completion. Total Costs shall be organized and totaled by CSI section.

4. Submit a Cost Flow Histogram in accordance with Article 3.04.L.3.
- L. CONTRACTOR shall submit computer generated reports and plots with the Proposed Baseline Schedule submittal package. Format shall display the following columns: Activity ID, Activity Description, Original Duration, Remaining Duration, Percent Complete, Early Start, Early Finish, Late Start, Late Finish, and Total Float. Unless otherwise noted, bar charts and reports shall be on 8 ½ by 11 paper and bound.
1. Color Bar charts shall be generated separately for:
    - a. Milestones only.
    - b. All Activities sorted by Early Start date and organized by Project, Area, Stage, and Substage. (The network shall be organized to show continuous flow of all activities from left to right). CONTRACTOR is reminded that during the monthly schedule update process, even the activities that have already been completed need to be shown in this “all activities” bar chart report.
    - c. Activities sorted by Responsibility.
    - d. Summary level of all activities sorted by craft/trade and area.
    - e. Critical Path (Longest Path). The network shall be organized to show continuous flow of all critical activities on the longest path from left to right (sorted by early start).
  2. Reports:
    - a. Total Float sorted low to high.
    - b. Predecessors and Successors sorted by Activity ID.
  3. Cost Flow Histogram
    - a. Using the costs assigned to each activity, develop a Histogram that projects the estimated invoice amounts by month for the Project duration. The histogram shall be produced from the scheduling software on 11” by 17” paper (landscape mode). It shall contain both a monthly bar histogram and a cumulative cost curve on the same graph. The Total Costs shall be based on the Early Dates option.
  4. Man Power Histogram
    - a. Submit a planned man-power graphic bar histogram produced from the scheduling software on 11” by 17” paper (landscape mode) that displays total man-hours based on Early Dates. Show both a weekly bar histogram and a cumulative curve on same graph. In addition, provide a summary excel table of average crew sizes and peak crew

sizes broken down by trade/subcontractor. CONTRACTOR will need to perform their due-diligence to make sure that the activity man-power loading is realistic and adequate based on material /labor cost estimates.

5. Provide a written narrative as required by Article 3.04.B.8.
  6. Electronic data: Provide an electronic file in its original format of the Schedule. The electronic P6 files shall be saved in "XER" type format.(version 15.1)
  7. Plots: Produce a color bar chart on E-size paper (30 by 42-inch) organized (at a minimum) by project, area, stage, and substage.
- M. OAR will notify CONTRACTOR of any adjustments that are required for the Proposed Baseline Schedule to be accepted. CONTRACTOR shall perform any required adjustments to the Proposed Baseline Schedule and resubmit it for acceptance certifying in writing that all information contained therein complies with the Contract Documents. OAR will review the Proposed Baseline Schedule for accuracy, reasonableness, and conformance with the Contract Documents and shall provide comments within ten days of receipt. Within five days after receiving OAR comments, CONTRACTOR shall both incorporate changes to address OAR concerns and resubmit the Proposed Baseline Schedule for OAR backcheck. This process will continue until the Proposed Baseline Schedule is accepted as the Baseline Schedule. Once accepted by OAR, the Baseline Schedule will be the basis upon which CONTRACTOR shall prepare updates that record and report actual performance and progress. The accepted Baseline Schedule and subsequent Monthly Updates (reference Articles 3.04 and 3.05 respectively) shall be the basis for consideration and analysis of requests for time extensions and CONTRACTOR progress payments.
- N. OAR acceptance of the Baseline Schedule or CONTRACTOR'S failure to identify or include an element of the Contract, shall not release CONTRACTOR'S obligation to complete all required Work in accordance with the Contract Documents.

### 3.05 REQUIREMENTS FOR MONTHLY/WEEKLY SCHEDULE UPDATING

- A. Once the Baseline Schedule is accepted by OAR, CONTRACTOR shall copy the Approved Baseline file to a new name, status the activities with actual as-built data through the end of the month & submit Monthly Schedule Updates beginning with month No. 1. The current month's schedule update cannot be accepted until the previous Monthly Schedule Update has been accepted by OAR. Each Monthly Schedule Update shall be submitted con-currently with the Monthly Pay Application no later than the fifth day of the succeeding month in accordance with Article 14 of the General Conditions.
- B. Monthly Schedule Update Format.
  1. Initially, the contractor shall status a current Monthly Schedule Update with actual Work progress only. No logic ties shall be modified. Status all Actual

Start and Finish dates, adjust Remaining Durations where needed, and update Percent Completion of cost and resource loaded activities. No activity Original Durations or Logic shall be changed unless authorized by OAR. No new activities shall be added (except for the addition of new activities for every re-submittal and re-review required) or unless authorized by the OAR.

2. Once the schedule is statused in accordance with Article 3.05-B1, CONTRACTOR shall print (and submit with Monthly Schedule Update) a report of “out-of-sequence” logic that results from the updating process. CONTRACTOR shall then correct all “out-of-sequence” logic to reflect CONTRACTOR’S actual Work sequence. Prior to submission of the Monthly Schedule Update, CONTRACTOR shall review and validate that all remaining activities along with their schedule relationships are still accurate based on the actual work flow in the field. If CONTRACTOR chooses to modify logic or add activities (other than out-of-sequence corrections), it shall be done in accordance with Article 3.07 for OAR Review & Approval. CONTRACTOR shall also submit a comparison report between the previous monthly schedule update and the current monthly update that will document the over-all changes (i.e. comparison software such as “Digger”, or “Schedule Analyzer”, etc.).
3. During construction, CONTRACTOR may desire to break down specific activities into greater detail. If greater detail is necessary, then CONTRACTOR shall identify expanded activities such that the Baseline Schedule activities that the expanded activities originated from are readily apparent. CONTRACTOR shall not allow the aggregate duration of the expanded activities to exceed the duration assigned to the Baseline Schedule activity unless permitted by OAR in writing.
4. Autocost rules and calculation rules shall link Remaining Duration and Percent Complete.
5. The Data Date for the Monthly Schedule Updates shall be the first day of the succeeding month. At a minimum, three days prior to the submission of the Monthly Schedule Update, CONTRACTOR shall meet in person with OAR to present the proposed Percentages of Completion and Actual Start and Actual Finish dates. Once percentages of completion and actual dates have been agreed to, they shall be the basis of the Monthly Schedule Update.
6. CONTRACTOR shall submit a Cost Histogram that overlays the planned cost curve from the Baseline Schedule, against the monthly cumulative “cost to date” curve, and against the remaining activities planned curve from the current Monthly Schedule Update.
7. Written Narrative Report: CONTRACTOR shall include a written report to explain the Monthly Schedule Update. The narrative shall, at a minimum include the following headings with appropriate discussions of each topic:



- a. Introduction.
  - b. A Summary of Work which was on-going (This Pay Period).
  - c. Problem Areas and Proposed Solutions.
  - d. Critical Path.
  - e. Current and Anticipated Delays.
  - f. Coordination of Work with Others.
  - g. Milestone Status.
  - h. Revisions: the standard schedule comparison report that compares the current update to the previous update shall be submitted to help document any variances/changes. However this comparison report will not be accepted by OWNER in lieu of the above written narrative requirements outline above.
8. In updating the Schedule, CONTRACTOR shall not modify Activity ID numbers, schedule calculation rules/criteria, or the Activity Coding Structure required.
  9. Submit bar charts, reports, a cost flow histogram, man-power histogram, written narrative, electronic data, and plots in accordance with Article 3.04-L.
  10. Submit a cost-loaded report (progressed monthly) produced from the scheduling software that displays all of the activities organized by the CSI section cost/resource accounts. This report shall be in compliance with Article 3.04-K, Section 01 2973 (Schedule of Values), Section 01 3229 (Project Forms), and Section 01 2976 (Progress Payment Procedures).
- C. Four-Week Rolling Schedule: At each Weekly Progress Meeting, CONTRACTOR shall present a Four-Week Schedule in Bar Chart format. It shall show one (1) week of actual and three (3) weeks of forecasted progress. The Four-Week Rolling Schedule shall be used as a basis for discussing progress and work planned during the three (3) weeks.
1. The Four-Week Rolling Schedule shall be based on the most recent OAR Accepted Monthly Schedule Update. It shall include weekly updates to all construction, submittal, fabrication and procurement, and separate work contract activities. CONTRACTOR shall ensure that it accurately reflects the current progress of the Work.
  2. CONTRACTOR shall discuss at the weekly Progress meeting the actual dates and any variances to critical or near critical activities.
  3. Upon request by OAR, CONTRACTOR shall provide the Four-Week Rolling Schedule in electronic format.
  4. If the Four-Week Rolling Schedule indicates activities are behind schedule, CONTRACTOR shall provide a Recovery Schedule in accordance with Article 3.06.

5. If the CONTRACTOR chooses to provide a Four-Week Rolling Schedule in a greater level of detail (by trade/subcontractor) outside of the monthly contractual P6 schedule database, then upon CONTRACTOR REQUEST and OAR written approval, the CONTRACTOR may proceed as long as the detailed activities roll-up to the contractual P6 monthly schedule updates. These detailed activities will need to be linked to the overall Substantial Completion date as to properly forecast whether the project is ahead or behind schedule during the weekly Progress Meetings. The Four-Week Rolling Schedule must accurately reflect the work that is going on during the current week and must accurately reflect what will happen in the next three weeks.

### 3.06 RECOVERY SCHEDULES

- A. If a Monthly Schedule Update indicates negative float greater than ten (10) days on a critical path as result of events not predicated by Articles 10 and 12 of the General Conditions CONTRACTOR shall prepare a Proposed Recovery Schedule demonstrating CONTRACTOR'S plan to regain the time lost. The Recovery Schedule shall be submitted either in advance of or concurrent with the Monthly Schedule Update and CONTRACTOR progress request. Both the Monthly Schedule Update and the Proposed Recovery Schedule shall be based on the same percentages of completion and actual dates accepted by OAR under Article 3.05 B.
- B. The Proposed Recovery Schedule shall be based on a copy of the Monthly Schedule Update for the calendar month during which the negative float first appears.
- C. The Proposed Recovery Schedule shall include a written narrative that identifies the causes of the negative float on the critical path and provides CONTRACTOR'S proposed corrective action to ensure timely completion of all Milestones and the Substantial Completion Date. CONTRACTOR'S corrective actions shall include but are not limited to increasing concurrent operations, increasing labor, adding multiple shifts in a 24-hour period, and adding overtime.
- D. During any period of time when CONTRACTOR is found to be behind schedule by OAR, the Monthly Schedule Update described above shall become a weekly requirement (at no additional cost to OWNER) to provide a greater degree of focus on the timely completion of the Work. These Updates shall be submitted to OAR every Monday morning. When CONTRACTOR is deemed by OAR to be back on schedule, CONTRACTOR may revert to submitting the schedule monthly.
- E. CONTRACTOR'S progress payment may not be processed until OAR accepts the Proposed Recovery Schedule. Following such an acceptance, the Proposed Recovery Schedule will be known as the Recovery Schedule and future Work will be performed by CONTRACTOR in accordance with it.

### 3.07 FRAGNETS AND TIME EXTENSION REQUESTS

- A. Float is not for exclusive use or benefit of either OWNER or CONTRACTOR but is an expiring resource available to both parties on a non-discriminatory basis. If required to meet specified Milestones, either party may utilize float. Adjustments

to Milestones or Contract Time will only be authorized by Change Order and only to the extent the claimed adjustments exceed total float along the most critical path of the current Monthly Schedule Update in effect at the time of the claimed adjustments. The claimed adjustments to the Milestones and/or Contract Time must also cause the Substantial Completion Date to exceed that currently indicated in the Monthly Schedule Update. No time extensions will be granted nor delay damages paid under contract until all available float is used and the CONTRACTOR obtains a Time Extension Request approval from the OAR in accordance with Article 3.07 in its entirety. CONTRACTOR claimed adjustments to an existing negative float path will not receive consideration until the activity with the highest negative float is driven even further negative.

1. Claimed adjustments to the Milestones or Contract Time will be administered in conjunction with those set forth in the General Conditions.
- B. Pursuant to the float sharing requirements of this Section, the use of float suppression techniques such as preferential sequencing or logic, special lead or lag logic restraints, and extended activity times or durations are prohibited. The use of float time disclosed or implied by the use of alternate float suppression techniques shall be proportionally shared to benefit OWNER and CONTRACTOR. The use of any technique solely for the purpose of suppressing float will result in OWNER rejection of the submitted Monthly Schedule Update.
- C. In the event CONTRACTOR believes the Project has suffered an adverse impact arising from events predicated by Articles 10 and 12 of the General Conditions, CONTRACTOR may prepare a Time Extension Request by submitting a Schedule Fragnet and a written narrative outlining the detail of the impact. A Schedule Fragnet must demonstrate a critical path delay. Such a delay must adversely impact the Substantial Completion Date for CONTRACTOR to receive a time extension. To demonstrate such an impact successfully, CONTRACTOR shall prepare a Schedule Fragnet based on a copy of OWNER accepted Monthly Schedule Update for the calendar month during which the adverse impact occurred. This “copy” of the OWNER accepted Monthly Schedule Update shall however first be updated (by OWNER and CONTRACTOR jointly) with both Percentages of Completion and Actual Dates up to the day the delay commenced. This process will provide the “pre-delay” project status. Once OWNER and CONTRACTOR have agreed to the “pre-delay” project status, CONTRACTOR should make a copy of this “pre-delay” schedule and this copy is to be the starting point for CONTRACTOR’S Schedule Fragnet development. OWNER will evaluate the activities, logic, durations, etcetera, in the Schedule Fragnet and will evaluate if the adverse impact arose from events described by Articles 10 and 12 of the General Conditions. The Fragnet shall also include CONTRACTOR-caused delays that affect the critical or near critical path in the network and should be accounted for in the Time Impact Analysis if overlapped at any point in time with OWNER-caused delay. If rain impact days were granted between the Start and Finish of OWNER-caused delay period, they should be accounted for in the Time Impact Analysis as well. Provided OWNER determines such an impact occurred, CONTRACTOR may be due a time extension

equal to the number of proportioned days of variance/delay that resulted to the Substantial Completion Date.

- D. Activities added into a Schedule Fragnet to demonstrate the impact of adverse event shall be assigned a unique activity code. The Schedule shall be organized by this unique activity code.
- E. The Schedule Fragnet shall incorporate logic that accurately ties reflective of the adverse event to pre-event predecessor activities and post event successor activities.
- F. The format and components of a Schedule Fragnet submittal shall be in accordance with this Section and Articles 10 and 12 of the General Conditions. It is crucial for the Fragnet to be submitted within the same month of discovery so it can be resolved during the monthly schedule update review. The notice shall be transmitted to OAR within the stipulations outlined in Article 12 of the General Conditions.
- G. If OWNER accepts CONTRACTOR'S Schedule Fragnet and an extension is granted, a Change Order will be prepared. OWNER will advise what change order number the time extension will become. When CONTRACTOR receives this Change Order number, all the activities added to the Schedule Fragnet shall be given Activity Identification Numbers that corresponds with the Change Order number. CONTRACTOR shall cost load and resource-load the activities if required by OWNER. If resource loading is required, the resource loading shall include a breakdown of labor, material, and equipment quantities.
- H. If OWNER rejects CONTRACTOR'S Schedule Fragnet in part based on improper forecast logic or activity tasks then it shall be revised accordingly to conform to OWNER'S review comments and resubmitted. If the forecast logic and activity tasks cannot be agreed to then the pre-delay schedule outlined in Article 3.07-C shall be compared to the actual as-built data in the succeeding month of the encountering issue, event, condition, circumstance, and/or cause. The variance to the project between the pre-delay and post delay schedules shall be discussed in CONTRACTOR'S written narrative and proportioned between the different parties involved in the delay.
- I. If OWNER rejects CONTRACTOR'S Schedule Fragnet in whole then CONTRACTOR may follow the procedures set forth in Article 16 of the General Conditions.

### 3.08 PAYMENT FOR SCHEDULING

- A. The Work of this Section will be included as part of the bid price.
- B. Preparation, revising, maintenance, and compliance with this Section and Section 01 2973 is an integral part of the Contract Documents and is specified to have a minimum value equal to 2 percent of the original Contract Amount or \$150,000, whichever is less. This amount shall be proportionally cost loaded into two activities in both the Proposed Baseline Schedule and the Schedule of Values described in Section 01 2973. One activity for the "Baseline Schedule" and the other activity for the "Monthly Schedule Update Process" as follows:

1. CONTRACTOR may allocate twenty percent (20 percent) of the total cost and place in the “Baseline Schedule” activity. It can then be billed against when the OAR accepts the Proposed Baseline Schedule as the Baseline Schedule.
2. The remaining eighty percent (80 percent) may be cost loaded into the “Monthly Schedule Update Process” activity. This amount may be billed in equal monthly increments. The amount of those increments is determined by dividing the remaining cost by the total number of months in the Contract Time. Payment of these incremental amounts is contingent upon OAR acceptance of CONTRACTOR Monthly Schedule Updates, Recovery Schedules, Four-Week Rolling Schedules, Fragnets, Time Impact Analysis, and the updated Log of Required Submittals.
3. The CONTRACTOR shall anticipate in their base contract scope that numerous Fragnets and written time impact analyses will be required during the duration of the project with the Monthly Schedule Updates. Requests for extra scheduling services will not be considered until the CONTRACTOR demonstrates that all of the costs stipulated in Article 3.08-B has been expended.

### 3.09 FAILURE TO COMPLY WITH REQUIREMENTS

- A. At any time during the project if CONTRACTOR fails to comply with the specified requirements, OWNER reserves the right to engage independent estimating and scheduling consultants to fulfill these requirements. Upon notice to CONTRACTOR, OWNER shall assess against CONTRACTOR, incurred costs for these additional services.
- B. In such an event, OWNER will require, and CONTRACTOR shall participate and provide requested information to ensure the resulting Milestones Schedule accurately reflects CONTRACTOR’s plan to execute the Work in compliance with the Contract Documents. If it becomes necessary for OWNER to recommend logic or duration revisions as a result of CONTRACTOR failure to furnish acceptable data, and if CONTRACTOR has objections to the recommendations, CONTRACTOR shall provide notice to OWNER within three days and CONTRACTOR shall provide an acceptable alternate plan. If CONTRACTOR fails to so note any objections and provide an acceptable alternate plan, or if CONTRACTOR implements the recommendations of OWNER without so noting any objections, CONTRACTOR will be deemed to have waived all objections and concurred with the recommended logic/duration revisions provided by ARCHITECT and/or OWNER.
- C. Submittal of any Monthly Schedule Updates are subject to review and acceptance by OWNER. OWNER retains the right, including, but not limited to Article 14 of the General Conditions, to withhold progress payments in whole or part until CONTRACTOR submits a Monthly Schedule Update acceptable to OWNER. If a Monthly Schedule Update is “Rejected” due to the OWNER not receiving a satisfactory schedule that accurately reflects the on-going work activities, the

OWNER will mandate a separate meeting with the CONTRACTOR and approved Scheduler to remedy the non-conformance. If after the 2nd consecutive month the OWNER still has to "Reject" the monthly Schedule update due to non-conformance, then the CONTRACTOR'S Scheduler will need to be replaced at no additional cost to the OWNER. CONTRACTOR shall within one week of disapproval, propose another Scheduler who meets the experience requirements stated in this Section.

3.10 CONTRACTOR RESPONSIBILITY

- A. Nothing in this Section shall be construed to be a usurpation of CONTRACTOR authority, responsibility, and obligation to plan and schedule Work as CONTRACTOR deems necessary, subject to all other requirements of the Contract Documents.
- B. CONTRACTOR shall involve the subcontractors, manufacturers, and suppliers in the development and periodic updating of the schedule.

3.11 RECORD DOCUMENTS / FINAL AS-BUILT SCHEDULE

- A. Prior to Contract Completion of the Work, CONTRACTOR shall submit a final as-built schedule, and a time-scaled network diagram reflecting the actual dates of all activities. This shall be submitted prior to the final application of payment and prior to the request to release retention.

END OF SECTION

## SECTION 01 3229

## PROJECT FORMS

## PART 1 - GENERAL

## 1.01 SECTION INCLUDES

- A. The following, but not limited to, administrative forms and documents listed in this Section are to be utilized in the administration of the Work. Upon CONTRACTOR request, OAR may approve the use of alternate forms. Electronic versions of these forms are available on the LAUSD website.
- B. From time to time, OWNER may release new revisions and new Project Forms. At any time during the Project, if requested by OAR, CONTRACTOR shall use the newly released Project Forms.

## 1.02 RELATED REQUIREMENTS

- A. Division 01: General Requirements.

## PART 2 - PRODUCTS (Not used)

## PART 3 - EXECUTION

## 3.01 FORMS

- A. The following examples of forms are contained within this Section:
  - 1. Allowance Disbursement Authorization.
  - 2. Application for Payment (2 pages)<sup>1</sup>.
  - 3. Certification of Compliance with Project Stabilization Agreement and Labor Compliance.
  - 4. Certification of Compliance with CEQA Mitigations.
  - 5. Certificate of Substantial Completion.
  - 6. Change Order.
  - 7. Change Order Proposal.
  - 8. Change Order Proposal – Compensable Delay Costs.
  - 9. Change Order Proposal Detail Sheet.
  - 10. Change Order Proposal Guidelines.
  - 11. Change Order Proposal – Labor Rate Calculation Form (Request for Rate Higher Than Fully burdened Labor Rates).
  - 12. Conditional Waiver and Release – Final Payment.
  - 13. Construction Directive.
  - 14. Correction Notice.

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<sup>1</sup> Application for Payment (Multiple Projects Form) is available from the OAR.  
ARROYO HIGH SCHOOL  
GREENHOUSE

15. Daily Construction Report.
16. Daily Time and Material Record.
17. Initial Notice of start of Issue. Event, Condition, Circumstance, or Cause of Perceived or Actual Delay, Disruption, Interference, Condition, Circumstance, or Cause of Perceived Delay, Disruption, Interference, Hindrance, Acceleration.
18. Final Notice of End of Issue, Event, Condition, Circumstance, or Cause of Perceived or Actual Delay, Disruption, Interference, Condition, Circumstance, or Cause of Perceived Delay, Disruption, Interference, Hindrance, Acceleration.
19. Five Day Notice.
20. List of Subcontractors.
21. Notice of Completion.
22. Notice of Partial Use or Occupancy.
23. Notice of Termination.
24. Notice to Proceed.
25. "Or Equal" Request.
26. OWNER Assessment Summary.
27. Property Inventory.
28. Request for Certification of Substantial Completion.
29. Request for Clarification.
30. Request for Proposal.
31. Request for Reduction of Retention.
32. Schedule of Values.
33. Storm Water Pollution Prevention – Site Monitoring Report.
34. Submittal Log.
35. Substitution Request.
36. Survey of Existing Site Conditions.
37. Transmittal.

## 3.02

## PROCEDURES

- A. Allowance Disbursement Authorization: This form is used for the request and approval of Contract allowances.
- B. Application for Payment: This form is used in requesting a progress payment.
- C. Application for Payment (Multiple Projects): Alternate progress payment request form for contracts comprising more than one project.
- D. Certification of Compliance with Project Stabilization Agreement and Labor Compliance Code Section 1776: This form is used to certify that all contributions



due and owing to appropriate trust funds have been paid by CONTRACTOR and all Subcontractors, as specified by the Project Stabilization Agreement (PSA) and General Conditions Article 6.49. This form is also used to certify that CONTRACTOR has submitted all certified payroll records mandated by Labor Code 1776, and General Conditions Article 6.49.

- E. Certification of Compliance with CEQA Mitigations: This form is used to certify that all CEQA requirements were complied with by CONTRACTOR.
- F. Certificate of Substantial Completion: This form is used according to Article 14 of the General Conditions.
- G. Change Order: This form is used to adjust the Contract Amount, Milestones or Contract Time.
- H. Change Order Proposal: This form is used to communicate proposed adjustments to the Contract Amount, Milestones or Contract Time.
- I. Construction Directive: This form is used to issue a Construction Directive.
- J. Correction Notice: This form is used to provide notice of defective Work.
- K. Daily Construction Report: This form is used to report daily Work activities and manpower levels of CONTRACTOR or Subcontractor.
- L. Daily Time and Material Record: This form is used to provide daily records as set forth in Article 11.11 of the General Conditions.
- M. Initial Notice of Start of Issue, Event, Condition, Circumstance, or Cause of Perceived Delay, Disruption, Interference, Hindrance, Acceleration: This form is used to provide notice as set forth in Article 12.2.1 of the General Conditions.
- N. Final Notice of End of Issue, Event, Condition, Circumstance, or Cause of Perceived Delay, Disruption, Interference, Hindrance, Acceleration: This form is used to provide notice as set forth in Article 12.2.2 of the General Conditions.
- O. Five Day Notice: This notice is used according to Article 15.3.2 of the General Conditions.
- P. List of Subcontractors: This form is used according to Article 14.2 of the General Conditions.
- Q. Notice of Completion: This form is used according to Article 14.17 of the General Conditions.
- R. Notice of Partial Use or Occupancy: This form is used according to Article 14.15 of General Conditions.
- S. Notice of Termination: Contractor shall submit a Notice of Termination (NOT) to the Los Angeles Regional Water Quality Control Board, LARWQCB. Provide a copy of NOT to OAR (See Section 01 7416).
- T. Notice To Proceed: This form is used to establish the date of Contract Time commencement and the date Contractor is authorized to commence performance of Contractor obligations.
- U. "Or Equal" Request: This form is used to submit a list of proposed "or equal" substitutions.

- V. Owner Assessment Summary: This form is used for all assessments or withholds by the Owner, permitted under the Contract or required by law, including without limitation, stop notices, prevailing wage violations, liquidated damages, additional consultant services, OCIP premiums, etc.
- W. Property Inventory: This form is used to establish Owner property in a space.
- X. “Request for Certification of Substantial Completion”: This form is used according to Article 14 of the General Conditions
- Y. Request for Clarification: This form is to be used for clarification of the intent of the Contract Documents.
- Z. Request for Proposal: This form is used to request a proposed adjustment in the Contract Amount, Milestones or Contract Time in response to the Work contained within the Request for Proposal.
- AA. Request of Reduction of Retention: This form is used according to Article 14.8 of the General Conditions.
- BB. Schedule of Values: This form is used to establish the basis of the certified Application for Payment.
- CC. Storm Water Pollution Prevention Plan (SWPPP): Site Monitoring Reports: These forms are used to certify that construction activities are in compliance with SWPPP (see Section 01 7416).
- DD. Submittal Log: This form is a format for the listing of the required submittals.
- EE. Substitution Request: This form is used to submit proposed substitutions of materials or equipment no longer manufactured or which cannot be acquired from existing inventories.
- FF. Transmittal: This form is used for transmission of items related to the Contract.

END OF SECTION

SECTION 01 3300  
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Administrative and procedural requirements for submittals required for the Work, including but not limited to; Shop Drawings, Product Data, Samples, material lists, and quality control items.
- B. Throughout the Contract Documents, the minimum acceptable quality of materials, fabrication, and execution have been defined by the name and catalog number of a manufacturer and by reference of recognized industry standards.
- C. To ensure that specified products are furnished and installed in accordance with the design intent, procedures have been established for submittal of design data and for its review by ARCHITECT, OAR and others.

1.02 RELATED REQUIREMENTS

- A. Section 01 1216: Phasing of the Work.
- B. Section 01 2513: Product Substitution Procedures.
- C. Section 01 2973: Schedule of Values.
- D. Section 01 2976: Progress Payment Procedures.
- E. Section 01 3113: Project Coordination.
- F. Section 01 3213: Construction Schedule.
- G. Section 01 3229: Project Forms.
- H. Section 01 4523: Testing and Inspection.
- I. Section 01 4525: Testing, Adjusting, and Balancing for HVAC.
- J. Section 01 5000: Construction Facilities and Temporary Controls.
- K. Section 01 7123: Field Engineering.
- L. Section 01 7329: Cutting and Patching.
- M. Section 01 7416: Storm Water Pollution Prevention.
- N. Section 01 7700: Contract Closeout.
- O. Section 01 7836: Warranties.

## PART 2 – PRODUCTS (Not used)

## PART 3 - EXECUTION

## 3.01 PROCEDURES

- A. CONTRACTOR is required to review and approve every submittal and shop drawing prior to transmittal and delivery to ARCHITECT. Should CONTRACTOR determine a submittal contains errors, or does not meet the requirements of the contract, CONTRACTOR shall immediately return the submittals and shop drawings to the producer and expedite the corrections prior to transmitting the submittal to ARCHITECT. Submittals shall not be used by CONTRACTOR to request clarifications or submit questions. CONTRACTOR will affix stamp to each submittal certifying CONTRACTOR has performed, at minimum, the following:
1. Verified the submittal is complete in all respects and follows the requirements of the Contract Documents without variance.
  2. Confirmed that no substitutions have been included. If substitutions are included, CONTRACTOR shall eliminate them from the submittal and process them in accordance with Section 00 7000 General Conditions Article 6.14.
  3. Identified any variances from the requirements of the Contract Documents and confirmed that the identified variance meets, but does not exceed the allowable limitations or tolerances as defined in these specifications.
  4. Verified that all submitted materials, dimensions and tolerances are compatible with existing or planned conditions of the Work in order to erect, fabricate, or install the submitted assembly in conformance with the requirements of the Contract Documents.
  5. Coordinated and verified that the dimensions match CONTRACTOR measured field or installation conditions.
  6. Coordinated and verified that the products of separate manufacturers required within any field produced assembly are compatible in all respects for such assembly.
  7. Packaged together all related submittals or shop drawings where such is necessary for a comprehensive ARCHITECT review.
- B. CONTRACTOR shall package each submittal appropriately for transmittal and handling. Transmittal format shall be as required by OWNER. CONTRACTOR shall transmit and deliver six sets of each submittal or re-submittal to ARCHITECT, two of which shall be returned to CONTRACTOR. Some specifications may require additional copies be provided. CONTRACTOR shall provide the OWNER additional copies as specified or as requested by OAR. ARCHITECT will not accept submittals received from sources other than from CONTRACTOR.
- C. After ARCHITECT'S review, ARCHITECT will transmit submittals to OAR and OAR shall further distribute to CONTRACTOR, INSPECTOR and others as

required. Work shall not commence, unless otherwise approved by OAR, until approved submittals are transmitted to CONTRACTOR.

- D. CONTRACTOR shall clearly identify any deviations from the Contract Documents on each submittal. Any deviation not so noted even though stamped reviewed is not acceptable.
- E. CONTRACTOR shall coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities requiring sequential activity.
- F. Timing of Submittals:
  - 1. In accordance with General Conditions, CONTRACTOR shall submit to ARCHITECT, with copy of transmittal to the OAR, those Shop Drawings, Product Data, diagrams, materials lists, Samples and other submittals required by the Contract Documents.
  - 2. The scheduling of submittals shall be sequenced to support the progress of the Work, and shall be:
    - a. Submitted sufficiently in advance of construction, fabrication or installation in order to allow time for transmittal, review, modification, correction, (and resubmission and re-review when required.)
    - b. Phased with adequate time between submittals in order to allow for proper review by the ARCHITECT without negative impact to the Milestones Schedule.
  - 3. CONTRACTOR shall coordinate submittal of related items and ARCHITECT reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received by ARCHITECT.
  - 4. CONTRACTOR shall revise, update and submit submittal schedule to ARCHITECT and OAR on the first of each month, or as required by OAR.
  - 5. CONTRACTOR shall allow in the Construction Schedule, at least sixteen days for ARCHITECT review following ARCHITECT receipt of submittal. For mechanical, plumbing, electrical, low voltage, fire sprinklers, door and hardware, and other submittals requiring joint review with OAR, CONTRACTOR shall allow a minimum of eighteen days following ARCHITECT receipt of submittal. Deferred approval items shall be allowed additional time for DSA review.
  - 6. No adjustments to the Contract Time or Milestones will be authorized because of a failure to transmit submittals to ARCHITECT sufficiently in advance of the Work to permit review and processing or where CONTRACTOR fails to provide ARCHITECT submittals on related items.
  - 7. In case of product substitution, Shop Drawing preparation shall not commence until such time as OWNER accepts or rejects the proposed

substitution in accordance with the procedures described in the General Conditions.

- G. If required, resubmit submittals in a timely manner. Resubmit as specified for initial submittal but identify as such. Review times for re-submitted items shall be as per the time frames for initial submittal review.
- H. Shop Drawing preparation shall not commence until such time as CONTRACTOR receives Product Data acceptance.
- I. ARCHITECT will stamp each submittal with a uniform, action stamp. ARCHITECT will mark the stamp appropriately to indicate the action taken, as follows:
  - 1. Final Unrestricted Release: When ARCHITECT marks a submittal “Reviewed” the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
  - 2. Final-But-Restricted Release: When ARCHITECT, or authorized agent, marks a submittal “Reviewed as Noted,” the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
  - 3. Returned for Re-submittal: When ARCHITECT, or authorized agent, marks a submittal “Rejected, Revise and Resubmit,” do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat as necessary to obtain different action mark. In case of multiple submittals covering same items of Work, CONTRACTOR is responsible for any time delays, schedule disruptions, out of sequence Work, or additional costs due to multiple submissions of the same submittal item. Do not use, or allow others to use, submittals marked “Rejected, Revise and Resubmit” at the Project site or elsewhere where Work is in progress.
  - 4. Other Action: Where a submittal is for information or record purposes or special processing or other activity, ARCHITECT, or authorized agent, will return the submittal marked “Action Not Required “.

### 3.02 SHOP DRAWINGS

- A. Shop Drawings are original drawings prepared by CONTRACTOR, Sub-contractor, supplier, or distributor illustrating some portion of Work by showing fabrication, layout, setting, or erection and shall not be based on reproduced Contract Documents or copied standard information.
- B. Produce Shop Drawings to an accurate scale that is large enough to indicate all pertinent features and methods. Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.

- C. Shop Drawings shall include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:
1. Dimensions.
  2. Identification of products and materials included by sheet and detail number.
  3. Compliance with specified standards.
  4. Notation of coordination requirements.
  5. Notation of dimensions established by field measurement.
- D. Provide a space of approximately 4 by 5 inches on the label or beside the title block on Shop Drawings to record CONTRACTOR and ARCHITECT review, and the action taken. Include the following information on the label for processing and recording action taken:
1. Project name.
  2. Date.
  3. Name and address of ARCHITECT.
  4. Name and address of CONTRACTOR.
  5. Name and address of Subcontractor.
  6. Name and address of supplier.
  7. Name and address of manufacturer.
  8. Name and title of appropriate Specification section.
  9. Drawing number and detail references, as appropriate.
- E. Unless otherwise agreed to or indicated in individual Specification sections, submit a sufficient number of sets to allow for adequate distribution to CONTRACTOR, Sub-Contractor, supplier, manufacturer and fabricators plus four (4) sets (two sets to be retained by ARCHITECT, one set to the INSPECTOR and one set to OAR).

### 3.03 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of Work or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, wiring diagrams, schedules, illustrations, or performance curves.

1. Mark each copy to show or delineate pertinent materials, products, models, applicable choices, or options. Where Product Data includes information on several products that are not required, clearly mark copies to indicate the applicable information. Include the following information:
  - a. Manufacturer's printed recommendations.
  - b. Compliance with trade association standards.
  - c. Compliance with recognized testing agency standards.
  - d. Application of testing agency labels and seals.
  - e. Notation of dimensions verified by field measurement.
  - f. Notation of coordination requirements.
  - g. Notation of dimensions and required clearances.
  - h. Indicate performance characteristics and capacities.
  - i. Indicate wiring diagrams and controls.
2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed by CONTRACTOR.

C. Required Copies and Distribution: Same as denoted in Article 3.02.E.

### 3.04 SAMPLES

A. Procedure:

1. Submit Samples of sufficient size, quantity, cured and finished and physically identical to the proposed product or material. Samples include partial or full sections or range of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches denoting color, texture, and/or pattern.
  - a. Mount or display Samples in the manner to facilitate review of qualities indicated. Include the following:
    - 1) Specification section number and reference.
    - 2) Generic description of the Sample.
    - 3) Sampling source.
    - 4) Product name or name of manufacturer.
    - 5) Compliance with recognized standards.
    - 6) Availability and delivery time.



2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
    - a. Where variations in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show the approximate limits of the variations.
    - b. Refer to other Specification sections for requirements for Samples that illustrate materials, fabrication techniques, assembly details, connections, operation, and similar construction characteristics.
    - c. Refer to other sections for Samples to be returned to CONTRACTOR for incorporation into the Work. Such Samples must be undamaged at time of installation. On the transmittal indicate special requests regarding disposition of Sample submittals.
    - d. Samples not incorporated into the Work, or otherwise not designated as Owner property, remain the property of CONTRACTOR and shall be removed from the Project site prior to Substantial Completion.
  3. Color and Pattern: Whenever a choice of color or pattern is available in a specified product, submit accurate color chips and pattern charts to OAR for review and selection.
  4. Number Required: Submit six, minimum, of each. Two will be returned to CONTRACTOR.
- B. When specified, erect field Samples and mock-ups at the Project site to illustrate products, materials, fabrications, or execution and to establish standards by which completed Work shall be judged.
  - C. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of the Work. Sample sets may be used to obtain final acceptance of the Work associated with each set.

### 3.05 QUALITY CONTROL SUBMITTALS

- A. Submit quality control submittals, including design data, certifications, manufacturer's field reports, and other quality control submittals as required under other sections of the Contract Documents.
- B. When other sections of the Contract Documents require manufacturer's certification of a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
- C. Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the represented company.

- D. Requirements for submittal of inspection and test reports are specified in other sections of the Contract Documents.

END OF SECTION

## SECTION 01 3593

## OFF-SITE IMPROVEMENT PROCEDURES

## PART 1 - GENERAL

## 1.01 SUMMARY

- A. Section Includes:
  - 1. Surface improvements including street, sidewalks, curbs and gutters.
  - 2. Tree planting.
  - 3. Utilities: Underground utilities, fire hydrants, streetlights, catch basins, parkway drains, and culverts.
- B. Related Requirements:
  - 1. Division 01 - General Requirements.
  - 2. Division 31 – Earthwork.
  - 3. Division 32 - Exterior Improvements.
  - 4. Division 33 – Utilities.

## 1.02 SYSTEM DESCRIPTION

- A. Regulatory Requirements:
  - 1. Comply with requirements of authorities having jurisdiction over the area.
  - 2. Obtain and pay for permits, licenses and inspections required by authorities having jurisdiction over the area.
  - 3. Bonds: Post as required by authorities having jurisdiction over the area.

## 1.03 SUBMITTALS

- A. Shop Drawings: Submit plans, sections, and details of concrete Work. Submit design drawings and calculations signed and stamped by a civil and/or structural engineer licensed in the State of California.

## 1.04 QUALITY ASSURANCE

- A. Comply with Standard Specifications for Public Works Construction, current edition.

## PART 2 - PRODUCTS

## 2.01 MATERIALS

- A. Materials shall meet the requirements of the authorities having jurisdiction over the Work.

## PART 3 - EXECUTION

## 3.01 GENERAL

- A. Perform the Work in accordance with the requirements of the authorities having jurisdiction over the area.
- B. Match adjoining improvements, such as construction and expansion joints, sidewalk marking patterns, and trees.

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- C. Foundry or other identifying stamps or markers are not permitted to be installed on exposed portions of the Work.

3.02 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.03 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

## SECTION 01 4213

## ABBREVIATIONS, SYMBOLS AND ACRONYMS

## PART 1 - GENERAL

## 1.01 SECTION INCLUDES

- A. List of abbreviations, symbols, and acronyms of societies, institutes, and associations generally appearing in the Contract Documents.

## 1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements

## PART 2 - PRODUCTS (Not applicable)

## PART 3 - EXECUTION

## 3.01 ABBREVIATIONS

ac	Alternating current
amp	ampere
C	Degrees Centigrade, Celsius
Cat 6	Category 6, unshielded twisted pair cabling
CFC	Chlorofluorocarbon
cfh	Cubic feet per hour
cfm	Cubic feet per minute
cm	Centimeter
Co.	Company
Corp.	Corporation
d	Penny
db.	Decibel
DB	Dry bulb
dc	Direct current
ePTZ	Digital Pan Tilt Zoom
F	Degrees Fahrenheit
fpm	Feet per minute
FPS	Frames per Second
ft	Foot or feet
GA	Gage
gph	Gallons per hour
gpm	Gallons per minute
HP	Horsepower
Hz	Hertz
ID	Inside Diameter

Inc.	Incorporated
IP	Internet Protocols
IR light	Infrared light
Kbps	Kilobits per Second
KHz	Kilohertz
Kip	thousand pounds
Ksf	Thousand pounds per square foot
Ksi	Thousand pounds per square inch
Kv	Kilovolt
KVA	Kilovolt amperes
KW	Kilowatt
KWH	Kilowatt hour
LED	Light Emitting Diode
LF	Linear foot
Lb(s)	Pound(s)
LCD	Liquid Crystal Display
Lux	A standard unit of illumination measurement
Max	Maximum
MBH	1000 BTUs per hour
MHz	Mega hertz
mil	Thousandth of an inch
Min	Minimum
mm	Millimeter
mph	Miles per hour
NA	Not Applicable
NIC	Not in Contract
OC	On Center
OD	Outside Dimension
oz.	Ounce
PCF	Pounds per cubic foot
pH	Acidity-alkalinity balance
PoE	Power Over Ethernet – A standard for providing power over network cable
psf	Pounds per square foot
psi	Pounds per square inch
psig	Pounds per square inch, gage
PTS	Pan-Tilt-Zoom
PVC	Polyvinylchloride
QoS	Quality of Service
RF	Radio frequency
rpm	Revolutions per minute
SDK	Software Development Kit
SF	Square foot

SIP	Session Initiation Protocol
SMA	Software Maintenance Agreement
SS	Stainless Steel
SSL	Secure Sockets Layer
SSM	Server Software Module
SY	Square yard
TCP	Transmission Control Protocol
TLS	Transport Layer Security
UI	User Interface
Unicast	Communication between a single sender and single receiver on network
UPnP	Universal Plug and Play
V	Volts
VBR	Variable Bit Rate
VMS	Video Management System
W	Watts
WB	Wet bulb
WDR	Wide dynamic range

## 3.02

## SYMBOLS

#	Number or pound
'	Foot or feet
"	Inch(es)
%	Percent
°	Degree (Angle or Temperature)

## 3.03

## ACRONYMS

AA	The Aluminum Association, Inc
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ABMA	American Boiler Manufacturers Association
ACI	American Concrete Institute
ACS	Access Control System
AEC	Automatic Echo Cancellation
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
AFF	Above Finish Floor
AGC	Automatic Gain Control
ALPR	License Plate Recognition
AGA	American Gas Association
AGC	Automatic Gain Control
AGCIH	American Conference of Governmental Industrial Hygienists

AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association, Inc.
ANI	Automatic Number Identification
ANSI	American National Standards Institute
APA	APA – The Engineered Wood Association
API	Application Programming Interface
ARI	Air-Conditioning and Refrigeration Institute
ARS	Automated Route Selection
ARP	Address Resolution Protocol
ATSC	Advanced Television Systems Committee
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATBCB	Architectural & Transportation Barriers Compliance Board
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BBS	Backbone Switch
BGP	Border Gateway Protocol
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America
BICSI	Building Industry Consulting Services, International
BRI	Basic Rate Interface
BOOTP	Bootstrap Protocol
BTU	British thermal unit
CAL/OSHA	California Occupational Safety and Health Administration
CAC	Call Admission Control
CAS	Channel Associated Signaling
CAT 5e	Category 5e
CBC	California Building Code
CCR	California Code of Regulations
CCK	Complementary Code Keying
CDR	Call Detail Record
CEC	California Electrical Code
CESM	Compact Edge Switch-Managed
CFR	Code of Federal Regulations



CIF	Common Intermediate Format
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CLI	Command Line Interface
CLID	Calling Line Identification
CMAS	California Multiple Award Schedule
CMC	California Mechanical Code
CNG	Comfort Noise Generation
CNID	Calling Party Name Identification
CQC	California Quality Control (CMA Standards)
Codec	Coder/Decoder
COP	Coefficient of performance
COS	Class of Service
CPC	California Plumbing Code
CRA	California Redwood Association
CSA	Client Software Application
CRI	Carpet and Rug Institute
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards, U.S. Department of Commerce
CS	Communications Server
CSFM	California State Fire Marshal
CSI	Construction Specifications Institute
CTIOA	Ceramic Tile Institute of America
CTI	Cooling Tower Institute
DHCP	Dynamic Host Configuration Protocol
DHI	Door and Hardware Institute
DHCP	Dynamic Host Configuration Protocol
DGM	Dynamic Graphical Map
DNS	Domain Name System
DSA	Division of the State Architect
DTV	Digital Television
DSS	Direct Station Selection
DTMF	Dual Tone Multiple Frequency
DVD	Digital Video Disc
EER	Energy efficiency ratio
EIA	Electronic Industries Alliance
EIS	Electronic Image Stabilization
ESM	Edge Switch-Managed
E&M	Ear and Mouth
FAT	Field Acceptance Testing
FEP	Front End Processor
FEP	Fluorinated Ethylene Propylene
FPS	Frames per Second
FTP	File Transfer Protocol
FXS	Foreign Exchange Station

EPA	Environmental Protection Agency
ETL	ETL Testing Laboratories
FCC	Federal Communication Commission
FDA	Food and Drug Administration
FECC	Far End Camera Control
FPS	Frames per Second
FM	Factory Mutual
FPS	Frames per Second
FS	Federal Specifications
FTP	File Transfer Protocol
FXO	Foreign Exchange Office
FXS	Foreign Exchange Station
GA	Gypsum Association
GANNA	Glass Association of North America
GBIC	Gigabit Interface Converter
GUI	Graphical User Interface
GigE	Gigabit Ethernet
HMMA	Hollow Metal Manufacturer's Association
HPVA	Hardwood Plywood & Veneer Association
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol over SSL
HVAC	Heating, Ventilation, and Air Conditioning
IACS	International Annealed Copper Standards
IAMPO	International Association of Plumbing and Mechanical Officials
IC	Intercom
ICBO	International Conference of Building Officials
ICEA	Insulated Cable Engineers Association
ICMP	Internet Control and Message Protocol
ID	Identifier
IDF	Intermediate Distribution Frame
IEEE	Institute of Electrical & Electronic Engineers, Inc.
IDS	Intrusion Detection System
IEC	International Electro technical Commission
IES	Illuminating Engineering Society
IMI	International Masonry Institute
IOR	Inspector of Record
IP	Internet Protocol
IP Router	Internet Protocol Router
IPVC	Internet Protocol Video Conferencing
IPX	Internetwork Packet Exchange
IRI	Industrial Risk Insurers
ISDN	Integrated Services Digital Network
ISO	International Organization for Standardization
ISA	Industry Standard Architecture
ISDN	Integrated Services Digital Network

ISM	Intermediate Switch-Managed (Fiber Switch)
ISMS	Integrated Security Monitoring and Management System
ISP	Internet Service Provider
ITD	OWNER, Information Technology Division
ITU	International Telecommunication Union
IVR	Interactive Voice Response
JPEG	Joint Photographic Experts Group (image format)
Kbps	Kilobits per Second
LAN	Local Area Network
LCD	Liquid Crystal Display
LDC	Local Distribution - Cabinet
LDF	Local Distribution Frame
LED	Light Emitting Diode
LIU	Light Interconnection Unit
MAC	Media Access Control
MAN	Metropolitan Area Network
MBR	Maximum Bit Rate
MCU	Multipoint Conference Unit
MDF	Main Distribution Frame
MDF-BBS	Main Distribution Frame Backbone Switch
MIB	Management Information Base
MIC	Message Integrity Check
MLD	Multicast Listener Discovery
MLSFA	Metal Lath/Steel Framing Association
MPOE	Main Point of Entry
MPEG	Moving Picture Experts Group
MP-BGP	Multi-Protocol Border Gateway Protocol
MOS	Mean Opinion Scale
MSS	Manufacturers Standardization Society of the Valve & Fittings Industry.
NAAMM	National Association of Architectural Metal Manufacturers
NAT	Network Address Translation
NAT-PT	NAT Protocol Translation
NAS	Network Attached Storage
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEBB	National Environmental Balancing Bureau
NEBS	Network Equipment Building System
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NEC	National Electrical Code
NFPA	National Fire Protection Association
NFPA	National Forest Products Association

NIC	Network Interface Card
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NMP	Simple Network Management Protocol
NOFMA	National Oak Flooring Manufacturers Association
NPCA	National Paint and Coatings Association
NPDES	National Pollutant Discharge Elimination System
NRCA	National Roofing Contractors Association
NSF	National Sanitation Foundation
NTP	Network Time Protocol
NTSC	National Television System Committee
NTMA	National Terrazzo & Mosaic Association
NTSC	National Television System Committee
NUSIG	National Uniform Seismic Installation Guidelines
NWMA	National Woodwork Manufacturers Association
OAR	OWNER Authorized Representative
OC-3	Optical Carrier Level-3 (~155 Mbps)
OEHS	Office of Environmental Health and Safety (LAUSD's)
OFNR	Optical Fiber Non-Conductive Riser
OFNP	Optical Fiber Non-Conductive Plenum
OID	Object Identifier
OPX	Off Premise Extension
OSHA	Occupational Safety & Health Administrations
OSI	Open Systems Interconnection
OSPF	Open Shortest Path First
OTDR	Optical Time Domain Reflectometer.
ONVIF	Open Video Interface Forum
OWAN	OWNER's Wide Area Network
OWNER	Los Angeles Unified School District
PA	Public Address
PABX	Private Auxiliary Branch Exchange
PA/IC	Public Address/Intercommunications
PAL	Phase Alternating Line
PAT	Port Address Translation
PBX	Private Branch Exchange
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PCM	Pulse Code Modulation
PDI	Plumbing and Drainage Institute
PEI	Porcelain Enamel Institute

PHB	Per Hop Behavior (DiffServ)
PIC	PBX Integration Card
PIM	Protocol-Independent Multicast
PING	Packet Internet Groper
PINX	Private Integrated Services Network Exchange
PIP	Picture in Picture
PMO	Project Management Office
PoE	Power-over-Ethernet
POP	Point of Presence
POTS	Plain Old Telephone System
PRI	Primary Rate Interface
PS	Product Standard, U.S. Department of Commerce
PSIP	Program and System Information Protocol
PSTN	Public Switched Telephone Network
PZM	Pressure Zone Microphone
QCIF	Quarter CIF – See CIF
QoS	Quality of Service
QSIG	Q-Signaling
RADIUS	Remote Access Dial-In User Service
RIP	Routing Information Protocol
RIPng	Routing Information Protocol Next Generation
RIS	Redwood Inspection Service
RMON	Remote Network Monitoring
RMON2	Remote Network Monitoring Version 2
SAN	Storage Area Network
SCAQMD	South Coast Air Quality Management District
SCSI	Small Computer System Interface
SDEI	Steel Deck Institute
SDI	Steel Door Institute
SFM	State Fire Marshal
SFP	Small Form-factor Pluggable transceiver
SFP+	Enhanced Small Form-factor Pluggable transceiver
SFPA	Southern Forest Products Association
SIF	Source input format (NTSC)
SIP	Session Initiation Protocol
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SLC	Small Learning Community
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SMDI	Simple Message Desk Interface
SMI	Structure of Management Information
SMTP	Simple Mail Transfer Protocol
SMPTE	Society of Motion Picture and Television Engineers

SNA	Systems Network Architecture
SNMP	Simple Network Management Protocol
SSH	Secure Shell
SSID	Service Set Identifier
SSL	Secure Socket Layer
SSPC	Steel Structures Painting Council
S/P DIF	Sony/Philips Digital InterFace
SWI	Steel Window Institute
TEHO	Tail End Hop Off
TCA	Tile Council of America
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol
TIA	Telecommunications Industry Association
TKIP	Temporal Key Integrity Protocol
TLS	Transport Layer Security
TOS	Type of Service
UBPPA	Uni-Bell PVC Pipe Association
UCI	Uniform Construction Index
UFAS	Uniform Federal Accessibility Standards
UL	Underwriters' Laboratories, Inc.
UM	Unified Messaging
UPS	Uninterruptible Power Supply
UPnP	Universal Plug and Play
URL	Uniform Resource Locator
USDA	United State Department of Agriculture
UTC	Coordinated Universal Time
UTP	Unshielded Twisted Pair
UPS	Uninterruptible Power Supply
USP	Unified Security Platform
USW	Unified Web Client
VAD	Voice Activity Detection
VBR	Variable Bit Rate
VLAN	Virtual Local Area Network
VM	Voice Mail
VSS	Video Surveillance System
VoD	Video on Demand
VFD	Vacuum Fluorescent Display
VTC	Video Teleconference
WAN	Wide Area Network
WDR	Wide dynamic range
WLAN	Wireless Local Area Network
WCLIB	West Coast Lumber Inspection Bureau
WDMA	Window and Door Manufacturers Association

111001

WWPA Western Wood Products Association

END OF SECTION

SECTION 01 4523  
TESTING AND INSPECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Testing and inspection services to meet requirements of the California Building Code (CBC) and the Division of the State Architect (DSA).
- B. Related Requirements:
  - 1. Section 03 2000 – Concrete Reinforcing.
  - 2. Section 03 3000 – Cast-in-Place Concrete.
  - 3. Section 05 1200 – Structural Steel Framing.

1.02 REFERENCES

- A. American Concrete Institute (ACI):
  - 1. ACI 318 – Building Code Requirements for Structural Concrete and Commentary.
- B. American Institute of Steel Construction (AISC):
  - 1. AISC 360 – Specification for Structural Steel Buildings.
  - 2. AISC 341 – Seismic Provisions for Structural Steel Buildings.
- C. ASTM International (ASTM):
  - 1. ASTM A108 – Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
  - 2. ASTM A370 – Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
  - 3. ASTM A706 – Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
  - 4. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  - 5. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
  - 6. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
  - 7. ASTM C1140 - Standard Practice for Preparing and Testing Specimens from Shotcrete Test Panels.
  - 8. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.



9. ASTM C1604 - Standard Test Method for Obtaining and Testing Drilled Cores of Shotcrete.
  10. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments.
  11. ASTM E488 - Standard Test Methods for Strength of Anchors in Concrete Elements.
  12. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing.
  13. ASTM E605 - Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.
  14. ASTM E1444 - Standard Practice for Magnetic Particle Testing.
  15. ASTM F606 - Standard Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, Direct Tension Indicators, and Rivets.
- D. Association of the Wall and Ceiling Industry (AWCI):
1. AWCI Technical Manual 12-B - Standard Practice for the Testing and Inspection of Field Applied Thin Film Intumescent Fire-Resistive Materials; an Annotated Guide.
- E. American Welding Society (AWS):
1. AWS D1.1 – Structural Welding Code.
  2. AWS D1.4 – Structural Welding Code – Reinforcing Steel.
  3. AWS D1.8 – Structural Welding Code – Seismic Supplement.
- F. Division of the State Architect (DSA) Interpretation Regulations (IR):
1. DSA IR 17-2 – Nondestructive Testing (N.D.T.) of Welds.
  2. DSA IR 17-3 – Structural Welding Inspection.
  3. DSA IR 17-8 – Sampling and Testing of High Strength Bolts, Nuts and Washers.
  4. DSA IR 17-9 – High Strength Bolting Inspection.
  5. DSA IR 17-10 – Sampling, Testing and Tagging of Reinforcing Bars.
  6. DSA IR 17-11 – Identification, Sampling and Testing of Threaded Steel Anchor Bolts and Anchor Rods.
  7. DSA IR 22-3 – Open Web Steel Joists and Joist Girders.
  8. DSA IR 23-4 – Metal-Plate-Connected Wood Trusses.
  9. DSA IR-23-8 – Manufactured Wood-Chord-Metal-Web Trusses.

### 1.03 REGULATORY REQUIREMENTS

- A. Laboratories performing testing shall have DSA's Laboratory Evaluation and Acceptance Program approval prior to providing material testing or special inspection services.
- B. Tests of materials and inspections shall be in accordance to Section 4-213 through 4-219 of the California Building Standards Commission's, California Administrative Code.
- C. Required material testing, inspections and special inspections are indicated on the DSA approved DSA-103, Listing of Structural Tests & Special Inspections (T&I List). OAR will provide CONTRACTOR copy of DSA-103.

#### 1.04 TESTS

- A. OWNER will contract with a DSA approved testing laboratory to perform the testing indicated on the Contract Documents, including the Tests and Special Inspections (T&I) list.
- B. Selection of material to be tested shall be by the Testing Laboratory and not by CONTRACTOR.
- C. Any material shipped from the source of supply prior to having satisfactorily passed such testing and inspection, or prior to the receipt of notice from Project Inspector such testing and inspection is not required, shall not be incorporated into the Work.
- D. OWNER will select, and directly reimburse, the Testing Laboratory for costs of all DSA required tests and inspections; however, the Testing Laboratory may be reimbursed by CONTRACTOR for such costs as specified or noted in related sections of the Contract Documents.
- E. The Testing Laboratory is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
- F. The Testing Laboratory shall not perform any duties of CONTRACTOR.
- G. CONTRACTOR shall provide an insulated curing box with the capacity for twenty concrete cylinders and will relocate said box and cylinders as rapidly as required in order to provide for progress of the Work.

#### 1.05 TEST REPORTS

- A. Test reports shall include all tests performed, regardless of whether such tests indicate the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations, when and as required, shall also be reported. Reports shall indicate the material (or materials) was sampled and tested in accordance with requirements of CBC, Title 24, Parts 1 and 2, as indicated on the Contract Documents. Test reports shall indicate specified design strength and specifically state whether or not the material (or materials) tested comply with the specified requirements.

#### 1.06 VERIFICATION OF TEST REPORTS

- A. Each Testing Laboratory shall submit to the Division of the State Architect, in duplicate, a verified report covering all tests required to be performed by that agency during the progress of the Work. Such report, covering all required tests, shall be furnished prior to Substantial Completion and/or, when construction on the Work is suspended, covering all tests up to the time of Work suspension.

1.07 INSPECTION BY OWNER

- A. OWNER, and its representatives, shall have access, for purposes of inspection, at all times to all parts of the Work and to all shops wherein the Work is in preparation. CONTRACTOR shall, at all times, maintain proper facilities and provide safe access for such inspection.
- B. OAR shall have the right to reject materials and/or workmanship deemed defective Work and to require correction. Defective workmanship shall be corrected in a satisfactory manner and defective materials shall be removed from the premises and legally disposed of without charge to OWNER. If CONTRACTOR does not correct such defective Work within a reasonable time, fixed by written notice and in accordance with the terms and conditions of the Contract Documents, OWNER may correct such defective Work and proceed in accordance with related Articles of the Contract Documents.
- C. CONTRACTOR is responsible for compliance to all applicable local, state, and federal regulations regarding codes, regulations, ordinances, restrictions, and requirements.

1.08 PROJECT INSPECTOR

- A. A Project Inspector will be employed by OWNER in accordance with requirements of Title 24 of the California Code of Regulations with their duties specifically defined therein. Additional DSA Special Inspectors may be employed and assigned to the Work by OWNER in accordance with the requirements of the CBC and DSA.
- B. Inspection of Work shall not relieve CONTRACTOR from any obligation to fulfill all terms and conditions of the Contract Documents.
- C. CONTRACTOR shall be responsible for scheduling times of inspection, tests, sample taking, and similar activities of the Work.



1.09 STRUCTURAL TESTS AND SPECIAL INSPECTIONS

- A. Soils:
  - 1. General: Periodic inspection by Geotechnical Engineer for verification of the following construction activities in conformance to CBC Table 1705A.6:
    - a. Site has been prepared properly prior to placement of controlled fill and/or excavations for foundations.

- b. Foundation excavations are extended to proper depth and have reached proper material.
      - c. Materials below footings are adequate to achieve the design bearing capacity.
    - 2. Compacted Fills: Testing and inspections shall be in conformance to Table 1705A.6:
      - a. Geotechnical Engineer will continuously verify the use of proper materials and inspect lift thicknesses, placement, and compaction during placement of fill.
      - b. Testing Laboratory under the supervision of the Geotechnical Engineer will:
        - 1) Perform qualification testing of fill materials.
        - 2) Test the compaction of fill.
    - 3. Retaining Walls:
      - a. Continuous inspections by Geotechnical Engineer:
        - 1) Placement, compaction and inspection of soil per CBC Section 1705A.6.1 for fills supporting foundations.
        - 2) Segmental retaining walls; inspect placement of units, dowels, connectors, etc.
      - b. Concrete Retaining Walls: Provide tests and inspections as indicated on paragraphs below for concrete.
- B. Concrete:
- 1. Cast in Place Concrete: Inspection and testing in conformance to CBC Table 1705A.3:
    - a. Inspection of reinforcement, including prestressing tendons and verification of placement, per ACI 318, sections 25.2, 25.2, 25.5.1 through 26.5.3.
    - b. Reinforcing bar welding: Inspect per AWS D1.4, ACI 318 26.5.4.
      - 1) Verification of weldability of reinforcing bars other than ASTM A706.
      - 2) Inspect single-pass fillet welds, maximum 5/16".
      - 3) Inspect all other welds.
    - c. Inspect anchors cast in concrete per ACI 318, section 17.8.2.
    - d. Inspect anchors post-installed in hardened concrete members:
      - 1) Continuous inspection of adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads, per ACI 318, section 17.8.2.4.

- 2) Mechanical anchors and adhesive anchors, not defined in previous paragraph, per ACI 318, section 17.8.2.
  - e. Design Mix:
    - 1) Verify use of required mix, per ACI 318, chapter 19 and sections 26.4.3 and 26.4.4.
    - 2) Batch Plant Inspection: The quality and quantity of materials used in transit-mixed concrete and in batched aggregates shall be continuously inspected as required by CBC section 1705A.3.2. If approved by DSA, batch plant inspection may be reduced to periodic if plant complies with CBC section 1705A.3.3.1, item 1, and requires first batch inspection, weightmaster, and batch tickets.
  - f. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete, per ASTM C172, ASTM C31, ACI 318, sections 26.4.5 and 26.12.
  - g. Inspect concrete placement for proper application techniques, per ACI 318, section 26.4.5.
  - h. Verify maintenance of specified curing temperature and techniques per ACI 318 sections 26.4.7 through 26.4.9 and CBC section 1908.9.
- C. Structural Steel:
1. Special inspector will verify that all materials are properly marked in conformance with AISC 360, Section 3.3 and applicable ASTM standards.
    - a. Mill certificates indicating material properties that comply with requirements.
    - b. Materials, sizes, types and grades complying with requirements.
  2. Testing Laboratory will test unidentified materials in conformance with ASTM A370.
  3. Special inspector will examine seam welds of HSS shapes in conformance with DSA IR-17-3.
  4. Special inspections and non-destructive testing of structural steel elements shall be in conformance to CBC section 1705A.2.1.
- D. High Strength Bolts:
1. Special inspector will verify identification markings and manufacturer's certificates of compliance conform to ASTM standards specified in the Contract Documents, per DSA IR 17-9.
  2. Testing Laboratory will test high-strength bolts, nuts and washers in conformance with ASTM F606, ASTM A370 and DSA IR 17-8.

3. Special inspector will inspect bearing-type (“snug tight”) bolt connections in conformance with AISC 360, section M2.5 and DSA IR 17-9.
  4. Special inspector will inspect slip-critical bolt connections in conformance with AISC 360, section M2.5.
- E. Welding:
1. Verification of Materials, Equipment and Welders:
    - a. Special inspector will verify weld filler material identification markings per AWS designation listed on the Contract Documents and the WPS.
    - b. Special inspector will verify material manufacturer’s certificate of compliance.
    - c. Special inspector will verify WPS, welder qualifications and equipment in conformance to DSA IR 17-3.
  2. Shop Welding: Special inspector will inspect the following, per CBC 1705A.2.1, AISC 360 (and AISC 341, as applicable) and DSA IR 17-3:
    - a. Groove, multi-pass fillet welds larger than 5/16”, plug and slot welds.
    - b. Single-pass fillet welds equal or less than 5/16”.
    - c. Inspect welding of stairs and railing systems.
    - d. Verification of reinforcing steel weldability.
    - e. Welding of reinforcing steel, per AWS D1.4.
  3. Field Welding: Special inspector will inspect the following, per CBC 1705A.2.1, AISC 360 (and AISC 341, as applicable) and DSA IR 17-3:
    - a. Groove, multi-pass fillet welds larger than 5/16”, plug and slot welds.
    - b. Single-pass fillet welds equal or less than 5/16”.
    - c. End welded studs (ASTM A108) installation, including bend test.
    - d. Floor and roof deck welds.
    - e. Welding of structural cold-formed steel.
    - f. Welding of stairs and railing systems.
    - g. Verification of reinforcing steel weldability.
    - h. Inspect welding of reinforcing steel.
  4. Non-Destructive Testing: Testing Laboratory will test perform ultrasonic and magnetic particle testing in conformance to AISC 360 section N5.5, AISC 341 appendix Q5.2, AWS D1.1, AWS D1.8, ASTM E543, ASTM E1444, ASTM E164 and DSA IR 17-2.

- F. Anchor Bolts, Anchor Rods and Other Steel:
1. Testing Laboratory will sample and test not readily identifiable anchor bolts and anchor rods in accordance with DSA IR 17-11.
  2. Testing Laboratory will sample and test not readily identifiable threaded rod not used for foundation anchorage per procedures noted in DSA IR 17-11.

PART 2 – PRODUCTS (Not used).

PART 3 – EXECUTION (Not used).

END OF SECTION

SECTION 01 4524  
ENVIRONMENTAL IMPORT/EXPORT MATERIALS TESTING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies the requirements for the sampling, testing, transportation and certification of imported fill materials or exported fill materials from school sites.
- B. This Section defines:
  - 1. CONTRACTOR requirements for use of existing, imported or generated materials on school sites.
  - 2. CONTRACTOR requirements for stockpiling materials for use on schools sites.
  - 3. CONTRACTOR requirements for exporting materials from a school site including transportation.
  - 4. Testing requirements for all materials imported, exported, stockpiled or generated for use on a school site.
  - 5. CONTRACTOR testing and reporting requirements.
  - 6. CONTRACTOR submittal requirements.
- C. Related Requirements:
  - 1. Division 1: General Requirements.
  - 2. Section 01 1100: Summary of Work.
  - 3. Section 01 3113: Project Coordination.
  - 4. Section 01 3213: Construction Schedule.
  - 5. Section 01 3300: Submittal Procedures.
  - 6. Section 01 7700: Contract Closeout.
  - 7. Section 31 2200: Grading.
  - 8. Section 31 2313: Excavation and Fill.
  - 9. Section 31 2316: Excavation and Fill. (Pavement)
  - 10. Section 31 2323: Excavation and Fill (Utilities).
  - 11. Section 32 1100: Base Course.

1.02 OBJECTIVES

- A. Ensure that fill materials imported to school sites are safe for students, staff and visitors.
- B. Ensure that materials exported from school sites for use at school and non-school sites or offsite disposal/recycling are adequately characterized for lawful disposition.



- C. Ensure that representative data be collected so that analytical determinations can be made in regard to the first two objectives.
- D. Require CONTRACTOR to contract with and pay for the services of a licensed environmental professional (licensed State of California Professional Engineer [PE Civil] or Professional Geologist [PG]) familiar with environmental site assessment and waste classification and disposal requirements to perform such services.
- E. Require CONTRACTOR to contract with and pay for an independent, approved California Department of Health Services certified testing laboratory to perform analytical testing of imported, exported and site generated fill materials.
- F. Require CONTRACTOR to pay all fees required by authorities having jurisdiction over area.
- G. Require CONTRACTOR to post bonds required by authorities having jurisdiction over area.

### 1.03 DEFINITIONS

- A. Definitions not furnished in text of this section:
  1. CEQA: California Environmental Quality Act.
  2. EIR: Environmental Impact Report.
  3. Environmental Health Supervisor, Environmental Compliance Group: Individual at OEHS, who ensures OWNER compliance with all pertinent regulations, ordinances, codes, and/or policies.
  4. OEHS: OWNER's Office of Environmental Health and Safety.
  5. Licensed Environmental Professional: Person licensed in the State of California and with sufficient knowledge and experience to competently perform environmentally-related work, including (but necessarily limited to) environmental site investigations, remedial projects, and other tasks involving the collection of soil, soil vapor, and groundwater samples; the selection of analytical methods for said samples; the interpretation of analytical data; the preparation of work plans, reports, and other relevant documents; and the supervision and/or oversight of remedial contractors. For the purposes of this Section, a licensed environmental professional shall include a Professional Geologist or "P.G." or a Civil Professional Engineer or "P.E."
  6. ug/kg: micrograms/kilogram.
  7. mg/kg: milligrams/kilogram.
  8. NA: Not Applicable.
  9. RCRA: federal Resource Conservation and Recovery Act.
  10. Soil Certification/Sample Data Report: Report documenting location, volume, sampling procedures, analytical methods, chemical test results, and recommendations for either disposing or re-using stockpiled soil excavated from OWNER sites or proposed for import to same. Preparation of report is to follow the procedures given in Article 1.04 of this Section.

11. Soil Sampling Plan (SSP): As described in Article 1.04 of this Section, a document providing sufficient guidance with which to adequately characterize soil proposed for import to, or export from, an OWNER's school Site. Guidance in this document is to be in accordance with the procedures described in Article 1.04 of this Section.
12. STLC: Soluble Threshold Limit Concentrations as defined in Tables II and III, Chapter 11, Article 3, § 66261.24-1 of Title 22 of the California Code of Regulations (CCR).
13. TCLP: Toxicity Characteristic Leaching Procedure, test Method 1311, documented in Title 40, Part 261, Subpart C, § 261.24 of the Code of Federal Regulations (CFR).
14. TPH: Total Petroleum Hydrocarbons.
15. TTLC: Total Threshold Limit Concentrations, as defined in Tables II and III, Chapter 11, Article 3, § 66261.24-1 of Title 22 of the CCR.
16. USEPA or EPA: United States Environmental Protection Agency.
17. VOCs: Volatile Organic Compounds.
18. WET: Waste Extraction Test, as defined in Appendix II-1, Chapter 11 of Title 22 of the CCR.

#### 1.04 SUBMITTALS

##### A. CONTRACTOR shall submit to OAR for transmittal to the OEHS:

1. A qualifications statement for CONTRACTOR's independent California certified testing laboratory and required licensed environmental professional (California Professional Civil Engineer (PE) or Professional Geologist (PG) prior to the start of Work. CONTRACTOR's licensed environmental professional must possess recent demonstrated environmental experience in soil sampling and waste classification.
2. A draft import/export Soil Sampling Plan (SSP) prepared by CONTRACTOR's licensed environmental professional for review and concurrence by OEHS. The objective of the SSP is to obtain representative sample data. The Draft SSP or equivalent document acceptable to OEHS must be submitted at least 72 hours prior to all proposed import/export sampling activities. The consultant's proposal (with or without fees) is acceptable in lieu of a SSP.
  - a. At a minimum, the Draft SSP shall include a site map which shows the location of the proposed import/export soils and the location and number of the proposed stockpile samples. The draft SSP shall also contain information pertaining to the total volume of the stockpile proposed for sampling and the rationale in support of the proposed sampling approach. Existing environmental documentation specific to the import/export site shall be utilized by the CONTRACTOR's environmental professional to support the proposed sampling approach and analytical method suite. It is the responsibility of the CONTRACTOR to request this information in advance from the OAR if they do not already have access to a copy at the jobsite.

- b. Lacking this information or rationale, samples shall be analyzed for all analytical methods described in paragraph 3.02 E. Guidance for the minimum number of samples per total volume of soil to be excavated is provided in Table 1. Supplemental samples may be required by OEHS if pothole sampling is utilized. In addition, the draft SSP shall contain all necessary contact information for the import/export site and a proposed schedule for the sampling activities.
  - c. OEHS will either approve the document or request that revisions be made. This process shall continue until OEHS approves the draft SSP.
3. Draft Soil Certification/Sample Data Report:
- a. A draft Soil Certification/Sample Data Report prepared by CONTRACTOR's licensed environmental professional for review and concurrence. At a minimum the draft Soil Certification/Sample Data Report shall contain:
    - 1) A site map showing the location of the in situ sampling locations or the stockpile(s) and stockpile sample locations.
    - 2) A detailed discussion and evaluation of the laboratory results.
    - 3) A summary of findings and recommendations that provide a determination on the waste classification of the subject materials, based on the representative sample results.
    - 4) Recommendations for additional step-out samples, if any.
    - 5) Chain-of-custody forms and all laboratory data with respective QA/QC sheets.
  - b. CONTRACTOR must allow OEHS a minimum of 72 hours to review the draft Soil Certification/Sample Data Report. OEHS will either approve the document or request that revisions be made. This shall continue until OEHS approves the draft Soil Certification/Sampling Data Report.
  - c. Upon revision of the draft Soil Certification/Sample Data Report by the CONTRACTOR'S licensed environmental professional and acceptance by OEHS, the final report, signed and stamped by the licensed professional, shall be submitted to the OAR for distribution to OEHS and the project file. If the soil is to be exported to or imported from, an OWNER school site, if it satisfied the requirements of paragraphs 3.02.F and 3.02.G of this Section, then a PG or civil PE must sign and stamp the final report.
    - 1) The Environmental Health Supervisor, Environmental Compliance Group will confirm that the proposed waste classification for the proposed import/export material is appropriate. For materials designated unacceptable for export except to a licensed facility, or for those materials sent electively by CONTRACTOR to a licensed facility, the Environmental Health Supervisor, Environmental Compliance Group will provide information on the necessary waste manifest documentation.
    - 2) If an OAR/Complex Project Manager (CPM) would like OEHS to conduct the soil sampling and/or soil removal, the OAR/CPM

should submit a Project Referral Form with completed COLIN funding line information to OEHS at least 3 weeks prior to when the work needs to be conducted. Submit the Project Referral Form to: [environmental\\_review@lausd-oehs.org](mailto:environmental_review@lausd-oehs.org)

4. Written documentation, e-mail is acceptable, verifying that all export soil data for any soils exported for use at a non-school site, including the final Certification Report prepared by CONTRACTOR's licensed environmental professional, were provided to the proposed recipient prior to export and delivery.
5. Prior to import/export, written documentation in the form of a letter sent by the transporter to the CONTRACTOR, who must in turn submit it to OEHS, to verify the following:
  - a. The hauling contract for each load imported to, or exported from, the school site specifies the use of "clean" trucks and/or trailer beds, in which the material will be carried;
  - b. The actual trucks and/or trailer beds utilized for import/export activities will be clear of visible contamination or deleterious materials;
  - c. The trucks will go directly from the source location to the recipient location with no detours or stops at other locations; and
  - d. Short loads will not be augmented by other materials that were not tested as part of the final SSP.
  - e. All import/export transportation activities shall be conducted in accordance with all applicable local, state and federal rules and regulations.
6. Certification, in the form of haul tickets or completed waste manifests, documenting the volume and recipient of all import/export materials and activities. This documentation shall be coordinated through the OEHS Environmental Health Supervisor, Environmental Compliance Group.
  - a. For approved import/export to unregulated facilities (landfill) or non-school sites, haul tickets may be utilized, but shall contain the following minimum information:
    - 1) Date(s) of haul activity.
    - 2) Address of source site.
    - 3) Address of recipient.
    - 4) Load volume.
    - 5) Time of departure from source.
    - 6) Time of arrival at recipient site.
    - 7) Signature of recipient or recipient's agent.
    - 8) It is the CONTRACTOR's responsibility to confirm that no other trips or short-load augmentation occurred and submit documentation to the OAR and OEHS.
  - b. For export to regulated facilities (landfills, recyclers, etc.), the appropriate waste manifest as determined by the OEHS Environmental Health

Supervisor, Environmental Compliance Group in paragraph 1.04.A.3 must be completed and a copy of the executed manifest, signed by the receiving site, must be provided to the OAR. The waste manifest copy, signed by the receiving facility and based on the manifest address, will be sent directly to OEHS and the OEHS Environmental Health Supervisor, Environmental Compliance Group.

## 1.05 APPROVALS

- A. No import or export of earth or geotechnical grading or filling materials can occur at OWNER sites without prior approval by OEHS.

## PART 2 – PRODUCTS

### 2.01 MATERIALS

#### A. Imported:

1. Soils: Soils proposed for import shall be tested pursuant to the requirements of this Section (01 4524), unless a variance has been requested by CONTRACTOR and approved by OEHS prior to the import of the subject materials.
2. Gravels: Clean gravel, consisting of native rock from a commercial source, may be granted a variance from the testing requirements of this Section provided a request for variance is submitted by CONTRACTOR for review and approval at least 72 hours prior to import. CONTRACTOR shall provide written documentation, which identifies the source, volume and proposed transport date(s) of the material for review.
  - a. Furthermore, a letter signed and stamped by either a Civil PE or PG and originating from the commercial source must state the following:
    - 1) The quarry does not mine ultramafic (i.e. natural asbestos containing) materials.
    - 2) The gravel is produced from virgin aggregate materials and does not contain any contaminated or reclaimed or recycled materials.
  - b. Additionally, a letter from the material transporter and signed by the same must state the following:
    - 1) Haul truck and/or trailer beds transferring the material are clear of visible contamination and deleterious materials.
    - 2) Haul trucks will go directly from the quarry source to the site with no trips or augmentation of short loads with other materials.
  - c. The request for variance requires approval by OEHS prior to CONTRACTOR importing the materials.
3. Sands: Clean sand from a commercial source may be granted a variance from the testing requirements of this Section provided a request for variance is submitted by CONTRACTOR for review and approval at least 72 hours prior to import.

CONTRACTOR shall provide written documentation, which identifies the source, volume and proposed transport date of the material for review.

- a. Furthermore, a letter signed and stamped by either a Civil PE or PG and originating from the commercial source must state the following:
    - 1) The source does not mine ultramafic (i.e. natural asbestos containing) materials.
    - 2) The sand is produced from virgin materials and does not contain any contaminated or reclaimed or recycled materials.
  - b. Additionally, a letter from the material transporter and signed by the same must state the following:
    - 1) Haul truck and/or trailer beds transferring the material are clear of visible contamination or deleterious materials.
    - 2) Haul trucks will go directly from the commercial source to the site with no trips or augmentation of short loads with other materials.
  - c. The request for variance requires approval by OEHS prior to CONTRACTOR importing the materials.
4. Miscellaneous Material: No miscellaneous material containing crushed concrete, asphalt, construction debris, recycled, or other potential deleterious materials may be utilized or imported to an OWNER project site for use as fill or grading material.

B. Exported/Site Generated:

1. Soils: Soils proposed for export shall be tested pursuant to the requirements of the subject section, unless a variance has been requested by CONTRACTOR and approved by OEHS prior to the import of the subject materials. Once soils or other materials for export have been tested, they cannot be disturbed or reused for any purpose without prior approval by OEHS.
2. Gravels/Sands: Gravels, sands, or other natural rock materials shall not be exported from an OWNER project site without prior testing by CONTRACTOR pursuant to this Section (01 4524) and/or approval by OEHS. An exception to this provision is gravel adhering to concrete or asphalt pavement. In this instance and in consultation with OEHS, which shall make the final decision, CONTRACTOR may dispose of said materials and construction debris without sampling and analytical testing required under this Section.
3. Miscellaneous Material. No miscellaneous material or other similar materials shall be exported from an OWNER project site without prior testing by CONTRACTOR pursuant to this Section (01 4524) and/or approval by OEHS. No crushed miscellaneous material containing concrete, asphalt, construction debris, or other potential deleterious materials that is generated onsite may be used as fill or grading material of any sort at an OWNER project site. Crushed asphalt shall be segregated and stockpiled separately. The onsite use of crushing equipment is not permitted.

PART 3 - EXECUTION

ARROYO HIGH SCHOOL  
GREENHOUSE

DSA SUBMITTAL 01/17/20  
ENVIRONMENTAL IMPORT/ EXPORT MATERIALS TESTING  
01 4524-7

## 3.01 GRADING/EXCAVATION

- A. If the CONTRACTOR encounters an area with discolored, stained, and/or odorous soils or any other evidence of contamination during excavation/grading work, CONTRACTOR must immediately notify the OAR, cease work in the aforementioned area, and secure the area with fencing, tape, stakes or other suitable means to prevent entry by personnel or equipment. In turn, the OAR will immediately notify OEHS, which will initiate a construction response to address the contamination, in accordance with pertinent regulatory requirements.

## 3.02 SAMPLING AND TESTING

- A. CONTRACTOR shall contract with, and pay for, the services of a licensed environmental professional, licensed State of California Professional Civil Engineer (PE) or Professional Geologist (PG), to oversee or perform sampling of Materials that are subject to this Section.
- B. CONTRACTOR shall contract with, and pay for, an independent, approved California Department of Health Services certified testing laboratory to perform testing of imported, exported and site generated fill materials.
- C. All fill/grading material, unless otherwise specified in writing by OEHS, whether imported or exported, must be tested at the site of origin. Import/export testing and certification process shall include the steps listed below. OWNER retains the right to refuse any fill material proposed for use at a school site.
1. Stockpile all materials for sampling (standard stockpile or backhoe pothole stockpile). Crushed fill materials generated by CONTRACTOR at a school site must be segregated by material.
  2. Submit draft SSP for review and concurrence by OEHS. SSP must include figures identifying the site location, the in situ sampling boundary or stockpile location, the sampling locations, and a brief site history including the type of remedial activity that occurred at the source site, if any.
  3. Collect and analyze samples (see Table 1 for number of samples per volume) per the SSP. Samples must include both discrete samples and composite samples.
    - a. Discrete samples correspond to a single sample depth at a single sampling/boring location. Discrete samples are to be used for producing composite samples, as described in subparagraph b. below, and for analysis, in accordance with paragraph 3.02.E.1, which applies only to VOCs and TPH-g. For analysis of these compounds, the licensed professional shall collect one discrete sample from each sampling location and samples should be collected at different depths between these locations, so that all stockpile depths are equally represented.
    - b. Composite samples correspond to three sample depths from a single sampling location (this includes in situ samples). Each composite sample shall consist of three discrete samples collected near the top, middle, and bottom of the stockpile or in situ boring location at each sampling location. The licensed environmental professional shall then have the analytical laboratory combine the discrete samples into a single composite sample. The laboratory should

be directed to retain a sufficient quantity of each discrete sample for further analysis, as necessary. The composite sample shall be analyzed, in accordance with paragraph 3.02.E.2, which describes required testing other than for VOCs and TPH-g. Once materials for export have been stockpiled and tested, they may not be used onsite for any purpose without prior approval by OEHS.

- 1) Composite samples with analyte concentrations approximating or exceeding acceptable screening criteria, as specified below in paragraphs F through H, may be attributed to constituents within one or more discrete samples. Analyzing the discrettes comprising the composite may reveal the discrete samples with elevated analyte concentrations and, thus, better isolate (and minimize) the volume of soils within the stockpile requiring removal and licensed disposal.
4. Submit draft Soil Certification/Sample Data Report for review and concurrence by OEHS.
  5. Submit final Soil Certification/Sample Data Report to the OEHS. All certified material not utilized or exported within a period of 90 days will be subject to retesting unless a variance is requested by CONTRACTOR and is approved by OEHS prior to use or import/export of the subject materials.
  6. Submit required pre import/export documentation/record to the OAR and to OEHS, e-mail is acceptable.
  7. Submit post import/export certifications to the OAR and OEHS, e-mail is acceptable.
  8. In addition to the preceding, requirements, and as necessary or as specified by OEHS, certifications and submittals as indicated in previous articles of PART 3 or in the remainder of this Section may be required.
- D. Import/export fill materials shall be samples in situ or stockpiled by CONTRACTOR (or at export site) and are deemed acceptable for import/export or reuse only when it is demonstrated to the satisfaction of OEHS that the subject materials meet the requirements of this Section.
- E. As described in paragraph 1.04.A.2.b, lacking site-specific data or sample rationale to support a more focused analytical approach; the CONTRACTOR shall analyze all samples for the following substances according to the methods indicated below. Table 3 is a waste classification flowchart for use by CONTRACTOR's licensed environmental professional. In all cases, detection levels and quality assurance/quality control methods shall be in accordance with standard method reporting limits, best laboratory practices and the following USEPA (EPA) methods for discrete and composite samples:
1. Discrete samples shall be analyzed for Volatile Organic Compounds (VOCs), utilizing EPA Method 8260B/5035 and for Total Petroleum Hydrocarbons (TPH) gasoline (TPH-g), utilizing EPA Method 8015M [with EPA Method 5035 extraction using either volatile organic analysis (VOA) kits, EnCores<sup>®</sup>, or an equivalent soil collection device].
  2. Composite samples shall be analyzed for the following:



- a. TPH, utilizing EPA Method 8015M, for full carbon-chain speciation (including diesel, oil, and other long-chain hydrocarbons).
  - b. Polychlorinated biphenyls, utilizing EPA Method 8082.
  - c. Semi-Volatile Compounds (SVOCs), utilizing EPA Method 8270C.
  - d. Organochlorine Pesticides (OCPs), utilizing EPA Method 8081A.
  - e. Organophosphorous Pesticides (OPPs), utilizing EPA Method 8141A.
  - f. Chlorinated Herbicides, utilizing EPA Method 8151A.
  - g. California Code of Regulations Title 22 (CAM 17) Metals, utilizing EPA Method 6010B/7470A.
  - h. Hexavalent Chromium, utilizing EPA Method 7199.
  - i. Arsenic/Thallium, utilizing EPA Method 6020.
3. For EPA Method 8270C, a Method Detection Limit (MDL) of 250 ug/kg in addition to the Practical Quantitation Limit (PQL) or equivalent. This requirement is due to a recent DTSC directive requiring MDLs or PQLs to be sufficiently low to detect Carcinogenic Polycyclic Aromatic Hydrocarbons (CPAHs) in the composite sample, even if these compounds exceed actionable concentrations (900 ug/kg) in only one of the three discrete samples comprising the composite.
  4. The certified laboratory may also need to analyze the composite samples for polycyclic aromatic hydrocarbons (PAHs), a component of semi-volatile compounds, if the data evaluation performed in accordance with paragraph 3.02.G of this Section (01 4524) does not meet DTSC requirements. The analytical methods to be used for this purpose are EPA Method 8270 SIM, if the samples contain relatively high concentrations of hydrocarbons, or EPA Method 8310, if the samples contain low concentrations of hydrocarbons.
- F. Import/export fill material may be deemed defective for use by OEHS at a school site if any of the following results are obtained:
1. TPH are present at concentrations exceeding 100 milligrams per kilogram (mg/kg) for gasoline and/or 1,000 mg/kg for oil/diesel and long-chain hydrocarbons.
  2. Solvents and other VOCs are present at concentrations exceeding the laboratory reporting limit. Detections between the laboratory reporting limit and the practical quantitation limit (J-flags) should not be reported.
  3. PCBs are present at concentrations exceeding the laboratory reporting limit. Detections between the laboratory reporting limit and the practical quantitation limit (J-flags) should not be reported.
  4. SVOCs are present at concentrations exceeding the laboratory reporting limit. Detections between the laboratory reporting limit and the practical quantitation limit (J-flags) should not be reported.

5. OCPs are present at concentrations exceeding the laboratory reporting limit. Detections between the laboratory reporting limit and the practical quantitation limit (J-flags) should not be reported.
  6. OPPs are present at concentrations exceeding the laboratory reporting limit. Detections between the laboratory reporting limit and the practical quantitation limit (J-flags) should not be reported.
  7. Chlorinated herbicides are present at concentrations exceeding the laboratory reporting limit. Detections between the laboratory reporting limit and the practical quantitation limit (J-flags) should not be reported.
  8. California Code of Regulations Title 22 (CAM 17) Metals at concentrations exceeding site-specific background. Detections between the laboratory reporting limit and the practical quantitation limit (J-flags) should not be reported.
  9. Hexavalent chromium is present at concentrations exceeding 300 ug/kg.
- G. As mentioned in paragraph 3.02.E, evaluate concentrations of CPAHs, a subset of SVOCs, in the import/export material by conducting the analyses set forth below.
1. Comparing CPAH concentrations with the benzo(a)pyrene [b(a)p] equivalent concentration of 900 ug/kg, the background concentration for CPAHs defined in “A Methodology For Using Background PAHs To Support Remediation Decisions,” prepared by the Environ Corporation for the Southern California Gas Company and Southern California Edison, January 24, 2002 (referred to as “document”). In this document, CPAHs are defined in Table 2, and Potency Equivalency Factors (PEFs) for each CPAH are listed in Table 3. Using the correct PEF for each CPAH, the licensed environmental professional shall convert the concentration of each CPAH into its b(a)p equivalent concentration. The summation of these b(a)p equivalents for each CPAH must not exceed 900 ug/kg. If CPAHs do not exceed the laboratory reporting limit, then the licensed environmental professional must perform the procedure described above, using the PEF and the laboratory reporting limit (LRL) for each CPAH. The result will be the LRL for each CPAH converted to b(a)p equivalent concentrations. The summation of these b(a)p equivalent concentrations (representing the LRL for each CPAH) must not exceed 900 ug/kg.
- H. Evaluate concentrations of metals in import fill by conducting the analysis set forth below.
1. Compare the maximum detected metal concentrations in import/export material samples to either DTSC or US EPA regulatory action levels for either residential or school sites, whichever is more conservative. If any metal concentration exceeds its listed regulatory action level, the fill material fails and shall be deemed defective and unacceptable for use.
  2. In addition to paragraph 3.02.G.1, import/export fill shall be deemed defective and unacceptable for use if any of the following results are obtained:
    - a. Arsenic concentrations greater than or equal to 12.0 mg/kg.
    - b. Lead concentration greater than or equal to 80 mg/kg.
    - c. Import/Export materials at school sites with total lead concentrations greater than or equal to 50 mg/kg shall be analyzed for leachability (STLC)

prior to export. Materials exceeding STLC limits identified in Table 2 are deemed defective and unacceptable for use at school sites.

- d. Import/Export materials at school sites with total chromium concentrations greater than or equal to 100 mg/kg shall be tested for hexavalent chromium.
- I. All export/import material shall be characterized, handled, and documented in accordance with applicable US EPA and State of California hazardous waste and hazardous materials regulations (See Table 2). For the purpose of this specification, “contaminated” shall mean any soil or geotechnical material with constituent concentrations, which would require disposal at a regulated facility (i.e., California hazardous waste or RCRA hazardous waste). Refer to Article 3.03 COSTS which outline the disposal fee requirements for excavated contaminated soil. OAR must be notified at least 72 hours prior to the disposal of hazardous waste or hazardous material. No material disposal or reuse can take place without prior written approval of OEHS.
- J. Specification test results and OEHS approvals are valid for a period of 90 days from the date of the subject testing unless a variance is requested by CONTRACTOR and approved by OEHS. Previously approved materials shall not be utilized or disposed offsite after the 90 day limit without prior review and approval by OEHS.
- K. Requests for variances to this Specification Section shall be submitted in writing to OEHS a minimum of two weeks in advance of need for review and approval. The request for a variance from soil sampling for export must state the following: “The soil for export is less than 10 cubic yards, has no visible staining, is not odorous, and appears native”. A photograph of the stockpiled soil must be included in the variance request. The photograph must have a representative scale within it in order for OEHS to determine the volume of soil to be exported. The request for variance must provide all available testing data, and a rationale to support the request. OEHS will review the request for variance and will provide its preliminary determination within 72 hours. Once OEHS approves the variance from sampling, the soil stockpile may be removed as “construction related debris”. Certain requests may require final approval by the DTSC.

### 3.03 TRANSPORTATION

- A. Details of the samples and testing must be submitted to and approved by OEHS Environmental Compliance Manager before the materials from which the samples were collected undergo transportation.
- B. Haul Routes and Regulations/Restrictions: CONTRACTOR must comply with requirements of project environmental disclosure documents (i.e., CEQA EIR) and authorities having jurisdiction over the project area and the proposed activities (e.g. Regional Water Quality Control Board, DTSC, etc.).

### 3.04 COSTS

- A. CONTRACTOR shall pay all fees required by authorities having jurisdiction over area.
- B. Contractor shall pay all fees for disposal and/or processing of impacted and/or hazardous fill materials at a regulated facility.
- C. CONTRACTOR shall post and pay for all bonds required by authorities having jurisdiction over area.



TABLE 1: MINIMUM SAMPLING FREQUENCY

Volume (Cubic Yards)*	Sampling Frequency*
0 - 500	1 per 100 CY
501 - 1,000	1 per 250 CY
1,001 - 5,000	1 per 250 CY for first 1000 CY 1 per 500 CY thereafter
> 5,000	12 samples for first 5000 CY 1 per 1000 CY thereafter

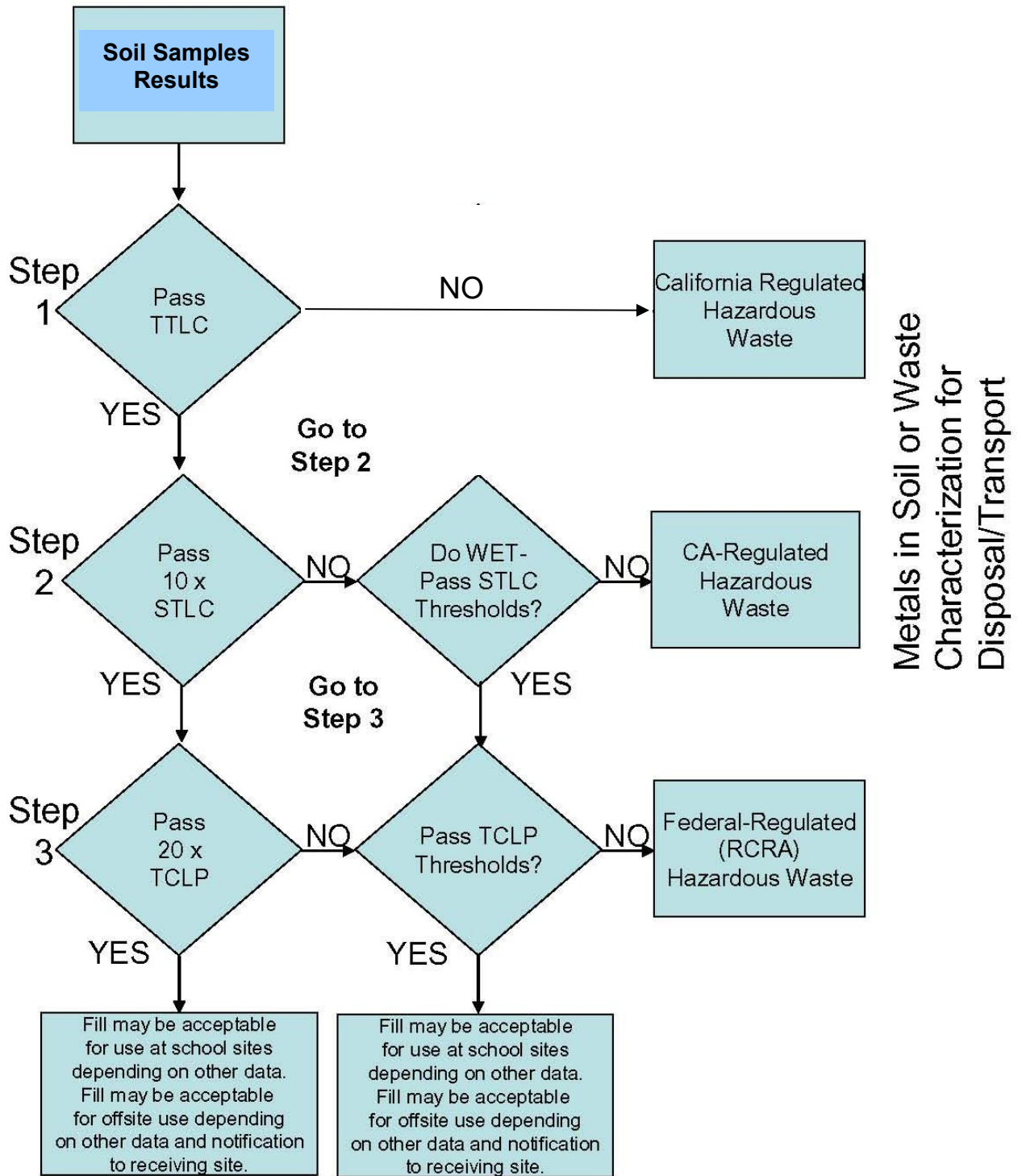
All samples are to be collected, analyzed and accepted before import/export: materials going to licensed facilities must meet sampling criteria from that facility. The rationale for sample approach should be discussed in the draft SSP.

Pothole stockpile sampling may require discrete depth supplemental sampling in order to achieve representative results. The rationale for sample approach should be discussed in the draft SSP. In-situ (in place) sampling by mechanical boring or a hand auger method is acceptable if no space exists to store the soil stockpile at the site with prior OEHS approval.

\*Discuss alternative screening & sampling approaches with OEHS representative for project.

Chemicals of Potential Concern	TABLE 2 WASTE CHARACTERIZATION				
	Hazardous Waste if Exceed Criteria - TTLC Level* (mg/kg)	Additional WET Leaching Tests if Exceed Hazardous Waste Criteria - 10 times STLC Level** (mg/kg)	California-Regulated Hazardous Waste - Soluble Threshold Limit Concentration -STLC Level (mg/l)	Additional TCLP Leaching Tests if Exceed Hazardous Waste Criteria - 20 times TCLP Level** (mg/kg)	Federally-Regulated (RCRA) Hazardous Waste - Toxicity Characteristic Leaching Procedure - TCLP Level (mg/l)
CAM 17 Metals					
Antimony	500	150	15	NA	NA
Arsenic	500	50	5	100	5
Barium	10,000	1,000	100	2,000	100
Beryllium	75	7.5	0.75	NA	NA
Cadmium	100	10	1	20	1
Chromium	2,500	50	5	100	5
Cobalt	8,000	800	80	NA	NA
Copper	2,500	250	25	NA	NA
Lead	1,000	50	5	100	5
Mercury	20	2	0.2	4	0.2
Molybdenum	3,500	3,500	350	NA	NA
Nickel	2,000	200	20	NA	NA
Selenium	100	10	1	20	1
Silver	500	50	5	100	5
Thallium	700	70	7	NA	NA
Vanadium	2,400	240	24	NA	NA
Zinc	5,000	2,500	250	NA	NA
<i>Chromium (VI)</i>	500	50	5	NA	NA

TABLE 3 – WASTE CLASSIFICATION FLOWCHART



END OF SECTION

SECTION 01 4525  
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 – GENERAL

1.01 SUMMARY

A. SECTION INCLUDES

1. This Section specifies the requirements for test and balance of HVAC and related systems.

B. RELATED REQUIREMENTS

1. Section 01 1100: Summary of Work.
2. Section 01 3113: Project Coordination.
3. Section 01 3213: Construction Schedule.
4. Section 01 3300: Submittal Procedures.
5. Section 01 7700: Contract Closeout.
6. Section 23 0500: Common Work Results for HVAC.
7. Section 23 0513: Basic HVAC Materials and Methods.
8. Section 23 0548: HVAC Sound, Vibration and Seismic Control.
9. Section 23 0900: HVAC Instrumentation and Controls.
10. Section 23 0923: Environmental Control and Energy Management Systems (Only include when DDC Energy Management and Control Systems are provided).
11. Section 23 2013: HVAC Piping.
12. Section 23 3000: Air Distribution.
13. Section 23 3813: Kitchen Ventilation System.
14. Section 23 5000: Central Heating Equipment
15. Section 23 6416: Oil Lubricated Centrifugal Water Chillers.
16. Section 23 6418: Oil Free Centrifugal Water Chillers.
17. Section 23 6423: Scroll Water Chillers.
18. Section 23 6426: Rotary-Screw Water Chillers.
19. Section 23 6428: Air-Cooled Rotary Screw Chillers.
20. Section 23 6500: Cooling Towers.
21. Section 23 8000: Heating, Ventilating and Air Conditioning Equipment.
22. Section 28 3149: Carbon Monoxide Detection and Alarm Systems.

PART 2 – PRODUCTS (Not used)



## PART 3 – EXECUTION

## 3.01 DEFINITIONS AND APPLICABLE PUBLICATIONS

- A. For the purposes of this Section definitions are as indicated in applicable publications of AABC, NEBB, TABB, ASHRAE, ANSI and SMACNA.
1. TAB: Testing, Adjusting and Balancing.
  2. TABB: Testing, Adjusting and Balancing Bureau.
  3. AABC: Associated Air Balance Council.
  4. NEBB: National Environmental Balancing Bureau.
  5. ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers.
  6. ANSI: American National Standards Institute.
  7. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.
  8. OAR: OWNER'S Authorized Representative

## 3.02 QUALITY ASSURANCE

- A. The General Contractor shall contract directly with the test and balance agency. Tests performed by testing agencies contracted with the system's subcontractor will not be accepted. The qualifications of the agency shall comply with Article 3.02, Quality Assurance. The agency shall be responsible for furnishing labor, instruments, and tools required to test, adjust, and balance the heating, ventilating, and air conditioning (HVAC) systems and related plumbing systems, as described and/or as indicated in the Contract Documents.
- B. CONTRACTOR shall obtain services of an independent, qualified testing agency acceptable to Architect to perform testing and balancing Work as specified and as follows:
1. Agency shall be currently certified by either the Associated Air Balance Council (AABC), the National Environmental Balancing Bureau (NEBB), or the Testing, Adjusting and Balancing Bureau (TABB). NEBB or TABB certification shall be for Air and Hydronic Testing, Adjusting and Balancing and Sound and Vibration Measurement.
  2. Work shall be in accordance with the latest edition of the AABC, NEBB, or TABB National Standards. Where the requirements of the two standards are different, the more stringent requirements shall prevail. Also, if the Contract Documents impose a more stringent standard, then the Contract Documents shall prevail.
- C. Performance Criteria: Work of this Section shall be performed in accordance with approved Testing, Adjusting, and Balancing agenda.
- D. Test Equipment Criteria: Basic instrumentation requirements and accuracy/calibration required by Section Two of the AABC, Section II of the NEBB, or TABB Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.
- E. Verification: The Test and Balance Agency shall recheck 10 percent (minimum 10) of the measurements listed in the report. The locations shall be selected by PROJECT

INSPECTOR or OAR. The recheck will be witnessed by PROJECT INSPECTOR or OAR. If 20 percent of the measurements that are retested differ from the report and are also out of the specified range, an additional 10 percent will be tested. If 20 percent fall outside the specified range, the report will be considered invalid and all test and balance work shall be repeated.

- F. Due to more stringent acoustical requirements in the educational environment, the Test and Balance Agency shall recheck the air systems where the sound level is higher than the specified requirements and demonstrate compliance with the methodology specified in this document with emphasis on fan speed adjustment and balancing for optimum acoustical performance. The recheck will be witnessed by PROJECT INSPECTOR or OAR. When there are multiple air systems, a system selected by PROJECT INSPECTOR or OAR shall be rechecked. If this system is found to be not in compliance, a second system shall be checked. If the second system is also found to be not in compliance, the report will be considered invalid, and all test and balance work shall be repeated.

### 3.03 SUBMITTALS

- A. Submit name of agency to perform the Work. Include in the submittal the certified qualifications of all persons responsible for supervising and performing actual Work of this Section. Agency shall submit a minimum of five commercial or industrial HVAC system TAB projects of similar type, size, and degree of difficulty completed within the last two years. Agency shall provide name and telephone number of contact person for each listed project.
- B. Submit, for approval, 6 copies of the Agenda as indicated in Article 3.06 to test and balance all mechanical and relevant plumbing systems.
- C. Preliminary Report: Review the Contract Documents, examine Work installations and submit a written report to ARCHITECT, PROJECT INSPECTOR and OAR indicating deficiencies in Work precluding proper testing and balancing of the Work.
- D. Final TAB Report: Submit the final TAB report for review by ARCHITECT, PROJECT INSPECTOR, and OAR outlining the conditions and Work completed on each HVAC system. All outlets, devices, HVAC equipment, etc. shall be identified, along with a numbering system corresponding to report unit identification.
- E. Submit an AABC “National Project Performance Guaranty” or “NEBB Quality Assurance Certification”, assuring the Project systems were tested, adjusted, and balanced in accordance with the Specifications and AABC, NEBB, or TABB National Standards.
- F. CAD drawings: Submit single line, multi-color CAD drawings indicating outside return and supply air, volume control boxes, each outlet and inlet, room numbers, duct sizes at traverse locations, temperatures and pressures, systems balanced, components changed, and CONTRACTOR installed access points. In addition, drawings shall identify controls, equipment settings, including manual damper quadrant positions, manual valve indicators, fan speed control levers, and similar controls, and devices shall be marked on the drawings to show final settings. CAD files shall be submitted on CD-ROM upon final submittal of TAB report. Reports shall identify discrepancies between

completed Work and the Contract Documents affecting the performance and longevity of the system.

### 3.04 GENERAL SCOPE OF WORK

- A. The general scope of Work shall include but not be limited to the following:
1. Measure airflow rates of HVAC systems and make adjustments to achieve design airflow rates, tabulate results, and submit reports.
  2. Measure water-flow rates of HVAC systems and make adjustments to achieve design water flow rates, tabulate results, and submit reports.
  3. Measure flow velocities, temperatures, static pressures or head, rotational speed, and electrical power demand of fans, pumps, and other related HVAC system components, tabulate results, and submit reports.
  4. Measure sound levels in each conditioned space, tabulate results, and submit reports.
  5. Measure ambient sound levels of outdoor HVAC units and system components such as chillers and cooling towers, tabulate results, and submit reports.
  6. Reports shall contain sufficient data for the system designer to evaluate system performance and solve installation problems such as system pressure profiles and pressure drops across system components

### 3.05 SPECIFIC SCOPE OF WORK

- A. The specific scope of Work shall include the following HVAC system components as indicated on the Drawings:

--

1. Air Handling Units.
2. Air Conditioning Units.
3. Heating and Ventilating Units.
4. Heating and Cooling Coils.
5. Supply, Return, Relief and Exhaust Fans.
6. Outside Air and Return Air Plenums.
7. Outside Air Intakes.
8. All Supply and Return Ductwork.
9. All associated Air Terminal Devices, i.e. Supply Diffusers, Return Registers, etc.
10. Mixing Boxes and Variable Air Volume (VAV) boxes.
11. Reheat Coils (Electric or Hot Water).
12. Exhaust Duct Systems.
13. Fire and Fire/Smoke Dampers.

14. Kitchen Hoods.
15. Heat Exchangers.
17. Chillers.
18. Cooling Towers.
19. Boilers.
20. Chilled water, heating hot water and cooling tower water pumps.

### 3.06 TESTING, ADJUSTING, AND BALANCING AGENDA

- A. Provide proposed materials, methods, procedures, forms, diagrams, and reports for test and balance Work.
- B. Agenda to be completed by the test and balance agency and submitted to ARCHITECT, PROJECT INSPECTOR, and OAR for review and approval.
- C. Agenda shall include one complete set of AABC, NEBB, or TABB publications listed in Sub-paragraph 3.02.B.2, applicable publications, or, in case of other test and balance agencies and or organizations, comparable publications to establish an approved, systematic, and uniform set of procedures.
- D. Agenda shall also include the following detailed narrative procedures, system diagrams, and forms for test results:
  1. Specific standard procedures required and proposed for each system of the Work.
  2. Specified test forms for recording each procedure and for recording sound and vibration measurements.
  3. Systems diagrams for each air, water, and steam system. Diagrams may be single line.
- E. In addition to information recorded for standard AABC, NEBB, or TABB procedures, the following information is required:
  1. Fan data.
  2. System number, location, manufacturer, model, and serial number.
  3. Fan wheel type and size.
  4. Motor horse power, type, and rpm.
  5. Sheave size, type, number of grooves, and open turns on Variable Pitch Sheave.
  6. Number and size of belts, motor and fan shaft sizes, center-to-center of shafts in inches, and adjustment available motor data, including nameplate data, actual amps, rated, and actual motor rpm, volts, phase, hp, kW, starter heater size, and capacity.
  7. Fan design airflow and service (supply, return, outdoor air or exhaust).
  8. Fan static pressure, suction/discharge, static profile, and static control point.
- F. The following traverse data is required:

1. Traverse location, size of duct (inside dimensions), and area of duct in square feet.
  2. Column for each hole traversed/lines for each reading.
  3. Barometric pressure.
  4. Temperature/Static pressure in the duct.
  5. Actual CFM corrected to SCFM.
  6. Notes.
- G. The following air distribution data is required:
1. Room identification.
  2. Outlet or intake balance sequence number.
  3. Size of outlet or inlet.
  4. AK Factor.
  5. Design and Actual FPM and CFM.
  6. Notes.
- H. The following hydronic coil data is required:
1. Air flow through the coil in CFM.
  2. Dry bulb and wet bulb temperatures entering/leaving coil.
  3. Enthalpy or total heat differences in BTU/pound.
  4. Capacity in BTU/hour at time of test.
  5. Water temperature and pressure entering/leaving coil.
  6. Flow (in GPM) through coil.
  7. Air pressure drop across coil.
  8. Water head drop across coil.
  9. Notes.
- I. The following DX coil data is required:
1. Air flow through the coil in CFM.
  2. Dry and wet bulb temperatures entering/leaving coil.
  3. Enthalpy or total heat difference across coil in BTU/ pound.
  4. Capacity in BTU/hour at time of test.
  5. Air pressure drop across coil.
  6. Notes.
- J. The following data is required for steam to water heat exchangers for heat and/or domestic generation:
1. Exchanger identification number.

2. Nameplate data; manufacturer, model, and serial number.
  3. Temperature entering/leaving unit.
  4. Flow through unit in GPM.
  5. Pressure drop through unit.
  6. Entering steam pressure.
  7. Notes.
- K. The following electric heating coil data is required:
1. Heating coil identification number.
  2. Nameplate data; manufacturer, model and serial number.
  3. Amperage/Voltage on each phase.
  4. Phase, kW, and Stages.
  5. Safety device installed.
  6. Air pressure drop across coil.
  7. Notes.
- L. The following water-cooled chiller data is required:
1. Identification number.
  2. Nameplate data; manufacturer, model and serial number.
  3. Chilled water flow through evaporator in GPM.
  4. Water temperature entering/leaving evaporator.
  5. Pressure drop through evaporator.
  6. Condenser water flow through.
  7. Pressure drop through condenser.
  8. Water temperature entering/leaving condenser.
  9. Motor data, amps, volts, rpm, starter type, overload protection type, phase, hertz, nameplate, and actual measured kW input.
  10. Type of refrigerant.
  11. Notes.
- M. The following cooling tower data is required:
1. Identification number.
  2. Nameplate data; manufacturer, model and serial number.
  3. Performance test results for rated capacity.
  4. Water flow through the tower in GPM.
  5. Water temperature entering/leaving tower.
  6. Outside Air dry and wet bulb temperatures.

7. Motor data, amps, volts, phase, hertz, and kW input.
  8. Starter size and type and heater size and capacity.
  9. Water droplets leaving tower - yes/no.
  10. Water balanced across tower pans and basins.
  11. Airflow across the tower within design rating according to fan curves.
  12. Notes.
- N. The following boiler and domestic water heater data is required:
1. Performance test results for rated capacity.
  2. Boiler identification number.
  3. Nameplate data; manufacturer, model, and serial number.
  4. Water temperature entering/leaving the boiler.
  5. Outside conditions: temperature, humidity, general cloud cover.
  6. Barometric pressure.
- O. The following air-cooled split system condensing unit data is required:
1. Performance test results for rated capacity.
  2. Unit identification number.
  3. Nameplate data, manufacturer, model, and serial number.
  4. Compressor nameplate and actual amps, volts, phase, and hertz.
  5. RPM of motors, where applicable.
  6. Refrigerant type.
  7. Suction/Discharge pressure when gage installed.
  8. Number of stages.
  9. Low-pressure/High-pressure control setting.
  10. Condenser fan sequence stages.
  11. Crankcase heater watts (nameplate).
  12. Hot gas bypass installed - yes/no.
  13. SCFM Air Flow Measurement vs. Design CFM.
- P. The following air-cooled split system heat pump data is required:
1. Performance test results for rated heating and cooling capacities.
  2. Unit identification number.
  3. Nameplate data, manufacturer, model, and serial number.
  4. Compressor nameplate and actual amps, volts, phase, and hertz.
  5. RPM of motors, where applicable.

6. Refrigerant type.
  7. Suction/Discharge pressure for both heating and cooling modes when gage installed.
  8. Number of stages.
  9. Low-pressure/High-pressure control setting.
  10. Condenser fan sequence stages.
  11. Crankcase heater watts (nameplate).
  12. Hot gas bypass installed - yes/no.
  13. SCFM Air Flow Measurement vs. Design CFM.
- Q. The following sound test data is required:
1. Area or location.
  2. Sound level in dB(A) as specified in Article 3.19.
  3. Sound level at the center band frequencies of eight non-weighted octaves with equipment on and off for 5 rooms selected by the OAR/PROJECT INSPECTOR.
  4. Plot of corrected sound-level reading on Noise Criteria (NC) curve for the measurements in Q 3 above.
- R. The following vibration test data is required:
1. Equipment identification number.
  2. Vibration levels at all accessible bearings, motors, fans, pumps, casings, and isolators.
  3. Measurements in mils deflection and velocity in inches per second.
  4. Each measurement taken in horizontal, vertical, and axial planes as accessible.
- S. The following mixing damper leakage test data is required:
1. Equipment identification number (unit, box, zone, etc.).
  2. Dry bulb temperature in the cold/hot (or bypass) deck.
  3. Dry bulb temperature in the mixed air stream.
  4. Calculated percent leakage.
  5. Data above taken in the full cool and full heat (or bypass) mode.
  6. Notes.
- T. The following airflow station data is required:
1. Station identification number.
  2. Nameplate data including effective area.
  3. Differential test pressure or velocity.
  4. Calculated CFM.



5. Actual CFM (from Pitot-tube traverse form).
  6. Read out CFM.
  7. Notes
- U. The following unit heater data is required:
1. Equipment identification number.
  2. Nameplate data; manufacturer, model, and serial number.
  3. Test CFM (use manufacturer rated CFM if not ducted).
  4. Heat test data per applicable procedure (hot water, electric, etc.).
  5. Notes.
- V. The following fan coil and unit ventilator data is required:
1. Equipment identification number.
  2. Nameplate data; manufacturer, model, and serial number.
  3. Tested supply CFM or manufacturer rated CFM if not ducted.
  4. Tested outside air in CFM.
  5. Motor data and actual amps and volts.
  6. Cooling/Heating test data.
  7. Static pressure.
  8. Notes.
- W. The following kitchen hood data is required:
1. Hood identification number.
  2. Nameplate data; manufacturer, model, and serial number.
  3. Pitot-tube traverse total air flow.
  4. Exhaust and supply (when part of hood) CFM.
  5. Exhaust and supply (when part of hood) test velocities shown on hood face diagram.
  6. Face velocities.
  7. Hood opening dimensions.
  8. Notes (turbulence and flow patterns at the face and inside the hood).
- X. The following laboratory hood data is required:
1. Hood identification number.
  2. Nameplate data; manufacturer, model, and serial number.
  3. Pitot-tube traverse total air flow.
  4. Exhaust and supply (when part of hood) CFM.

5. Exhaust and supply (when part of hood) test velocities shown on hood face diagram.
  6. Face velocities.
  7. Hood opening dimensions.
  8. Notes (turbulence and flow patterns at the face and inside the hood).
- Y The following data for water-to-water heat exchangers for domestic and/or heating is required:
1. Exchanger identification number.
  2. Nameplate data; manufacturer, model, and serial number.
  3. GPM and Pressure drop through each side.
  4. Capacity of each side.
  5. Notes.
- Z. The following pump data, including but not limited to, chilled water, heating hot water, cooling tower water, boiler feed, domestic hot water booster, domestic hot water circulation, sewage ejectors, sump pumps and domestic hot water booster is required:
1. Pump number.
  2. Nameplate data; manufacturer, model, and serial number.
  3. Motor data including nameplate data, actual amps, volts, RPM, horsepower, starter heater size, and capacity.
  4. Pump discharge and suction pressure along with total dynamic head in the following modes.
  5. Shut-off head FT, Wide open Head FT, and Final operating Head FT.
  6. Final GPM Test plotted on a pump curve.
  7. Notes.
- AA. The following water flow station data is required:
1. Station identification number.
  2. Nameplate data; manufacturer, model, and serial number.
  3. Design and actual GPM.
  4. Differential test pressure.
  5. Setting (open turns, degree, etc.) if required GPM.
  6. Notes.
- BB. The following terminal box data is required:
1. Box identification number.
  2. Node, address, or designation on system.
  3. Box size.

4. Cooling CFM.
5. Minimum CFM (if applicable).
6. Heating CFM (if applicable).
7. Box fan amps and volts (if applicable).
8. For DDC controlled boxes, record computer readout maximum, minimum, and heat, along with box correction factor for calibrating to true CFM.
9. Notes.

### 3.07 PROCEDURES

- A. Schedule the Work of this Section in order for test and balance activities to be completed prior to the date of Substantial Completion. CONTRACTOR shall place all heating, ventilating, and air conditioning equipment into operation during each day and until all HVAC adjusting, balancing, testing, demonstrations, and instructions on systems are completed. Agency shall prepare and submit reports within ten (10) days from completion of the Work of this Section to allow sufficient time for corrective measures to be completed before Substantial Completion of the Work. When an individual building or portion thereof is ready for occupancy, all equipment relative to such portion of Work shall be put into service, tested, and balanced.
- B. Prior to the date of Substantial Completion, and upon completion of test and balance Work, place all exhaust fans in operation, force all air handling units, and air conditioning units into a 100 percent outdoor air economizer mode with heating and cooling locked out and flush the building continuously for a period of fourteen (14) days.
- C. Coordinate test and balance procedures with any phased Project requirements so test and balance procedures on each phased portion of the Work will be completed prior to completion of said designated phase.

### 3.08 FIELD EXAMINATION

- A. Before the commencement of test and balance Work, CONTRACTOR shall ascertain that following conditions are fulfilled:
  1. Ensure that all water heating and water cooling systems have been flushed, cleaned, and filled and high points vented.
  2. Boilers (steam and hot water) are filled.
  3. Refrigerant systems are fully charged with specified refrigerant.
  4. Over-voltage and current protection have been provided for motors.
  5. Equipment has been labeled as required.
  6. Curves and descriptive data on each piece of equipment to be tested and adjusted are available as required.
  7. Operations and maintenance manuals have been supplied.
  8. Controls manufacturer and boiler-burner representatives shall be available for consultation and supervision of adjustments during tests.

9. Verify that heating and cooling coil fins are cleaned, combed and air filters clean, and installed.
  10. Verify that duct systems are clean of debris and leakage is minimized, access doors are closed and duct end caps are in place, and fire and volume dampers are in place and open.
  11. Automatic control systems are completed and operating.
  12. Start up and initial commissioning of all HVAC equipment except fans shall be by the manufacturer.
- B. In addition to the above, CONTRACTOR shall establish a specific, coordinated plan which details how each area of existing building will be balanced during the various phases of the Work. The evaluation shall address, at a minimum, the following concerns:
1. OWNER operations.
  2. Building safety and security policies. Prior to any fire safety or security systems shutdown at any time during the Work, CONTRACTOR shall first advise and coordinate with OWNER to ensure all concerned parties are notified.
  3. Protecting furniture, computers, photocopiers, and other office equipment.
  4. Protecting classroom fixtures and equipment.
  5. Concerns specific and unique to building related issues.
  6. Downtime required for each Air Handling Unit including projected time to return each portion of the building back to its normal occupancy temperature and humidity.
  7. Shutdown and reactivation of the fire alarm system to avoid accidental alarms during test and balance and related Work.

### 3.09 TEST AND BALANCE

- A. For each heating, ventilating, or air conditioning system the following shall be performed, recorded, and submitted in an approved format for review. Make, type, and model of unit, and location of each piece of equipment shall be included in the report. Readings shall include but not be limited to following:
1. Air Systems:
    - a. General
      - 1) Verify all ductwork, dampers, grilles, registers, and diffusers have been installed per design and set in the full open position. Agency shall perform the following TAB procedures in accordance with AABC or NEBB National Standards. Where the requirements of the two standards are different, the more stringent requirements shall prevail. Also, if the Contract Documents impose a more stringent standard then the Contract Documents shall prevail.
    - b. Zone, Branch, and Main Ducts:

- 1) Adjust ducts to within design CFM requirements by means of Pitot-tube duct traverse.
- c. Supply Fans:
- 1) Fan Speeds: Test and adjust fan RPM to achieve maximum or design CFM. CONTRACTOR shall provide new belt pulleys when required.
  - 2) Current and Voltage: Test and record motor voltage and amperage, and compare data with the nameplate limits. Ensure fan motor is not in or above the service factor as published by the motor manufacturer.
  - 3) Pitot-Tube Traverse: Perform a Pitot-tube traverse of main supply and return ducts, record total CFM.
  - 4) Outside Air: Test and adjust the outside air using Pitot-tube traverse.
  - 5) Static Pressure: Test and record system static profile of each supply fan.
  - 6) Current and Voltage: Test and record motor voltage and amperage, and compare data with the nameplate limits. Ensure fan motor is not in or above the service factor as published by the motor manufacturer.
- d. Return, Relief, and Exhaust Fans:
- 1) Fan Speeds: Test and adjust fan RPM to achieve maximum or design CFM. CONTRACTOR shall provide new belt pulleys where required.
  - 2) Pitot-Tube Traverse: Perform a Pitot-tube traverse of the main return ducts to obtain total CFM.
  3. Static Pressure: Test and record system static profile of each fan.
- e. VAV Systems:
- 1) Set volume regulators on all terminal boxes to meet design maximum and minimum CFM requirements.
  - 2) Identification: Identify the type, location, and size of each terminal box. This information shall be recorded on terminal box data sheets.
- f. Diffusers, Registers and Grilles:
- 1) Tolerances: Test and balance each diffuser, grille, and register to within 5 percent of design requirements.
  - 2) Identification: Identify the type, location, and size of each grille, diffuser, and register. This information shall be recorded on air outlet data sheets.

- g. Coils: Air Temperature: Once airflow is set to acceptable limits, agency shall take wet bulb and dry bulb air temperatures on the entering and leaving side of each cooling coil. Dry-bulb temperature shall be taken on the entering and leaving side of each heating coil.
- h. Duct Leakage Testing:
  - 1) On existing ductwork, agency shall calculate duct leakage by traversing the unit and reading associated diffusers.
  - 2) On new installations each and every section of the entire air distribution system (all supply, return, exhaust, and relief ductwork) shall be tested at 1.5 times design static pressure. All ducts shall demonstrate 5 percent leakage maximum (per CBC).
- i. Air Handling Units:
  - 1) Prepare pressure profile and show design and actual CFM (outside air, return air, and supply air).
  - 2) Measure and record each mode (minimum OA and 100 percent OA) where economizer cycle is specified.
  - 3) Record pressure drops of all components (coils, filters, sound attenuators, louvers, dampers, and fans) and compare with design values.
  - 4) Pressure profile and component pressure drops are performance indicators and are not to be used for flow measurements.
- j. System Pressure Profiles:
  - 1) Prepare pressure profiles from fan (supply, return, and exhaust) or air handling unit to extremities of system.
  - 2) As a minimum, show pressure at each floor, main branch, and airflow measuring device.
  - 3) Make pitot-tube traverses of all trunk lines and major branch lines where required for analysis of distribution system. Airflow measuring devices installed in ductwork, if available, may be utilized.
  - 4) Record residual pressures at inlets of volume controlled terminals at ends of system.
  - 5) Show actual pressures at all static pressure control points utilized for constant or variable flow systems.
- k. Fan speed adjustments and balancing for optimum acoustical performance:
  - 1) As the very first step, the speed of all fans (supply, return, and exhaust inside packaged equipment or air handling units) shall be adjusted to deliver the required fan total air quantity with all volume dampers and other flow rate control devices fully open. Adjustments shall be made with the outdoor air intake dampers,

return air dampers, and relief air dampers in the minimum outdoor air position. The adjustments shall be made again in the 100 percent outdoor air position in systems with 100 percent outdoor air economizers.

- 2) The above adjustment shall be done with wet cooling coils, where cooling coils are provided.
- 3) The airflow rates at each branch duct shall be adjusted as the second step with air with all volume dampers and other flow rate control devices fully open.
- 4) The airflow rates at each air inlet and outlet shall be adjusted as the final step. The volume damper in the branch duct shall be used for balancing. Opposed blade dampers at air inlets and outlets where provided shall only be used for fine adjustments and shall not be closed beyond 60 percent open or when the dampers start to generate audible noise.
- 5) CONTRACTOR shall provide the labor and materials for all dampers, pulleys, and belt changes required for balancing. The design documents indicate the worst-case scenario with safety factors in fan static pressures for contingency. Properly coordinated and installed air systems may require a lower static pressure and a reduction in fan speed.

2. Water Systems: CONTRACTOR shall confirm all equipment, piping, and coils have been filled and purged, strainers are clean, and all balancing valves (except bypass valves) are set full open. Agency shall perform the following TAB procedures in accordance with the AABC, TABB, or NEBB National Standards:

B. Pumps:

1. Test and adjust chilled water, hot water, and condenser water pumps to achieve maximum or design GPM.
2. Measure and record suction and discharge pressures.
3. Check pumps for proper operation. Pumps shall be free of vibration and cavitation.
4. Current and Voltage: Agency shall test and record motor voltage and amperage and compare data with the nameplate limits. Ensure pump motor is not in or above the service factor as published by the motor manufacturer.
5. Adjust pump flow by adjusting and setting balancing valves to obtain amperage reading on a clamp-on ammeter that corresponds to amperage indicated on pump's curves for required flow.
6. Verify that the motor is not drawing more current than indicated on motor plate rating. When actual flows of primary pumps are found by test to vary more than 5 percent from specified amount, system shall be re-balanced to regulate flow within this tolerance. When a flow indicating device(s) is in circuit, it shall be used to verify pump flows.

7. When testing is completed, a pump capacity chart with pump number and location indicated shall be marked indicating operating point of pump on the curve. Chart shall then be included in the report.
- C. Cooling Towers:
1. Test and balance water flows, balance tower cells, and flows between towers.
  2. Test and record temperature profiles for water and airside operation.
  3. Outside Climatic Conditions: Outside air dry bulb (DB) temperature, wet bulb (WB) temperature, and atmospheric conditions, during temperature profile runs.
- D. Chillers: (Start-up and initial commissioning by manufacturer only.)
1. Test and balance chiller water flows to achieve maximum or design GPM.
  2. Current and Voltage: Test and record motor voltage and amperage, and compare data with the nameplate limits. Ensure compressor motor is not in or above the service factor as published by the motor manufacturer.
  3. Test and record temperature and pressure profiles of chillers.
    - a. Inlet and outlet water temperature.
    - b. Inlet and outlet water pressure.
    - c. Evaporator temperature.
    - d. Condensing temperature pressure.
    - e. Purge pressure.
    - f. Oil temperature and pressure.
  4. Outside Climatic Conditions: Outside air DB temperature, WB temperature, and atmospheric conditions, during temperature profile runs.
- E. Boilers: (Start-up and initial commissioning by manufacturer only.) Test and balance boilers only after test and balance of pumps have been completed. Boilers shall not be initially operated or tests performed with students or faculty on the Project site. Boilers shall be tested for the following:
1. Heating Hot Water Boilers and Domestic Hot Water Boilers:
    - a. Current and Voltage: Test and record motor voltage and amperage, and compare data with the nameplate limits. Ensure motor is not in or above the service factor.
    - b. Test and balance water flow through water boilers.
    - c. Test and record temperature and pressure profiles of water and/or steam boilers.
    - d. Upon completion of tests, controls and devices shall be returned to their normal operating condition and boiler shall remain in service.
  2. Steam Boilers: Start-up and initial commissioning by manufacturer only.
- F. Heat Exchangers:



1. Steam to Hot Water Heat Exchanger: Steam pressure, entering and leaving hot water temperatures, gpm flow, pressure drop, and control set point.
  2. Water to Water Heat Exchanger:
    - a. Primary Heating Water: Entering and leaving hot water temperatures, gpm flow, and pressure drop.
    - b. Secondary Heated Water: Entering and leaving hot water temperatures, gpm flow, pressure drop, and control set point.
- G. Coils:
1. Tolerances: Test and balance all chilled-water and hot-water coils within 5 percent of design requirements.
  2. Verify the type, location, final pressure drop, and GPM of each coil.
- H. System Mains and Branches including chilled water, heating hot water, cooling tower water, domestic hot water and domestic cold water:
1. Balance water flow in pipes to achieve maximum or design GPM.
- I. Steam Heating Systems:
1. Heating Coils: Steam pressure at coils, cfm, coil pressure drop, entering and leaving air dry bulb temperatures.
  2. Boilers:
    - a. Steam pressure, temperature, and quantity of feed-water (see Testing and Adjusting procedures).
    - b. Make, type, serial number, and rated capacity.
    - c. Flue gas temperature at boiler outlet ahead of back-draft diverter.
    - d. Percent carbon dioxide in flue gas.
    - e. Condensate quantities and temperatures.
  3. Air Conditioning Units: (Start-up and initial commissioning by manufacturer only.)
    - a. Suction pressure and temperature.
    - b. Discharge pressure and temperature.
    - c. Amps and volts.
    - d. Make, type, and model of unit, capacity rating.
    - e. Ambient temperature: WB, DB.
    - f. Supply, return, relief, and exhaust fans shall be balanced as indicated in Section 3.09, A, 1, Air Systems.
    - g. Proper operation of controls: Temperature controllers and safety devices shall be tested during operating tests, with all other controls and devices, except one under test, being by-passed.

- h. Upon completion of tests, controls and devices shall be returned to their normal operating condition and boiler shall remain in service.
4. Condensing and Refrigerating Units: (Start-up and initial commissioning by manufacturer only.)
- a. Suction pressure and temperature.
  - b. Discharge pressure and temperature.
  - c. Amps and volts.
  - d. Make, type, and model of unit, capacity rating.
  - e. Ambient temperature: WB, DB.
  - f. Proper operation of controls: Temperature controllers and safety devices shall be tested during operating tests, with all other controls and devices, except one under test, being by-passed.
  - g. Upon completion of tests, controls and devices shall be returned to their normal operating condition and boiler shall remain in service.
5. Split System Heat Pump Units: (Start-up and initial commissioning by manufacturer only.)
- a. Suction pressure and temperature.
  - b. Discharge pressure and temperature.
  - c. Amps and volts.
  - d. Make, type, and model of unit, capacity rating.
  - e. Ambient temperature: WB, DB.
  - f. Supply, return, relief and exhaust fans shall be balanced as indicated in Sub-paragraph 3.09.A.1, Air Systems.
  - g. Proper operation of controls: Temperature controllers and safety devices shall be tested during operating tests, with all other controls and devices, (except one under test) being by-passed.
  - h. Upon completion of tests, controls and devices shall be returned to their normal operating condition and boiler shall remain in service.
6. MISCELLANEOUS:
- a. Electric Heaters:
    - 1. Amperage.
    - 2. Voltage.
    - 3. Make, type, model, and name plate capacity rating.

### 3.10 VERIFICATION OF HVAC CONTROLS

- A. Agency shall verify in conjunction with CONTRACTOR all control components are installed in accordance with the intent of the Contract Documents and are functioning

according to the design intent, including all electrical interlocks, damper sequences, air and water resets, fire stats, and other safety devices.

- B. CONTRACTOR shall verify all control components are calibrated and set for design operating conditions and intent.

### 3.11 TEMPERATURE TESTING

- A. To verify system control and operation, agency shall perform a series of three temperature tests taken at approximately two hour intervals in each separately controlled zone. The resulting temperatures shall not vary more than two degrees Fahrenheit from the thermostat or control set point during the tests. Outside temperature and humidity shall also be recorded during the testing periods.

### 3.12 KITCHEN HOOD TESTING

- A. Agency shall test and adjust hood total airflow by duct Pitot-tube traverse. If a Pitot-tube traverse is not practical, an explanation of why a traverse was not made must be made in writing to Architect and subsequently appear on the appropriate data sheet. Face velocities shall be tested under design operating conditions using a maximum of a one square foot grid pattern across the entire open face. CONTRACTOR shall set sash height on hoods to obtain face velocities within 20 percent of 100 feet per minute unless specified otherwise. Agency shall test and adjust exhaust airflows and make-up air flows to maintain design hood pressures and face velocities and design room pressurization. Agency shall test for turbulence and proper air flow patterns at the face and inside the hoods using a hand-held smoke puffer or other approved smoke-emitting device.

### 3.13 FUME HOOD TESTING

- A. Agency shall test and adjust fume hood total airflow by duct Pitot-tube traverse. If a Pitot-tube traverse is not practical, an explanation of why a traverse was not made must be made in writing to Architect and subsequently appear on the appropriate data sheet. Face velocities shall be tested under design operating conditions using a maximum of a one square foot grid pattern across the entire open face. CONTRACTOR shall set sash height on hoods to obtain face velocities within 20 percent of 100 feet per minute unless specified otherwise. Agency shall test and adjust VAV controllers to obtain design exhaust airflows and make-up air flows to maintain design hood pressures and face velocities and design room pressurization. Agency shall test for turbulence and proper air flow patterns at the face and inside the hoods using a hand-held smoke puffer or other approved smoke-emitting device.

### 3.14 BUILDING/ZONE PRESSURIZATION

- A. Agency shall test and adjust building/zone pressurization by setting the design flows to meet the required flow direction and pressure differentials. Positive/Negative area(s) supply air shall be set to design flow and exhaust air rates adjusted to obtain the required pressure differential(s).

### 3.15 FIRE AND SMOKE DAMPER TESTING

- A. This work is to be performed by OWNER and State Fire Marshall. Do not include in agency scope of work.

### 3.16 LIFE SAFETY CONTROLS TESTING

- A. This work is to be performed by OWNER and State Fire Marshall. Do not include in agency scope of Work.

### 3.17 FINAL TABULATION

- A. After heating, ventilating, and air conditioning components are satisfactorily tested and balanced, entire system shall be put into operation and all pressures, temperatures, gpm, cfm, velocities, etc., shall be recorded and checked against design schedules. Design requirements shall be listed on reports and final tabulation shall be within a tolerance of plus or minus five percent of design requirements.
- B. Readings at various locations as described herein will be made every hour for four (4) hours, during normal working hours for three (3) days. Boilers, forced air furnaces, and chillers shall be started up far enough in advance to meet design conditions during period of testing.

### 3.18 VIBRATION TESTING

- A. Furnish instruments and perform vibration measurements if specified in Division 23. Provide measurements for all rotating HVAC equipment half horsepower and larger, including reciprocating/centrifugal/screw/scroll compressors, pumps, fans, and motors.
- B. Record initial and final measurements for each unit of equipment on test forms. Where vibration readings exceed allowable tolerance and efforts to make corrections have proved unsuccessful, forward a separate report to ARCHITECT.

### 3.19 SOUND TESTING

- A. Perform and record sound measurements as specified in this Section and in Section 23 0548: HVAC Sound, Vibration and Seismic Control. Take additional readings if required by ARCHITECT.
- B. Measuring equipment and methods shall comply with the current requirements of the AABC, NEBB, TABB and ANSI S12.60. Take measurements with a calibrated Type 1 sound level meter and octave band analyzer.
- C. Sound reference levels, formulae, and coefficients shall be according to ASHRAE Handbook: HVAC Applications, Chapter on Sound and Vibration Control.
- D. Where sound pressure levels are specified as noise criteria or room criteria in Section 23 0548: HVAC Sound, Vibration and Seismic Control determine compliance with the Contract Documents as follows:
1. Reduce background noise as much as possible by shutting off unrelated audible equipment.
  2. Measure octave band sound pressure levels with specified equipment "off".
  3. Measure octave band sound pressure levels with specified equipment "on".
  4. Use difference in corresponding readings to determine sound pressure due to equipment. Sound pressure level, due to equipment equals sound pressure level with equipment "on" minus factor.

DIFF.:	0	1	2	3	4	5	9-10 or More
FACTOR:	10	7	4	3	2	1	0

5. Plot octave bands of sound pressure level due to equipment for typical rooms, on a graph, which also shows, noise criteria (NC) curves.
- E. Where sound levels are required in dbA, measure sound levels using the A-frequency-weighting of meter. Single value readings will be used instead of octave band analysis.
- F. Measure sound levels at each octave band as NC or RC (room criteria) if indicated in the Drawings or other Spec Sections. Where measured sound levels exceed specified level, CONTRACTOR shall take all remedial action and necessary sound tests shall be repeated. Sound tests after remedial action shall be in octave band in NC or RC for the room and also at each diffuser, grille, or register in occupied areas. Sound levels shall be measured approximately five feet above floor on a line approximately 45 degrees to center of opening, on the A- and C-frequency-weighting of the measuring instrument.
- G. Measure and record sound levels in decibels for each room per current ANSI S12.60.
- H. Report shall include ambient sound levels, taken without air-handling equipment operating, of rooms in which above openings are located. A report shall also be made of any noise caused by mechanical vibration.

END OF SECTION

SECTION 01 5000  
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

## PART 1 - GENERAL

## 1.01 SECTION INCLUDES

- A. Temporary utilities, construction facilities and temporary controls to be provided, maintained, relocated, and removed by CONTRACTOR.
- B. Temporary office furnishings and office equipment.
- C. Project signage.

## 1.02 QUALITY ASSURANCE

- A. CONTRACTOR shall comply with applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
  - 1. Building Code requirements.
  - 2. Division of the State Architect.
  - 3. Health and safety regulations.
  - 4. Utility company regulations.
  - 5. Police, fire department and rescue squad requirements.
  - 6. Environmental protection regulations.
- B. CONTRACTOR shall arrange for the inspection and testing of each temporary utility prior to use. Obtain required certifications and permits and transmit to OAR.
- C. CONTRACTOR provided facilities are to be in place and available for OWNER use and occupancy within (Insert Number of Days) calendar days following the date of issue of the Notice to Proceed and shall remain in place and available for OWNER use and occupancy throughout the full term of the Contract.

## 1.03 SUBMITTALS

- A. Temporary Utilities: Submit to OAR reports of tests, inspections, meter readings, certifications, permits and similar procedures performed on temporary utilities.
- B. Project Signage / Banner: Submit to OAR for review and approval.
  - 1. Shop Drawings: Elevation showing the text, OWNER sign and color of project signage, jointing, fittings and location of grommets.
  - 2. Certification: Submit certification attesting fabric is certified as flame retardant, in accordance to NFPA 701, Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

## 1.04 PROJECT IDENTIFICATION SIGNAGE AND BANNERS

- A. Provide the following project identification information:

1. “Your School Bond Funds at Work”.
2. “Providing Safe, Updated, and New School Facilities for 21st Century Learning”.
3. “Construction Anticipated to Start in XXXX”.
4. \$XXX Million Investment.
5. “Creates an Estimated XXX Jobs.
6. Name of LAUSD School Superintendent.
7. Alphabetical listing of Board of Education Members.
8. Name of the Architect/Engineer.
9. Name of CONTRACTOR.
10. Name of DESIGN-BUILD TEAM.

B. Project Sign:

1. CONTRACTOR shall furnish and install [ ] Project Signs on the Project site at a location established by OAR. For graphical layout refer to Appendix A. OAR will provide the information to be posted on the sign. A draft of the proposed sign shall be submitted to OAR for review and approval before fabrication.
2. Sign shall be direct printed on an aluminum sheet 0.08 thick, adhered to a 3/4 inch thick exterior grade plywood. Electronic file of graphic shall have a minimum resolution of 150 dpi at two feet by four feet. Provide posts, bracing and perimeter framing with intermediate backing not to exceed two feet on center. Size: eight feet wide by four feet high. Size of building rendering shall be approximately six feet wide by three feet high.

C. Banners:

1. CONTRACTOR shall furnish and install [ ] Banners on the Project site at a location established by OAR. For graphical layout refer to Appendix A. OAR will provide the information to be posted on the sign. A draft of the proposed sign shall be submitted to OAR for review and approval before fabrication.
2. Products of the following manufacturers form the basis for design and quality intended: 3M, MACtac North America, or equal, and shall meet the following requirements:
  - a. Flame retardant, heavy duty durable vinyl material, super smooth, minimum 16 ounces per layer.
  - b. Banners shall be cut with accurate angles and straight edges. Edges of banner shall be heat welded on four sides without causing fabric separation or otherwise damaging the work.
  - c. Banners shall have on both sides a clear, permanent, anti-graffiti coating that shall be durable and last a minimum of two years.

Cleaning or removal of graffiti shall not cause damage to the anti-graffiti coating or image, or cause it to flake, yellow, bubble, peel or fade.

- d. Ink used in the printing process shall be of the highest quality OEM inks and have integral UV protective components.
  - e. Banners shall be provided with ½ inch diameter grommets along the top and the bottom edges, spaced not more than 30 inches on center. Grommets shall be 4 inches, minimum, from the edges of the banner. Tie wire to fence / barricade.
- D. No other signs shall be displayed without approval of OAR. At CONTRACTOR'S expense and without limitation remove and/or relocate Project signage and related facilities as rapidly as required in order to provide for progress of the Work.
  - E. CONTRACTOR shall remove Project Identification Signage at Substantial Completion of the Work.

#### 1.05 TEMPORARY UTILITIES

- A. CONTRACTOR shall coordinate with the appropriate utility company to install temporary services. Where the utility company provides only partial service, CONTRACTOR shall provide and install the remainder with matching compatible materials and equipment.
- B. CONTRACTOR shall furnish, install and pay for all necessary permits, inspections, move ins/out, temporary lines, connections and fees, extensions and distribution, metering devices and use charges, deliveries/pickups, rentals, storage, transportation, taxes, labor, insurance, bonds, material, equipment and all other miscellaneous items for the temporary utility systems. CONTRACTOR shall pay to utility companies for the consumption of the following temporary utility services:
  - 1. Temporary Water service.
  - 2. Temporary Electrical service.
  - 3. Temporary Gas service.
  - 4. Temporary Telephone and Data.
- C. Maintain, extend and/or relocate temporary utility systems as rapidly as required in order to provide for progress of the Work.
  - 1. Water distribution piping and outlet devices shall be of the size and required flow rates in order to provide service to all areas of the Project site.
  - 2. Furnish, install, maintain, extend and distribute temporary electric area distribution boxes, so located that individual trades can obtain adequate power and artificial lighting, at all points required for the Work, for inspection and for safety.
    - a. Provide 20 foot candles minimum lighting levels inside building(s) and 5 foot candles outside for safety and security.



- b. Ensure welding equipment is supplied by electrical generators.
- 3. Provide temporary Heating, Ventilation and Air Conditioning. OWNER will not accept utilization of the permanent HVAC system for temporary HVAC until Substantial Completion. CONTRACTOR shall maintain manufacturer required levels of room and/or space temperature, humidity and ventilation necessary to install products, materials and/or systems, cure materials, disperse humidity, remove fumes, and prevent accumulation of dust, irritants, or gases.
- 4. Provide temporary phone, data service and distribution to Project site temporary offices.
- D. Upon Substantial Completion of the Work, remove temporary systems, devices and appurtenances.

#### 1.06 TEMPORARY OFFICES

- A. CONTRACTOR shall provide Project Site temporary office facilities for his own use, and in addition shall provide and maintain a minimum of one **{insert trailer size} {new}** construction trailer on the Project site for use by OWNER for the duration of the Work. Construction trailer shall be accessible by OWNER and/or INSPECTOR on a 7 day a week 24-hour basis. CONTRACTOR shall provide the necessary materials and labor to provide the trailer with access for disabled persons on request by the OAR. Trailer shall include, at a minimum, the following:
  - 1. Conference room with a table and adequate seating for twelve.
  - 2. One bathroom.
  - 3. An open work area with devising partitions as required by OWNER.
  - 4. Two enclosed, separate offices with windows and lockable doors.
- B. Trailer shall be furnished with two exterior entrance doors with one located in a separate office. Each door shall be furnished with 'Smart Key' technology on both the dead bolt and cylinder lock. Provide six keys for each locking device. Exterior doors and windows shall be provided with exterior mounted burglar bars. Windows shall be provided with operable window shades. Security of trailer and contents is a continuous obligation of CONTRACTOR and shall be equipped with local sounding security system.
- C. Trailer shall have ample headroom, 8-foot minimum, and shall be lighted, heated, ventilated, and air-conditioned. Provide an electrically chilled bottled water fountain of 5-gallon capacity. Purified water shall be supplied in 5-gallon containers, delivered weekly, with four spares on hand after each re-supply visit. As an option, CONTRACTOR may maintain a minimum of two 24 500ml bottles cases of purified water in owner trailer throughout the duration of the project.
- D. The separate offices shall each be approximately 120 square feet in size and shall be furnished with a minimum of four 120 volt single phase convenience outlets with one 4' long multi-outlet power strip (such as Legrand Model #PM48C) at each outlet location as well as one telephone jack and one data/LAN outlet. The

conference room shall be approximately 200 square feet in size and shall be furnished with a minimum of eight 120 Volt single phase convenience outlets with one telephone jack and one data/LAN outlet.

- E. CONTRACTOR shall coordinate floor plan and location of electrical, telephone, data outlets with OAR prior to ordering and delivering the trailer.
- F. At CONTRACTOR'S expense and without limitation remove and/or relocate temporary office(s) and related facilities as rapidly as required in order to provide for progress of the Work.
- G. CONTRACTOR shall remove waste bin trash from OAR'S trailer, vacuum OAR'S trailer floors and/or mop OAR'S trailer floors once per week. Provide trailer with bathroom paper goods, soap, broom, mop and doormats.
- H. Trailer shall remain property of CONTRACTOR. CONTRACTOR shall remove such property upon Substantial Completion of Work or as otherwise determined in writing by OAR.

#### 1.07 FURNISHINGS

- A. CONTRACTOR shall provide **{new}** furnishings in the following quantities, shall set in rooms and shall position as directed by OAR upon delivery:
  1. **{Insert quantity}** rolling mid-back task chairs, with arms, Allseating Inertia Mesh Back Basic Synchro Tilt 77089-T2-FM-NSBL-LH-BKN-OG17 Gray Mesh, Gray Matters Enviroleather, warranty 24/7 lifetime, or equal, shall be provided new and shall remain as OWNER's property.
  2. **{Insert quantity}** padded meeting chairs, Allseating 77054-NA-GM-FM-NGRY-FV-ARIVR, Gray Matters Enviroleather, warranty 24/7 lifetime, or equal shall be provided new and shall remain as OWNER's property.
  3. **{Insert quantity}** desks, 30 by 66 by 30 inches: Haworth Adaptables WURA-3066-LJSC H-AE Graphite worksurface, Haworth Reside Adjustable Hoop Leg ZKH2-3000-PNFD TR-J Graphite (2 per desk), Haworth X Series Pedestal JPMH-24-SJ B/B/F TR-J Graphite (2 per desk), lifetime warranty, or equal, shall be provided new and shall remain as OWNER's property.
  4. **{Insert quantity}** metal bookcases, three shelf, 41 by 34 by 12 inches; HON Brigade or equal (Similar to Staples Cat.# 793638; Item: 1598509/ Model: HS42ABCL).
  5. **{Insert quantity}** resin folding tables, 29 by 30 by 72 National Public Seating BT3072, 10 year warranty, or equal, shall be provided new and shall remain as OWNER's property.
  6. **{Insert quantity}** four drawer, legal size lateral filing cabinet. HON 500 series or equal. (Similar to Staples Item: 342892/Model: HON584L).
  7. **{Insert quantity}** four drawer, legal size lateral filing cabinet. HON 320 series or equal. (Similar to Staples Item: 904583/Model: HH324CPP).

8. **{Insert quantity}** five (5) shelf storage/supply cabinet of approximately 78-inch high by 36-inch wide by 24-inch deep, furnished with locking doors, Sandusky or equal. (Similar to Staples Cat. # 880049/Model: SA4R362478-07).
  9. Provide and install **{insert quantity}** “Plan-Hold” wall-mounted 42-inch wide plan racks with 36 individual plan holders each.
  10. Provide and install **{insert quantity}** large white board in one conference room, 48 by 72 inches, Quartet melamine dry-erase board or equal. (Similar to Staples Cat. # 789834/Model: S538).
  11. Provide and install **{insert quantity}** large tack board in the other conference room, 48 by 72 inches, Quartet cork bulletin board or equal. (Similar to Staples Cat. # 789842/Model: QRT2308).
  12. Provide and install **{insert quantity}** combination tack/white boards, 36 by 48 inches, one in each office, Quartet or equal. (Similar to Staples Cat. # 518886/Model: S554).
- B. Unless otherwise noted in this Section, furniture shall remain property of CONTRACTOR. CONTRACTOR shall remove such property upon Substantial Completion of Work or as otherwise determined in writing by OAR.

#### 1.08 TELEPHONE & DATA AND TRANSMISSION LINES

- A. Provide LAN and phone connectivity to all equipment specified below from the point of connection (POC) to equipment, including, but not limited to all cabling, jacks, patch panel, and patch cables as required to connect all of the equipment listed in this section to the LAN. Cabling shall be CAT 6 or better.
- B. Provide **{Quantity}** separate phone lines, one dedicated fax line and **{Quantity}** phone instruments each with speakerphone, intercom, conference call, flash, redial, call hold and voice mail. Each phone instruments shall have a 4-line or more capacity/selectivity. Provide supporting terminal blocks and any required switch, router, power supplies, and amplifiers.
- C. Provide business class Broadband data service. Broadband data service is defined as a minimum of 25 Mbps download.
- D. Provide, install, and maintain the following specified equipment:
  1. Cisco ISR 4331 capable of providing wireless Internet access. Smartnet will be provided for the entirety of the project to cover the networking equipment.
  2. Cisco Small Business unmanaged switch with enough capacity to provide a wired Ethernet connection to each device in the office capable of using one.
- E. Provide, install, configure and maintain **{Quantity}** laptop docking station.
- F. Printer/Copier/Scanner/Fax: Provide, install, configure and maintain for network connectivity one HP LaserJet MFP M880z+ (or latest HP equivalent model at time of bid) with the following features and accessories:

1. B/W and Color.
  2. Speed:
    - a. Copy: 46 ppm.
    - b. Scan: 70 ppm.
    - c. Print: 46 ppm.
  3. Network capable.
  4. Finisher with collation and one position stapling (minimum A2W80A HP LaserJet Stapler/Stacker).
  5. Three paper trays integral with the equipment including 8 ½ by 11, 8 ½ by 14 and 11 by 17.
  6. Additional 3500 sheet paper feed pedestal or drawer.
  7. 2 GB Image Memory, 160 GB hard disk drive.
  8. 600 by 600 dpi.
  9. Zoom, Reduction and enlargement from 25 percent to 400 percent.
  10. Embedded Print Controller with minimum 166 Mhz processor and 10/100 BaseT Network Interface Card.
  11. 1Fax specifications: See standard for MFP model.
  12. Maintenance: CONTRACTOR shall repair and service machine as necessary. Repair calls shall be responded to within 24 hours of placement.
  13. Supplies: CONTRACTOR shall provide THE FOLLOWING:
    - a. All toner supplies and consumables, including enough supplies to maintain two spares of each color toner.
    - b. All staples and other printer-related consumables, including enough supplies to maintain one spare staple cartridge.
- G. CONTRACTOR shall be responsible for maintaining all transmission lines, equipment and related devices. If equipment and/or transmission equipment becomes inoperable and downtime exceeds two days, CONTRACTOR shall replace and/or provide equivalent interim equipment.
- H. CONTRACTOR shall employ an experienced and qualified MCSE certified Network Administrator, who shall be responsible to set up and service the LAN equipment and appurtenances provided in OWNER trailer, so as to maintain the equipment in continuous operation. Service response shall be within one day of incident.
- I. Electronic/office equipment shall be new at the commencement of the project.

#### 1.09 TEMPORARY STORAGE UNITS

- A. CONTRACTOR shall provide secure and waterproof storage units for the temporary storage of furniture, equipment and other items requiring protection.

- B. Walls, roof and doors shall be a minimum of 16-gauge steel with floors of 1 inch tongue and groove hardwood or  $\frac{3}{4}$  inch minimum exterior type plywood. The undercarriage shall be designed to accommodate forklift blades 42-inch to 60-inch long. There shall be doublewide swing out lockable doors at one end equipped with waterproof gaskets.
- C. CONTRACTOR shall be responsible for delivery charges and will install the storage unit in an appropriate area.
- D. CONTRACTOR shall remove the storage unit from the Project site when the storage unit is no longer required for the Work or upon Substantial Completion of the Work.
- E. CONTRACTOR shall at their expense and without limitation remove and/ or relocate storage units as rapidly as required in order to provide for progress of the Work.

#### 1.10 TEMPORARY SANITARY FACILITIES

- A. CONTRACTOR shall provide portable chemical toilet facilities. Quantity of portable chemical toilet facilities shall be based on total number of workers and shall be in accordance with CAL/OSHA standards.
- B. Portable chemical toilet facilities shall be maintained with adequate supplies and in a clean and sanitary condition and shall be removed from the Project site upon Substantial Completion of the Work. CONTRACTOR shall keep both OWNER chemical toilet facilities and OWNER trailer restroom clean and operational at all times.
- C. CONTRACTOR employees shall not use school toilet facilities.
- D. At CONTRACTOR'S expense and without limitation remove and/or relocate portable chemical toilet facilities as rapidly as required in order to provide for progress of the Work.
- E. CONTRACTOR will contain their breaks and lunch periods to the areas designated by OAR or any public area outside the Project site. CONTRACTOR shall provide a suitable container within the break/lunch area for the placement of trash. Areas used for break/lunch must be maintained clean and orderly. Once finish flooring has been installed in a particular area, no food or beverages will be permitted in that area.

#### 1.11 TEMPORARY SECURITY FENCE / BARRICADE

- A. CONTRACTOR shall install temporary Project site security barricade(s) indicated on Drawings or as required for safety and as specified herein. New or used material may be furnished. Security of Project site and contents is a continuous obligation of CONTRACTOR.
- B. Unless otherwise indicated or specified, security fence shall be constructed of 8-foot high chain link fencing with an 8-foot high windscreen. Space posts not to exceed ten feet on centers. Posts shall be of following nominal pipe dimensions: terminal, corner, and gatepost 2  $\frac{1}{2}$ -inch, line posts 2-inch. Chain link fence shall

be not less than #13 gauge, 2-inch mesh, and in one width. Posts, fence and accessories shall be galvanized and as follows:

1. Shall be set in the earth a depth of 24-inch with soil firmly compacted around post, unless required otherwise in writing by OAR.
2. Fence fabric shall be attached to posts with #14 gauge tie wire at 16 inches on center. A #6 gauge steel tension wire with turnbuckles shall be installed at top and bottom of barricade fencing. Wire tie fabric to tension wires at 18" centers.
3. Windscreen shall be attached to fence fabric and steel tension wires at 18-inch centers with a minimum of #14 gauge tie wire. Windscreen shall be maintained and all rips, tears, missing sections shall be corrected upon notification by OAR.
4. Chain link fencing shall be free from barbs, icicles or other projections resulting from galvanizing process. Fence having such defects will be replaced even if it has been installed.
5. Gates shall be fabricated of steel pipe with welded corners, and bracing as required. Fence and fabric to be attached to frame at 12-inch centers. Provide all gate hardware of a strength and quality to perform satisfactorily until barricade is removed upon Substantial Completion of the Work. Each gate shall have a chain and padlock. Provide two gate keys to OAR. At Substantial Completion of the Work, remove barricade from Project site, backfill and compact fence footing holes. Existing surface paving that is cut into or removed shall be patched and sealed to match surrounding areas.
6. At CONTRACTOR'S expense and without limitation remove or relocate fencing, fabric and barricades or other security and protection facilities as rapidly as required in order to provide for progress of the Work.

#### 1.12 OTHER TEMPORARY ENCLOSURES AND BARRICADES

- A. Provide lockable, temporary weather-tight enclosures at openings in exterior walls to create acceptable working conditions, to allow for temporary heating and for security.
- B. Provide protective barriers around trees, plants and other improvements designated to remain.
- C. Temporary partitions shall be installed at all openings where additions connect to existing buildings, and where to protect areas, spaces, property, personnel, students and faculty and to separate and control dust, debris, noise, access, sight, fire areas, safety and security. Temporary partitions shall be as designated on the Drawings or as specified by ARCHITECT. At CONTRACTOR'S expense and without limitation remove and/or relocate enclosures, barriers and temporary partitions as rapidly as required in order to provide for progress of the Work.
- D. Since the Work of this Project may be immediately adjacent to existing occupied structures and vehicular and pedestrian right of ways, CONTRACTOR shall, in his sole judgment and in accordance with applicable safety standards, provide

temporary facilities, additional barricades, protection and care to protect existing structures, occupants, property, pedestrians and vehicular traffic. CONTRACTOR is responsible for any damage, which may occur to the property and occupants of the property of OWNER or adjacent private or public properties which in any way results from the acts or neglect of CONTRACTOR.

- E. CONTRACTOR shall be responsible for cleaning up all areas adjacent to the construction site which have been affected by the construction; and for restoring them to at least their original condition- including landscaping; planting of trees, sod, and shrubs damaged by construction; and raking and disposal of debris such as roofing shingles, paper, nails, glass sheet metal, bricks, and waste concrete. Construction debris shall be removed and properly disposed of. Culverts and drainage ditches with sediment from the construction area shall be cleared routinely to maintain proper drainage and re-cleaned prior to completion of the contract.
- F. CONTRACTOR shall ensure sediment does not block storm drains. CONTRACTOR shall be responsible for cleaning storm drains blocked due to erosion or sediment from the work area.

#### 1.13 TEMPORARY STORAGE YARDS

- A. CONTRACTOR shall fence and maintain storage yards in an orderly manner.
- B. Provide storage units for materials that cannot be stored outside.
- C. At CONTRACTOR'S expense and without limitation remove and/or relocate storage yards and units as rapidly as required in order to provide for progress of the Work.

#### 1.14 TEMPORARY DE-WATERING FACILITIES AND DRAINAGE

- A. For temporary drainage and de-watering facilities and operations not directly associated with construction activities included under individual sections, comply with de-watering requirements of applicable Division 01 sections. CONTRACTOR shall maintain the Work, Project site and related areas free of water.
- B. For temporary drainage and de-watering facilities and operations directly associated with new buildings, additions or other construction activities, comply with Divisions 01 and 33 Sections. CONTRACTOR shall be responsible for, but not limited to, de-watering of excavations, trenches and below grade areas of buildings, structures, the Project site and related areas.

#### 1.15 TEMPORARY PROTECTION FACILITIES INSTALLATION

- A. CONTRACTOR shall not change over from using temporary facilities and controls to permanent facilities until Substantial Completion, except as permitted by OAR.
- B. Until permanent fire protection needs are supplied and approved by authorities having jurisdiction, CONTRACTOR shall provide, install and maintain temporary fire protection facilities of the types needed in order to adequately protect against fire loss. CONTRACTOR shall adequately supervise welding operations, combustion type temporary heating and similar sources of fire ignition.

- C. CONTRACTOR shall provide, install and maintain substantial temporary enclosures of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security. Where materials, tools and equipment are stored within the Work area, CONTRACTOR shall provide secure lock up to protect against vandalism, theft and similar violations of security. OWNER accepts no financial responsibility for loss, damage, vandalism or theft.
- D. CONTRACTOR operations shall not block, hinder, impede or otherwise inhibit the use of required exits and/or emergency exits to the public way, except as approved by OAR. CONTRACTOR shall maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for firefighting equipment and/or personnel.
- E. With approval of OAR and at the earliest feasible date in each area of the Work, complete installation of the permanent fire protection facilities including connected services and place into operation and use. Instruct OWNER personnel in use of permanent fire protection facilities.
- F. In the event of an emergency drill or an actual emergency, designated by the sounding of the fire alarm and/or other sounding device, all construction activities must cease. CONTRACTOR shall evacuate the Work area and remain outside the Work area until permitted to return. No Work shall be conducted during the evacuation of a building or during an emergency.

#### 1.16 TEMPORARY SECURITY AND SAFETY MEASURES

- A. During performance of the Work in existing facilities and/or on a Project Site occupied by students, CONTRACTOR shall provide, install and maintain substantial temporary barriers and/or partitions separating all Work areas from areas occupied by students, faculty and/or administrative staff.
- B. During performance of the Work in existing facilities or on a Project site occupied by students and where temporary barriers or partitions are not physically feasible, CONTRACTOR shall provide an employee meeting the requirements of Education Code Section 45125.2.(2) to continually supervise and monitor all employees of CONTRACTOR and Subcontractor. For the purposes of this Section, CONTRACTOR employee shall be someone whom the Department of Justice has ascertained has not been convicted of a violent or serious felony as listed in Penal Code Section 667.5(c) and/or Penal Code Section 1192.7(c). To comply with this Section, CONTRACTOR shall have his employee submit his or her fingerprints to the Department of Justice pursuant to Education Code Section 45125.1(a).
- C. Penal Code Sections 290 and 290.4 commonly known as “Megan’s Law”, require, among other things, individuals convicted of sexually oriented crimes, to register with the chief of police where the convicted individual resides or with a county sheriff or other law enforcement officials. CONTRACTOR shall check its own employees and require each Subcontractor to check its employees and report to CONTRACTOR if any such employees are registered sex offenders. CONTRACTOR shall check monthly during the life of the Contract to ascertain this information and report same to OAR. Before starting the Work, and monthly



thereafter during the life of Contract, CONTRACTOR shall notify OWNER in writing if any of its employees and/or if any Subcontractor's employees is a registered sex offender. If so, CONTRACTOR shall proceed in accordance with paragraph B above.

- D. CONTRACTOR shall employ and maintain sufficient security and safety measures to effectively prevent vandalism, vagrancy, theft, arson, and all other such negative impacts to the Work. Any impacts to the progress of the Work of CONTRACTOR, OWNER, or OWNER'S forces, due to loss from inadequate security, will be the responsibility of CONTRACTOR.
- E. Until Substantial Completion of the Work, CONTRACTOR shall employ appropriate means to remove all graffiti from buildings, equipment, fences and all other temporary and/or permanent improvements on the Project site within twenty-four (24) hours from the date of report or forty-eight (48) hours of each occurrence.

#### 1.17 TEMPORARY ACCESS ROADS AND STAGING AREAS

- A. Due to the limited amount of on and off Project site space for the parking of staff and school visitor's vehicles there will be no parking of CONTRACTOR vehicles in areas designated for school use only. CONTRACTOR shall provide legal access to and maintain CONTRACTOR designated areas for the legal parking, loading, off-loading and delivery of all vehicles associated with the Work. CONTRACTOR shall be solely responsible for providing and maintaining these requirements whether on or off the Project site. CONTRACTOR shall provide and maintain ample on-site parking spaces designated for the exclusive use of OWNER. CONTRACTOR shall erect signs as required by OWNER each of these spaces and prevent all unauthorized vehicles from parking in the OWNER-reserved spaces.
- B. Temporary access roads are to be installed and maintained by CONTRACTOR to all areas of the Project site.
- C. CONTRACTOR will be permitted to utilize existing facility campus roads as designated by OAR. CONTRACTOR shall only utilize those entrances and exits as designated by OAR and CONTRACTOR shall observe all traffic regulations of OWNER.
- D. CONTRACTOR shall maintain roads and walkways in a clean condition including removal of debris and/or other deleterious material on a daily basis.

#### 1.18 DIRECTIONAL SIGNAGE AND ADVERTISEMENT POSTING

- A. CONTRACTOR shall provide and install signage to provide directional, identification, and contact information to construction personnel and visitors as follows and as reviewed by OAR.
  1. For construction traffic control/flow at entrances/exits, and as designated by OAR.
  2. To direct visitors.
  3. For construction parking.
  4. To direct deliveries.

5. For Warning Signs as required.
  6. In accordance with CAL/OSHA standards as necessary.
  7. For trailer identification and Project site address.
  8. For "No Smoking" safe work site at designated locations.
  9. Emergency contact information and phone number of CONTRACTOR.
  10. Emergency contact information and phone number of local police, fire, and emergency personnel.
  11. For Labor Compliance Program (LCP) as required under the General Conditions (Prevailing wage rates and Notice of LCP)
  12. Employee benefits payments paid to trust funds are required under the General Conditions.
- B. OWNER has established a program authorizing vendors to post advertisements and billboards along the perimeter of project site. CONTRACTOR shall provide access and shall allow advertising signage to be placed on top of temporary, perimeter, security barricade and/or fences.

#### 1.19 TRENCHES

- A. Open trenches for installation of utility lines (water, gas, electrical and similar utilities) and open pits outside barricaded working areas shall be barricaded at all times in a legal manner determined by CONTRACTOR. Trenches shall be backfilled and patch-paved within twenty-four (24) hours after approval of installation by authorities having jurisdiction or shall have "trench plates" installed. Required access to buildings shall be provided and maintained. CONTRACTOR shall comply with all applicable statutes, codes and regulations regarding trenching and trenching operations. Open trenches deeper than 3'-6", and not located within a public street access, shall be enclosed within an 8'-0" high chain-link fence.

#### 1.20 DUST CONTROL

- A. CONTRACTOR is responsible for dust control on and off the Project site. When Work operations produce dust the Project site and/or streets shall be sprinkled with water to minimize the generation of dust. CONTRACTOR shall clean all soils and debris from construction vehicles and cover both earth and debris loads prior to leaving the Project site. CONTRACTOR shall, on a daily basis, clean all streets and/or public improvements within the right of way of any and all debris, dirt, mud and/or other materials attributable to operations of CONTRACTOR.

#### 1.21 WASH OUT

- A. CONTRACTOR shall provide and maintain a minimum of four (4) wash out boxes of sufficient size and strength to provide for concrete mixer wash out. CONTRACTOR shall locate and relocate both the wash out boxes and wash out areas in order to accommodate the progression of the Work. The wash out area shall be located as to minimize the amount of potential run off onto adjacent private

and/or public property. CONTRACTOR shall legally dispose of the contents of the wash out boxes and area on an as needed basis or as required by OAR.

#### 1.22 WASTE DISPOSAL

- A. CONTRACTOR shall provide and maintain trash bins on the Project site. Trash bins shall be serviced on an as needed basis and CONTRACTOR is responsible for the transportation of and the legal disposal of all contents.

#### 1.23 ADVERSE WEATHER CONDITIONS

- A. Should warnings of adverse weather conditions such as heavy rain and/or high winds be forecasted, CONTRACTOR shall provide every practical precaution to prevent damage to the Work, Project site and adjacent property. CONTRACTOR precautions shall include, but not be limited to, enclosing all openings, removing and/or securing loose materials, tools, equipment and scaffolding.
- B. CONTRACTOR shall provide and maintain drainage away from buildings and structures.
- C. CONTRACTOR shall implement all required storm water mitigation measures as required under related Division 01 Sections.

#### 1.24 DAILY AND MONTHLY REPORTS

- A. CONTRACTOR shall provide and maintain in the Project site office of CONTRACTOR, a daily sign in sheet for use by all employees of CONTRACTOR and all Subcontractors at whatever tier. At the beginning of each work day, the foreman, project manager, superintendent of CONTRACTOR and/or Subcontractors shall visit the site office of CONTRACTOR and shall enter onto the daily sign in sheet: all employee names; trade classification; and represented company. The completed sign in sheet shall serve as the basis of and shall be submitted with the daily construction report as set forth in Paragraph B below.
- B. By the end of each workday, CONTRACTOR shall submit to OAR and INSPECTOR a daily construction report denoting the daily manpower counts and a brief description/location of the workday activities. Manpower shall be broken down by trade classification such as foreman, journeyman or apprentice. The report shall also note the date, day of the week, weather conditions, deliveries, equipment on the Project site whether active and/or idle, visitors, inspections, accidents and unusual events, meetings, stoppages, losses, delays, shortages, strikes, orders and requests of governing agencies, Construction Directive and/or Change Orders received and implemented, services disconnected and/or connected, equipment start up or tests and partial use and/or occupancies. CONTRACTOR shall also include on the daily construction report the above information for all Subcontractors at whatever tier.
- C. CONTRACTOR shall submit on a monthly basis the forms found in Sections 01 3229 and 01 7416 certifying CEQA Mitigations and Storm Water Pollution Prevention (SWPP) compliances.

#### 1.25 FIELD OFFICE SUPPLIES

ARROYO HIGH SCHOOL  
GREENHOUSE

DSA SUBMITTAL 01/17/20  
CONSTRUCTION FACILITIES TEMPORARY  
01 5000-14

- A. CONTRACTOR shall provide the initial supply of field office supplies to OAR in the quantities listed as set forth below in Table A. If specified in Section 01 2100 – Allowances, CONTRACTOR shall provide additional supplies as required by OAR. CONTRACTOR shall not deduct the costs of the Initial Field Office Supplies (as shown in Table A) from the Allowance for the monthly replenishment of OWNER field office supplies listed in Section 01 2100 – Allowances. CONTRACTOR shall deliver all of the initial field office supplies to OWNER Field Offices within fourteen days from the date established in the Notice to Proceed.
- B. CONTRACTOR may utilize different suppliers as the specified information is only to establish the required quantities and minimum levels of quality.
- C. Replenishment of Field Office Supplies: If an Allowance is identified in Section 01 2100 – Allowances for the periodic replenishment of OWNER field office supplies. OWNER shall submit requests for replenishment of field office supplies to CONTRACTOR from those listed in Table ‘A’ below. CONTRACTOR shall provide a monthly accounting of items being requested, cumulative cost of replenishment of Field Office supplies previously ordered, and balance of allowance remaining. Upon Substantial Completion of the Work, CONTRACTOR shall file a Change Order Proposal crediting OWNER for any remaining balance or unspent portion of the Allowance. This Allowance specifically excludes the initial supplies listed in Table ‘A’ below and is to be used exclusively for the monthly replenishment of OWNER field office supplies. Supplies are to be delivered to OWNER’S trailer within twenty-four hours of OWNER’S request.
- D. Postage and Delivery Costs: CONTRACTOR shall provide postage and delivery services for OWNER generated materials in quantities and/or frequencies as requested by OWNER. The cost for these services shall be deducted from the Allowance identified in Section 01 2100 – Allowances for the periodic replenishment of OWNER field office supplies. This allowance is for the OWNER’S use only. Postage and delivery costs for CONTRACTOR generated materials are the responsibility of the CONTRACTOR and shall not be charged to this allowance, regardless of whether the postage and/or delivery of CONTRACTOR generated materials resulted from a request and/or direction from OWNER.
- E. Other expendable field office support items specified elsewhere, including, but not limited to, furnishing toner cartridges, equipment maintenance, and bottled water, are to be supplied and paid for by CONTRACTOR. These costs are not to be deducted from the Allowance for the periodic replenishment of OWNER field office supplies identified in Section 01 2100.

Table A				
ITEM	DESCRIPTION	UNIT	QUANTITY	SUPPLIER/ITEM NUMBER
Three Ring Binders – 3-inch	N/A	Each	{ SPECIFY }	Staples / 823526-54
Three Ring Binders – 2-inch	N/A	Each	{ SPECIFY }	Staples / 816199-54
Three Hole Punch	N/A	Each	{ SPECIFY }	Staples / 893844
Two Hole Punch	N/A	Each	{ SPECIFY }	Staples / 506261-54
File Organizer	N/A	Each	{ SPECIFY }	Staples / 120162-54

Calculator	Canon WS-1400H	Each	{ SPECIFY }	Staples / 342763
Flash Drive	2 GB	2	{ SPECIFY }	
Wastebasket	N/A	Each	{ SPECIFY }	Staples / 125039-54
Digital Camera	5 megapixel	Each	1	
Camera Flash Memory with reader for computer	5 GB	Each	1	
Camera Batteries and Rechargeable Batteries with charger	Appropriate to Camera	Each	1	
Cordless Phone with Answering Machine	AT&T Dect 6.0	Each	1	Staples / 1148831
Surge Suppressors	N/A	Each	{ SPECIFY }	Staples / IM1RA1696
Flashlight	N/A	Each	{ SPECIFY }	Staples / 222397
Batteries	N/A	4/Lot	{ SPECIFY }	Staples / 318956-54
Clipboard	N/A	3/Lot	{ SPECIFY }	Staples / 450422-54
8-inch Cast Iron Shears	N/A	Each	{ SPECIFY }	Staples / 421040-54
First Aid Kit	N/A	Each	1	Staples / 503979-54
Journal	N/A	Each	{ SPECIFY }	Staples / 217695-54
Pens (blue, green and red)	N/A	12/Lot	{ SPECIFY }	Staples / 441884-64
Pencils	N/A	48/Lot	{ SPECIFY }	Staples / 711382-54
Pencil Sharpener	1900	1	{ SPECIFY }	Staples / 330250-54
Mouse Pad	N/A	Each	{ SPECIFY }	Staples / 382955-64
Date Received Stamp	N/A	Each	1	Staples / 920274-54
Colored Pencils	N/A	12/Lot	{ SPECIFY }	Staples / 317297-54
Markers	N/A	12/Lot	{ SPECIFY }	Staples / 932675
Telephone Message Book	N/A	Each	{ SPECIFY }	Staples / 194506
Wall Calendar	PM233-28	Each	{ SPECIFY }	Staples / 527861-54
Steno Pad	N/A	12/Lot	{ SPECIFY }	Staples / 163485-64
Legal Pad	N/A	12/Lot	{ SPECIFY }	Staples / 163865-64
Post Its	N/A	12/Lot	{ SPECIFY }	Staples / 130005-64
File Folders – 8-1/2 by 11	N/A	50/Lot	{ SPECIFY }	Staples / 831099-54
File Folders – 8-1/2 by 14	N/A	50/Lot	{ SPECIFY }	Staples / 831057-54
Tape / Dispenser	N/A	Each	{ SPECIFY }	Staples / 211540-54
Highlighters	N/A	12/Lot	{ SPECIFY }	Staples / 167031
Rubber Bands	N/A	Each	{ SPECIFY }	Staples / 808634
Push Pins	N/A	Each	{ SPECIFY }	Staples / 480118-54
Dry Erase Board	S537	Each	{ SPECIFY }	Staples / 518928-54
Binder Clip – Medium	N/A	24/Lot	{ SPECIFY }	Staples / 831602-54
Binder Clip - Large	N/A	12/Lot	{ SPECIFY }	Staples / 831610-54
Stapler	818	Each	{ SPECIFY }	Staples / 504308
3 Pocket Wall File	N/A	Each	{ SPECIFY }	Staples / 730523-54
Heavy Duty Stapler	415	Each	1	Staples / 386312-54
Heavy Duty Staples	SW1-35312	Each	1	Staples / 504191-54
Hanging File Folder	8-1/2 x 11	25/Lot	{ SPECIFY }	Staples / 116806-54
Hanging File Folder	8-1/2x14	25/Lot	{ SPECIFY }	Staples / 163352-54
File Folder Labels	5266	750/Lot	{ SPECIFY }	Staples / 287292-54
Fax Notes	N/A	12/Lot	{ SPECIFY }	Staples / 210625-64
Paper Clips	N/A	Each	{ SPECIFY }	Staples / 480108-54
Paper Clips	N/A	Each	{ SPECIFY }	Staples / 480109-54
Poster Kit - State	CA	Each	1	Staples / 1183148
Poster Kit - Federal	US	Each	1	Staples / 935983-54
Broom	N/A	Each	1	Staples / 256600
Fire Extinguisher	First Alert	Each	{ SPECIFY }	Staples / 238774-54
Copy Paper	8-1/2 x 11	5000/Case	{ SPECIFY }	Staples / 122374-69

Copy Paper	8-1/2 x 14	500/Ream	{ SPECIFY }	Staples / 122598-69
Copy Paper	11 x 17	500/Ream	{ SPECIFY }	Staples / 238105-69
Hardhats	White	Each	{ SPECIFY }	Fiber Metal Model E-2 Ratchet knob full range size adjustment
Safety Glasses	Clear and/or Tinted	Each	{ SPECIFY }	Crews Storm Series
Safety Vests, Zipper Front	Hi Vis Lime Yellow	Each	{ SPECIFY }	Aramak Wearguard Item DEF-1085

PART 2 – PRODUCTS – Not Used

PART 3 – EXUTION – Not Used

END OF SECTION

**APPENDIX A**

END OF APPENDIX A

SECTION 01 6000  
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements governing selection of products for incorporation into the Work.

1.02 RELATED REQUIREMENTS

- A. Section 01 3229 - Project Forms.  
B. Section 01 3113 - Project Coordination.  
C. Section 01 3300 - Submittal Procedures.  
D. Section 01 3213 - Construction Schedule.  
E. Section 01 4523 - Testing and Inspection.  
F. Section 01 2513 - Product Substitution Procedures.  
G. Section 01 7836 - Warranties.

1.03 DEFINITIONS

- A. Definitions used in this Section are not intended to change the meaning of other terms used in the Contract Documents, such as “specialties,” “systems,” “structure,” “finishes,” “accessories,” and other similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
1. “Products” are items purchased for incorporation into the Work, whether purchased for the Work or taken from previously purchased stock. The term “product” includes the terms “material” and “equipment” and terms of similar intent.
    - a. “Named Products,” are items identified by the manufacturer’s product name, including make, model number or other designation, shown or listed in the manufacturer’s published product literature, current as of the date of the Contract.
    - b. “Foreign Products,” as distinguished from “domestic products,” are items substantially manufactured (50 percent or more of value) outside the United States and its possessions. Products produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of, nor living within, the United States and its possessions are also considered to be foreign products.
  2. “Materials,” are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.



3. “Equipment,” is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

#### 1.04 SUBMITTALS

- A. Material list: Prepare a list in tabular form acceptable to ARCHITECT and/or OAR showing proposed products. Include generic names. Include the manufacturer’s name and proprietary names for each item listed.
  1. Coordinate material list with the Construction Schedule and the submittal schedule.
  2. Form: Prepare material list with information on each item tabulated under the following column headings.
    - a. Related Specification Section number.
    - b. Generic name used in Contract Documents.
    - c. Proprietary name, model number, and similar designations.
    - d. Manufacturer’s name and address.
    - e. Supplier’s name and address.
    - f. Installer’s name and address.
    - g. Projected delivery date or time span of delivery period.
  3. Initial Submittal: Within ten days after execution of each subcontract agreement, as set forth in General Conditions Article 6.23, submit three copies of an initial material list to the ARCHITECT with a copy to the OAR. Provide a written explanation for omissions of data and for known variations from the Contract Documents.
  4. ARCHITECT Action: ARCHITECT will respond in writing to OAR within fourteen days and OAR will forward response to CONTRACTOR within sixteen days of receipt of the completed material list. No response outside this period constitutes no objection to listed items but does not constitute a waiver of the requirement that selected items comply with the Contract Documents. ARCHITECT response will include a list of unacceptable item selections, containing a brief explanation of reasons for this action.

#### 1.05 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
  1. CONTRACTOR is to verify necessary lead times for all materials; however, when specified products are available only from sources that do not, or cannot, produce a quality adequate to complete Work in a timely manner, consult with the ARCHITECT to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a

determination has been made, select products from sources producing these qualities, to the fullest extent possible.

- B. Compatibility of Options: When the CONTRACTOR is given the option of selecting between two or more products for use in the Work, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Foreign Product Limitations: Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion into the Work:
  - 1. No available domestic product complies with the Contract Documents.
  - 2. Domestic products that comply with the Contract Documents are available only at prices or terms substantially higher than foreign products that comply with the Contract Documents.
- D. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturers or producer's nameplates or trademarks on exposed surfaces of products that will be exposed in view in occupied spaces or on the exterior.
  - 1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
  - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
    - a. Name of product and manufacturer.
    - b. Model and serial number.
    - c. Capacity.
    - d. Speed.
    - e. Ratings.

#### 1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
  - 1. Schedule delivery to minimize long-term storage at the Project site and to prevent overcrowding of Work spaces.
  - 2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to the Project site in an undamaged condition in the manufacturer's original sealed container or other packaging system,

complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products at the Project site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store heavy materials away from structures in a manner that will not endanger the structure's supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weather-tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

## PART 2 - PRODUCTS

### 2.01 MATERIAL SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
  1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
  2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other Projects.
- B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
  1. Proprietary Specification Requirements: Where Specifications name only a single material or manufacturer, provide the product indicated. No substitutions will be permitted.
  2. Semi-proprietary Specification Requirements: Where Specifications name two or more products or manufacturers, provide one of the products indicated. No substitutions will be permitted.
    - a. Where Specifications specify products or manufacturers by name, accompanied by the term "or equal" comply with General Conditions Article 6.14 to obtain approval for use of an unnamed product.
  3. Descriptive Specification Requirements: Where Specifications describe a product or assembly, list exact characteristics required, with or without use

of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with the Contract Documents.

4. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.
  - a. Manufacturer's recommendations may be contained in published material literature or by the manufacturer's certification of performance.
5. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes, or regulations specified.
6. Visual Matching: Where Specifications require matching an established Sample, decision of the ARCHITECT will be final on whether a proposed product matches satisfactorily.
7. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard or premium colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The ARCHITECT will select the color, pattern, and texture from the product line selected.

## PART 3 - EXECUTION

### 3.01 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located, and aligned with other Work.
- B. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration until Substantial Completion.

END OF SECTION

SECTION 01 7123  
FIELD ENGINEERING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Layout of the work
2. Verification of work
  - a. OWNER reserves the right to verify any work that INSPECTOR deems necessary.
  - b. Other sections that require Surveyor to verify or measure installed work and related item. Surveyor shall perform such verifications or measurements at CONTRACTOR'S expense. CONTRACTOR shall furnish a certification, signed by both Surveyor and CONTRACTOR, to INSPECTOR.

B. Related Requirements:

1. Section 01 1100 - Summary of Work.
2. Section 01 3113 - Project Coordination.
3. Section 01 3213 - Construction Schedule.
4. Section 01 3300 - Submittal Procedures.
5. Section 01 7700 - Contract Closeout.

1.02 SURVEY CONTROLS

- A. Vertical Control shall use same benchmark used in the preparation of topographic survey. When Work consists of both on-site and off-site and benchmarks differ, an equation shall be indicated on Drawings.
- B. Horizontal control for existing structures shall be the property line.

1.03 LAYOUT OF WORK

- A. All work related to staking shall be by a Land Surveyor, or Civil engineer, registered with the State of California to perform land surveying and employed by CONTRACTOR.
- B. Before commencement of Work, surveyor shall locate all reference points and benchmarks to be used for vertical and horizontal control.
- C. Surveyor shall lay out entire Work, set grades, lines, levels, control points, elevations, grids and positions.

1.04 RECORD DOCUMENTS

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- A. Maintain complete and accurate log of all control and survey documentation as work progresses.
- B. Record, by coordinates, all utilities onsite with top of pipe elevations, at major grade and alignment changes, rim, grate or top of curb and flow line elevations of all drainage structures and sewer manholes.
- C. Indicate reference and control points on record drawings. The basis of elevation shall be one of the established benchmarks.
- D. Upon Substantial Completion, obtain and pay for reproducible plans. Deliver plans to OAR. Clearly indicate all differences between original drawings and completed work within specified tolerances.

#### 1.05 SUBMITTALS

- A. Surveyor: Shall submit name, address and license number to OWNER, including any changes as they occur.
- B. Field notes: Upon request by OAR, submit copies of cut sheets, coordinate plots, data collector printouts, marked-up construction staking plans and other documentation as available to verify accuracy of field engineering work during and at completion of project. Submittals to OWNER must be signed and sealed by Surveyor and counter-signed by CONTRACTOR
- C. Statement of Compliance: CONTRACTOR shall submit a statement of certification signed and sealed by Surveyor, counter-signed by CONTRACTOR indicating compliance with grades and alignment of construction plans at rough grade, fine grade and top of rock stages. INSPECTOR shall approve survey submittals for each stage of construction prior to proceeding with work
- D. Upon Substantial Completion, CONTRACTOR shall obtain and pay for reproducible survey drawings (or "As Built").
- E. Completed record drawings shall be signed and certified as correct and within specified tolerances by licensed surveyor. Originals and two sets of blueprints shall be submitted to OWNER.

#### PART 2-PRODUCTS – NOT USED

#### PART 3-EXECUTION

##### 3.01 PREPARATION

- A. Pre-mark areas of excavation in accordance with the requirements of "Dig-Alert". Request locators 2 days before commencing excavation.
- B. Before commencing Work, establish all horizontal and vertical reference points used in Contract Documents according to existing field conditions.
- C. Preserve established reference lines and benchmarks.
- D. Differentiate school and city datum as applicable.

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- E. Relocate bench marks that may interfere with Work.
- F. Reset and re-establish reference marks damaged or lost during construction.

### 3.02 SURVEY REQUIREMENTS GENERAL

- A. Establish a minimum of two permanent horizontal and vertical control points on Project site, remote from construction area, referenced to data established by control points.
- B. Indicate reference points, relative to benchmark elevation, on record drawings.
- C. Provide grade stakes and elevations to construct over excavation and re-compaction, rough and final grades, paved areas, curbs, gutters, sidewalks, building pads, landscaped areas, and other areas as required.
- D. Calculate and layout proposed finished elevations and intermediate controls as required to provide smooth transitions between spot elevations indicated on Drawings.
- E. Provide stakes and elevations for grading, fill, and topsoil placement.
- F. Provide adequate horizontal and vertical control to locate utility lines, including but not limited to, storm, sewers, water mains, gas, electric and signal and provide vertical control in proportion to the slope of the line as required for accurate construction. Dry utilities will be based upon adequate horizontal and vertical control layout. Prior to trench closure, survey and record invert and flow line elevations. Survey and record top of curb and flow line elevations on finished concrete or asphaltic concrete (AC) surfaces at key locations such as beginning-of-curve (BC), end-of-curve (EC), grade breaks, corners or angle points in sufficient number to demonstrate the Work complies with the intent of the Contract Documents.
- G. Provide horizontal and vertical control for batter boards for drainage, utility, and other on-site structures as required.
- H. Furnish building corner offsets as required to adequately locate building pads. Provide cut and fill stakes within the building pad perimeter adequate to control both over excavation and re-compaction and the final sub-grade elevation of the building pad.
- I. Submit a certification signed by the surveyor confirming the elevations and locations of improvements are in conformance with the Contract Documents. The statement shall include survey notes for the finish floor and building pad, showing the actual measured elevations on the completed sub-grade, recorded to the nearest 0.01 of a foot. Building pad tolerance will be plus or minus 0.1 of a foot.
- J. Establish a minimum of two permanent horizontal and vertical control points on Project site, remote from building area, referenced to data established by survey control points.
- K. Mark boundaries for rights-of-way dedications and easements for utilities prior to making location of buildings and utilities.
- L. Layout all lines, elevations and measurements needed for construction or installation of buildings, grading, paving utilities according to the following:
  1. Identify site boundary, property lines.

2. Provide working benchmarks.
3. Set stakes for Bottom of Excavated Plane (B.E.P.).
4. Set gridlines, radii, working points etcetera, for foundation.
5. Set and verify building pad elevations.
6. Set finish floor elevations.
7. Stake location and elevations for exterior ramps and stairs.
8. Set gridlines, radii, working points, etcetera, for all floors of multi-story buildings.
9. Set storm drain and sanitary sewer inverts and other utilities as needed at 5-foot off-set from building lines.
10. For new facilities, establish permanent onsite Benchmark with 2-inch diameter brass disk. Location of Benchmark to be determined by OWNER.

### 3.03 SURVEY REQUIREMENTS FOR GRADING

- A. Provide grade stakes and elevations as follows:
  1. Removal limits (cut lines).
  2. Rough grade staking: 60-foot maximum grid plus additional stakes at grade changes and pertinent locations. Flag all grade changes including ridges, flow lines and grade breaks.
  3. Fine grade for top of dirt: 30-foot maximum grid plus additional stakes at grade changes and pertinent locations. Flag all grade changes including ridges, flow lines and grade breaks.
  4. Verify fine grade for top of rock: 30-foot maximum grid plus additional stakes at grade changes and pertinent locations. Flag all grade changes including ridges, flow lines and grade breaks.
  5. Finish grade marks on all buildings, structures and at pertinent locations
  6. Finish grades and offsets for all concrete work, utilities, landscape areas, and structures.
  7. Provide controls and baselines for playground striping.
  8. Offsite improvements: set grades and provide grade sheets as required by local authorities.
- B. Provide a minimum of two permanent horizontal and vertical control points onsite, remote from building area, referenced to data established by survey control points.

### 3.04 SURVEY REQUIREMENTS FOR UTILITIES

- A. Locate “wet” utility lines and provide vertical control proportionate to slope of line as required for accurate construction. “Dry” utilities shall have adequate horizontal and vertical control layout supplied by others.



- B. Prior to back-filling trench, survey and record invert and flow line elevations. Survey and record top of curb and flow line elevations on finished surfaces at key locations (such as Back of Curbs, grade breaks, corners or angle points) in sufficient number to demonstrate Work complies with intent of Contract Documents.
- C. Provide horizontal and vertical control for batter boards for drainage, utility, and other on-site structures as required.
  - 1. Set grades for vaults one inch higher than adjacent surrounding design grades, unless noted otherwise.
- D. Leave all trenches open until required inspection is completed.

### 3.05 SURVEY REQUIREMENTS FOR STRUCTURES

- A. Furnish building corner offsets as required to adequately locate building pads. Provide cut and fill stakes within building pad perimeter adequate to control both over excavation and re-compaction and final sub-grade elevation of building pad.
- B. Submit a certification signed by surveyor confirming elevations and locations of improvements are in conformance with Contract Documents. Statement shall include survey notes for finish floor and building pad, showing actual measured elevations on completed sub-grade, recorded to nearest 0.01 of a foot. Building pad tolerance will be plus or minus 0.1 of a foot.

END OF SECTION

SECTION 01 7329  
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies procedural requirements for cutting and patching.

1.02 RELATED REQUIREMENTS

- A. Section 01 2973 - Schedule of Values.
- B. Section 01 3113 - Project Coordination.
- C. Section 01 3119 - Project Meetings.
- D. Section 01 3213 - Construction Schedule.
- E. Section 01 3300 - Submittal Procedures.
- F. Section 01 7123 - Field Engineering.
- G. Section 01 7836 - Warranties.
- H. Section 01 4525 - Testing, Adjusting, and Balancing of HVAC.

1.03 SUBMITTALS

- A. The word “cutting” as used in the Contract Documents includes, but is not limited to, cutting, drilling, chopping, and other similar operations and the word “patching” includes, but is not limited to, patching, rebuilding, reinforcing, repairing, refurbishing, restoring, replacing, or other similar operations.
- B. Cutting and Patching Proposal: CONTRACTOR shall submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Contract Documents requires approval of these procedures before proceeding. Include the following information, as applicable, in the proposal:
  - 1. Describe the extent of cutting and patching required. Denote how it will be performed and indicate why it cannot be avoided.
  - 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building’s appearance or other significant visual elements.
  - 3. List products to be used and firms or entities that will perform this Work.
  - 4. Indicate dates when cutting and patching will be performed.

5. Utilities: List utilities that cutting and patching operations will disturb or affect. List utilities to be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
7. Review by ARCHITECT and DSA prior to proceeding with cutting and patching does not waive ARCHITECT right to later require complete removal and replacement of defective Work.

#### 1.04 QUALITY ASSURANCE

- A. Requirements for structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
  1. Obtain approval from ARCHITECT and DSA of the cutting and patching proposal before cutting and patching the following structural elements:
    - a. Foundation construction.
    - b. Bearing and retaining walls.
    - c. Structural concrete.
    - d. Structural steel.
    - e. Lintels.
    - f. Timber and primary wood framing.
    - g. Structural decking.
    - h. Stair systems.
    - i. Miscellaneous structural metals.
    - j. Exterior curtain-wall construction.
    - k. Equipment supports.
    - l. Piping, ductwork, vessels, and equipment.
    - m. Structural systems of special construction in Division 13 Sections.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safely.
  1. Obtain review of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
    - a. Primary operational systems and equipment.
    - b. Air or smoke barriers.

- c. Water, moisture, or vapor barriers.
  - d. Membranes and flashings.
  - e. Fire protection systems.
  - f. Noise and vibration control elements and systems.
  - g. Control systems.
  - h. Communication and/or data systems.
  - i. Conveying systems.
  - j. Electrical wiring systems.
  - k. Operating systems of special construction in Division 13 Sections.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the opinion of ARCHITECT, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.
- 1. If possible, retain the original installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original installer or fabricator, engage another recognized experienced and specialized firm.
    - a. Firestopping.
    - b. Acoustical ceilings.
    - c. Acoustical panels.
    - d. Finished wood flooring.
    - e. Synthetic sports flooring.
    - f. Carpeting.
    - g. HVAC enclosures, cabinets, or covers.
    - h. Ceramic and quarry tile.
    - i. Gypsum board.
    - j. Masonry (exterior and interior where exposed).
    - k. Tack boards.
    - l. Casework.
    - m. Finish carpentry.

## 1.05 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

## PART 2 - PRODUCTS (Not applicable)

## PART 3 - EXECUTION

## 3.01 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
  - 1. Before proceeding, meet at the Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

## 3.02 PREPARATION

- A. Temporary support: Provide adequate temporary support of existing improvements or Work to be cut.
- B. Protection: Protect existing improvements and Work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of existing improvements or Work that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Where the Work requires sandblasting of existing surfaces in order to receive new materials secured by cementitious, adhesive or chemical bond, completely remove existing finishes, stains, oil, grease, bitumen, mastic and adhesives or other substances deleterious to the new bonding or fastening of new Work. Utilize wet sand blasting for interior surfaces and for exterior surfaces where necessary to prevent objectionable production of dust.

## 3.03 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay. Carefully remove existing Work to be salvaged and/or reinstalled. Protect and store for reuse into the Work. Verify compatibility and suitability of existing substrates before starting the Work.
- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining Work. Where possible, review proposed procedures with the original installer; comply with the original installer's recommendations.
  - 1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
  3. Cut through concrete and masonry using a cutting machine, such as a carborundum saw or a diamond-core drill. Saw cut reinforcing bars and paint ends with bituminous paint except where bonded into new concrete or masonry.
  4. Comply with requirements of applicable Sections of Divisions 31, 32, and 33 where cutting and patching requires excavating, backfill, and recompaction.
  5. Woodwork: Cut and or remove to a panel or joint line.
  6. Sheet Metal: Remove back to joint, lap, or connection. Secure loose or unfastened ends or edges and seal watertight.
  7. Glass: Remove cracked, broken, or damaged glass and clean rebates and stops of setting materials.
  8. Plaster: Cut back to sound plaster on straight lines, and back bevel edges of remaining plaster. Trim existing lath and prepare for new lath.
  9. Gypsum Wallboard: Cut back on straight lines to undamaged surfaces with at least two opposite cut edges centered on supports.
  10. Acoustical ceilings: Remove hanger wires and related appurtenances where ceilings are not scheduled to be installed.
  11. Tile: Cut back to sound tile and backing on joint lines.
  12. Flooring: Completely remove flooring and clean backing of prior adhesive. Carefully remove wood flooring for patching and repairing of existing wood flooring scheduled to remain.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with required tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation. Verify conditions of existing substrates prior to executing Work.
  2. Restore exposed finishes of patched areas and extend finish restoration into retaining adjoining construction in a manner that will eliminate all evidence of patching and refinishing.
  3. Concrete: Maintain cut edges in a moist condition for twenty four hours prior to the placement of new concrete. In lieu of this an epoxy adhesive may be provided. Finish placed concrete to match existing unless noted otherwise. Concrete shall have a compressive strength of 3,000 psi where installed to repair and match existing improvements, unless noted otherwise.
  4. Metal Fabrications: Items to remain exposed shall have their edges cut and ground smooth and rounded.

5. Sheet Metal: Replace removed or damaged sheet metal items for new Work.
6. Glass: Install matching glass and re-seal exterior window assemblies.
7. Lath and Plaster: Install new lath materials to match existing and fasten to supports at 6-inch centers. Provide a 6-inch lap where new lath to adjoins existing lath. Fasten new lath as required for new Work. Restore paper backings as required. Apply a bonding agent on cut edges of existing plaster. Apply three coat plaster of the type, thickness, finish, texture, and color to match existing.
8. Gypsum Wallboard: Fasten cut edges of wallboard. Install patches with at least two opposite edges centered on supports and secure at 6-inch centers. Tape and finish joints and fastener heads. Patching shall be non-apparent when painted or finished.
9. Acoustical Ceilings: Comply with the requirements for new Work specified in related sections of the Contract Documents.
10. Resilient Flooring: Completely remove flooring and prepare substrate for new material.
11. Painting: Prepare areas to be patched, patch and paint as specified under related sections of the Contract Documents.

#### 3.04 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged coverings to their original condition.

END OF SECTION

## SECTION 01 7417

## BMP IMPLEMENTATION PLAN

(FOR SITES WITH LAND DISTURBANCE OF LESS THAN ONE ACRE)

## PART 1 - GENERALA

## 1.01 SUMMARY

## A. Section Includes:

1. Storm water permitting and certification as required by local regulations.
2. Preparation, implementation, upkeep and monitoring of BMP Implementation Plan.
3. Control runoff and pollutants from the site during construction activities

## B. Related Requirements:

1. Division 01 – General Requirements.
2. Section 33 4000 – Storm Drainage Utilities.

## 1.02 ACRONYMS AND DEFINITIONS

BMP	Best Management Practice.
CAN	Corrective Action Notice.
CASQA	California Stormwater Quality Association.
CGP	NPDES General Permit for Storm Water Discharges Associated with Construction Activities.
DWQ	Division of Water Quality.
LARWQCB	Los Angeles Regional Water Quality Control Board.
NPDES	National Pollutant Discharge Elimination System.
OEHS	LAUSD Office of Environmental Health and Safety.
QRE	Qualifying Rain Event, is an event that produces 0.5 inches of precipitation with a 48 hour or more period between rain events.
QSD	Qualified SWPPP Developer.
QSP	Qualified SWPPP Practitioner.
RISK LEVEL	As defined by CGP.
SWPPP	Storm Water Pollution Prevention.



SWRCB            State Water Resources Control Board.  
WPCD            Water Pollution Control Drawing.

### 1.03            REQUIREMENTS

- A.            CONTRACTOR shall assign a QSP and QSD for the Work of this Section.
- B.            Prior to start of Construction, CONTRACTOR shall:
1.            Submit QSP and QSD qualifications.
  2.            Develop a BMP implementation, inspection, and maintenance plan, certified by QSD, in accordance with CGP Attachment C - Risk Level 1 Requirements, which shall include:
    - a.            Provide WPCD to reflect proposed construction staging, phasing, schedule and other construction activities.
    - b.            Good Site Management "Housekeeping".
    - c.            Erosion, Sediment, Tracking, and Wind Erosion Control BMPs.
    - d.            Non-storm Water Control BMPs.
    - e.            Waste Management BMPs.
  3.            Incorporate BMP activities into the Project Schedule.
  4.            Secure and pay for deposits, permits inspections.
  5.            Inform CONTRACTOR and Subcontractors personnel on the BMP procedures to prevent pollutants from entering the storm drain system, before they start construction activities.
- C.            During Construction:
1.            Implement, install and maintain BMPs. Insure that BMPs are designed to protect all exposed portions of the site.
  2.            Conduct and document storm water training of CONTRACTOR site personnel and provide records of training to OAR. See Attachment "D" for sample training log. Keep personnel informed of the BMP implementation process and changes.
  3.            Conduct site inspection of pollution prevention controls and provide Site Monitoring Reports:
    - 1)            At least weekly.
    - 2)            Within 48 hours prior to a QRE.
    - 3)            Within 48 hours after a QRE, conduct a post-storm event inspection to identify whether BMPs are adequately designed, implemented,

and effective. Identify additional BMPs necessary and revise the BMP Implementation Plan accordingly.

- 4) Before and after a QRE.
- 5) At least once each 24 hours during extended storm events.
- 6) Conduct quarterly non-storm water inspection (per Attachment "C").
4. Prepare and maintain, at the Project site, a log of each inspection using Site Monitoring Report forms (Attachment "A", at the end of this Section).
5. Conduct quarterly non-storm water inspection (per Attachment "C").
6. Provide verification annually, no later than July 15, that construction activities are in compliance with BMP Implementation Plan (Attachment "B"). Non-compliance shall be reported to OAR immediately.
7. Provide to OAR Site Inspection reports, BMP plan revisions, and Compliance Certifications.
8. Participate in quarterly BMP inspections with representative from OWNER'S OEHS. Correct CAN items issued by OEHS.
9. Update Post Construction BMP Installation and Maintenance Log per Section 33 4000, Storm Drainage Utilities.
10. Markup the Post-Construction BMP Maintenance Plan provided by the ARCHITECT to reflect as-built conditions and submit to OAR.
11. Retain the BMP Implementation Plan on site and keep it updated until Substantial Completion.
12. Pay fines and penalties from regulatory agencies against OWNER due to CONTRACTOR'S non-compliance with storm water regulations. OWNER shall recover costs of fines and penalties by appropriate OWNER assessment. Review of the BMP Implementation Plan and inspection log by OAR shall not relieve CONTRACTOR from liabilities arising from non-compliance of storm water pollution regulations.

D. At Substantial Completion:

1. Handover maintenance log and maintenance plan to OAR.
2. Provide Site Monitoring Reports, BMP Implementation Plan revisions, Annual Compliance Certifications and related documents to OAR.
3. Conduct Post-Construction BMP training of OWNER personnel.
4. Notify OAR to schedule a meeting with OEHS to confirm Substantial Completion of BMP Implementation Plan.
5. Submit to OWNER Substantial Completion Certification that the Project has met all of the conditions of the BMP implementation Plan (Attachment "B"). Post-construction storm water operation and management plan as

mentioned in the compliance certifications are considered to be in place at Substantial Completion.

E. OWNER:

1. OWNER'S Project Inspector and OEHS Inspector will conduct inspection and examination of the BMP Implementation Plan.
2. OWNER Maintenance and Operations will maintain prevention controls left in place after CONTRACTOR receives Substantial Completion.

1.04 SUBMITTALS

A. BMP Implementation Plan:

1. Submit two compact disks of BMP Implementation Plan.
2. Provide the following documentation to OAR:
  - a. BMP material quality, grade, type as specified in the CASCA BMP Handbook.
  - b. QSP and QSD training and qualifications.
  - c. Electronic copy of weekly and quarterly inspection reports and annual compliance certifications.
  - d. Training records of CONTRACTOR site personnel.
  - e. BMP implementation schedule.
  - f. WPCD revisions..

B. Closeout Documents: At Substantial Completion provide one hard copy and two CD's with electronic files in PDF format of the documents listed below to OAR. OAR will forward records electronically to OWNER Supervising Civil Engineer for retention period of three years.

1. BMP implementation and Monitoring Program.
2. Inspection Records.
3. Annual Compliance Certifications and Check Lists.
4. Training Records for CONTRACTOR and OWNER personnel.
5. Maintenance records for post construction BMP.
6. Post Construction BMP Maintenance Plan.
7. Substantial Completion Certification.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with the following requirements:

ARROYO HIGH SCHOOL  
GREENHOUSE

DSA SUBMITTAL 01/17/20  
BMP IMPEMETATION PLAN  
01 7417-4

[Redacted]

1. National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Lands Disturbance Activities; ORDER NO. 2009-0009-DWQ; NPDES NO. CAS000002, adopted by the State Water Resources Control Board.
2. Regulations of the California Environmental Protection Agency, State Water Resources Control Board; Los Angeles Regional Water Control Board, and local ordinances.
3. CASQA Stormwater Best Management Practice Handbook for Construction Activity (BMP Handbook) current adopted edition.

[Redacted]

B. CONTRACTOR’s QSP/QSD shall meet the following qualifications:

1. Current certification as a CASQA Qualified SWPPP Practitioner/Developer.
2. Two years minimum experience in erosion and sediment control and knowledgeable in the requirements of SWPPP, Best Management Practices and CGP.

1.06 STORAGE AND PROTECTION

- A. Provide proper storage of materials and equipment to prevent rain and storm water runoff to come in contact with pollutants, such as soil stabilizers, paint or fluids from vehicles.

1.07 TRAINING OF OWNER PERSONNEL

[Redacted]

A. Training of Owner’s personnel shall include 8 hours of on-site overview and maintenance of the following Post Construction BMPs:

1. Bioretention Facilities, Planter Boxes and Proprietary Biotreatment Devices.
2. Vegetated Swales, Vegetated Filter Strips and Green Roofs.
3. Sand Filters and Cartridge Media Filters.
4. Infiltration Trenches, Dry Wells, Proprietary Infiltration Devices and Permeable Pavement.
5. Hydrodynamic Devices and Catch Basin Inserts.

- B. Training of Owner’s personnel on the Post Construction BMPs shall be per Section 33 4000, Storm Drainage Utilities.

1.08 ATTACHMENTS

- A. The following attachments are included at the end of this Section:
  - 1. Attachment “A” - Site Monitoring Report.
  - 2. Attachment “B” - Compliance Certification and Checklist.
  - 3. Attachment “C” – Quarterly Non-Storm Water Form.
  - 4. Attachment “D” – Sample LAUSD Construction Storm Water Training Form.
- B. The following attachments are included at the end of Section 33 4000:
  - 1. Attachment “A” - Post-Construction BMP Maintenance Plan.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Provide quality, grade and type of materials as specified in CASQA Stormwater Best Management Practice, Handbook.

PART 3 – EXECUTION

3.01 IMPLEMENTATION

- A. Install perimeter controls prior to starting Work at the Project site.
- B. Implement BMP plan to contain on-site storm water on the Project site. Provide storm drain inlet protection. Do not drain on-site water directly into the storm drain without proper BMP in place.
- C. Prevent pollutant discharges into the storm drain system. Prevent storm water from coming into contact with pollutants, such as sediment, material spills, or leakage from storage tanks, waste containers or transfer areas. In the event contamination is found CONTRACTOR shall immediately notify OAR who will contact the OEHS.
- D. Protect exposed dirt, such as stockpiles, landscaping areas, and hillsides.
- E. Properly manage non-storm water discharges such as ground water, broken utility lines and fire hydrant testing per BMP Implementation Plan.
- F. Adjust BMP’s locations and layouts in accordance to construction progress to assure compliance to regulations.

- G. Conduct inspections of pollution prevention controls and provide Site Monitoring Report to OAR immediately if pollutants are discharged into the site runoff. CONTRACTOR shall remediate contaminated water.
- H. Upon Substantial Completion: Maintain and leave post-construction storm water pollution prevention controls in place and remove those that are not needed as determined by the QSD and OAR.

3.02 CLOSEOUT

- A. Verify the following prior to Substantial Completion:
  - 1. Elements of the BMP Implementation Plan have been completed.
  - 2. Final stabilization of site has been demonstrated.
  - 3. There is no potential for construction related storm water pollutants to be discharged into site runoff.
  - 4. Construction related equipment and temporary BMP have been removed from site.
  - 5. Rubbish, debris, and waste materials have been removed and legally disposed of off the Project site.
  - 6. OEHS CAN items have been closed and signed-off.
  - 7. Post-Construction BMP Maintenance plan has been established.

END OF SECTION

<hr style="width: 80%; margin: 0 auto;"/> <p>OWNER Project Number</p>
---

**Los Angeles Unified School District  
As OWNER  
ATTACHMENT "A"  
STORM WATER POLLUTION  
PREVENTION  
SITE MONITORING REPORT**

<p>STATE OF CALIFORNIA STATE WATER RESOURCES CONTROL BOARD</p>
--

School Name: _____	Contract Number _____
Project Description: _____	

**I. Type of Examination:** (Use one form for each type of examination):

- Prior to Anticipated Storm Event     
  After Actual Storm Event     
  Weekly

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

**II. Check the response for each BMP Implementation Plan question below:**

	YES	NO
1. Do you have an updated Storm Water Pollution Prevention Plan (BMP Implementation Plan) and a BMP Handbook on the Project site?	<input type="checkbox"/>	<input type="checkbox"/>
2. Does your BMP Implementation Plan incorporate an up-to-date erosion control plan?	<input type="checkbox"/>	<input type="checkbox"/>
3. Is the erosion control installed per plan?	<input type="checkbox"/>	<input type="checkbox"/>
4. Is the Work at a stage where the erosion control plan can not be constructed, is the erosion control at the Maximum Extent Practicable for the stage you are in?	<input type="checkbox"/>	<input type="checkbox"/>
5. Did you observe the presence of any floating materials such as oil, grease, pieces of wood, paper, etc., odor, toxics, and/ or sediments?	<input type="checkbox"/>	<input type="checkbox"/>
6. If yes, what is it that you observed? _____		

**III. Check the status of the following items as observed:**

BMP Implementation Plan Items	Not Applicable	Acceptable	Not Acceptable	Repairs Required	Date Repairs Completed
1. De-silting Basins (Cleaned)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
2. Water Quality Basin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
3. Silt Fences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
4. Hay bales/ Check dams/ Sandbags	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
5. Berms and Dikes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
6. Sand/Gravel Inlet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
7. Slope Protection - Polymer and Mulch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
8. Vegetation / Re-vegetation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
9. Dust Control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
10. Surface Erosion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
11. Slope Instability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
12. Storage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
13. Disposal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
14. Spills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
15. Clean-up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
16.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
17.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>

**IV. Describe any problems or required repairs checked above and the necessary actions needed:**

Item	Description of Problem or Required Repair	Action Needed
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Examination Performed by  
CONTRACTOR:

\_\_\_\_\_ By (Print Name and Title) \_\_\_\_\_ Date

Verified by Inspector:

\_\_\_\_\_ By (Print Name and Title) \_\_\_\_\_ Date





## Detailed Storm Water Quality Construction Site Inspection Checklist

ATTACHMENT "A" (Cont.)

<b>GENERAL INFORMATION</b>				
Project Name				
Project Number	LAUSD Ref. No.			
Contractor				
Inspector's Name				
Inspector's Title				
Signature				
Date of Inspection				
Inspection Type (Check Applicable)	<input type="checkbox"/> Prior to forecast rain		<input type="checkbox"/> After a rain event	
	<input type="checkbox"/> 24-hr intervals during extended rain		<input type="checkbox"/> Other <u>Weekly</u> or <u>Quarterly</u>	
Season (Check Applicable)	<input type="checkbox"/> Rainy		<input type="checkbox"/> Non-Rainy	
Storm Data	Storm Start Date & Time:		Storm Duration (hrs):	
	Time elapsed since last storm (Circle Applicable Units)	Min. Hr. Days	Approximate Rainfall Amount (inches)	

<b>PROJECT AREA SUMMARY AND DISTURBED SOIL AREA (DSA) SIZE</b>	
Total Project Area	_____ Acres
Field Estimate of Active DSAs	_____ Acres
Field Estimate of Non-Active DSAs	_____ Acres

INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
<b>Preservation of Existing Vegetation</b>				
Is temporary fencing provided to preserve vegetation in areas where no construction activity is planned?				
Location:				
Location:				
Location:				
Location:				
<b>Erosion Control</b>				
Does the applied temporary erosion control provide 100% coverage for the affected areas?				
Are any non-vegetated areas that may require temporary erosion control?				
Is the area where erosion controls are used required free from visible erosion?				
Location:				
Location:				
Location:				
Location:				
<b>Temporary Linear Sediment Barriers (Silt Fence, Fiber Rolls, Sandbag Barriers, etc.)</b>				
Are temporary linear sediment barriers properly installed, functional and maintained?				
Are temporary linear sediment barriers free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				
Are cross barriers installed where necessary and properly spaced?				
Location:				
Location:				
Location:				
Location:				
Location:				
<b>Storm Drain Inlet Protection</b>				
Are storm drain inlets internal to the project properly protected?				
Are storm drain inlet protection devices in working order and being properly maintained?				
Location:				
Location:				
Location:				
Location:				

INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
Location:				
<b>Sediment Basins</b>				
Are basins designed in accordance with the requirements of the General Permit?				
Are basins maintained to provide the required retention/detention?				
Are basin controls (inlets, outlets, diversions, weirs, spillways, and racks) in working order?				
Location:				
Location:				
Location:				
Location:				
<b>Stockpiles</b>				
Are all locations of temporary stockpiles, including soil, hazardous waste, and construction materials in approved areas?				
Are stockpiles protected from run-on, run-off from adjacent areas and from winds?				
Are stockpiles located at least 15 m from concentrated flows, downstream drainage courses and storm drain inlets?				
Are required covers and/or perimeter controls in place?				
Location:				
Location:				
Location:				
Location:				
<b>Concentrated Flows</b>				
Are concentrated flow paths protected and free from visible erosion?				
Location:				
Location:				
Location:				
Location:				
<b>Tracking Control</b>				
Is the entrance stabilized to prevent tracking				
Is the stabilized entrance inspected daily to ensure that it is working properly				
Are points of ingress/egress to public/private roads inspected and swept and vacuumed as needed?				
Are all paved areas free of visible sediment tracking or other particulate matter?				
Location:				

INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
Location:				
Location:				
Location:				
<b>Wind Erosion Control</b>				
Is dust control implemented?				
Location:				
Location:				
Location:				
Location:				
<b>Dewatering Operations</b>				
Are all one-time dewatering operations covered by the General Permit inspected before and as they occur and BMP implemented as necessary during discharge?				
Is ground water dewatering handled in conformance with the dewatering permit issued by the LARWQCB?				
Is required treatment provided for dewatering effluent?				
Location:				
Location:				
Location:				
Location:				
<b>Vehicle &amp; Equipment Fueling, Cleaning, and Maintenance</b>				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				
Are dedicated fueling, cleaning, and maintenance areas located at least 15 m away from downstream drainage facilities and watercourses and protected from run-on and runoff?				
Is wash water contained for infiltration/ evaporation and disposed of appropriately?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
On each day of use, are vehicles and equipment inspected for leaks and if necessary, repaired?				
Location:				
Location:				
Location:				

INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
Location:				
<b>Waste Management &amp; Materials Pollution Control</b>				
Are material storage areas and washout areas protected from run-on and runoff, and located at least 15 m from concentrated flows and downstream drainage facilities?				
Are all material handling and storage areas clean; organized; free of spills, leaks, or any other deleterious material; and stocked with appropriate clean-up supplies?				
Are liquid materials, hazardous materials, and hazardous wastes stored in temporary containment facilities?				
Are bagged and boxed materials stored on pallets?				
Are hazardous materials and wastes stored in appropriate, labeled containers?				
Are proper storage, clean-up, and spill-reporting procedures for hazardous materials and wastes posted in open, conspicuous and accessible locations adjacent to storage areas?				
Are temporary containment facilities free of spills and rainwater?				
Are temporary containment facilities and bagged/boxed materials covered?				
Are temporary concrete washout facilities designated and being used?				
Are temporary concrete washout facilities functional for receiving and containing concrete waste and are concrete residues prevented from entering the drainage system?				
Do temporary concrete washout facilities provide sufficient volume and freeboard for planned concrete operations?				
Are concrete wastes, including residues from cutting and grinding, contained and disposed of off-site or in concrete washout facilities?				
Are spills from mobile equipment fueling and maintenance properly contained and cleaned up?				
Is the site free of litter?				
Are trash receptacles provided in the yard, field trailer areas, and at locations where workers congregate for lunch and break periods?				
Is litter from work areas collected and placed in watertight dumpsters?				
Are waste management receptacles free of leaks?				
Are the contents of waste management receptacles properly protected from contact with storm water or from being dislodged by winds?				
Are waste management receptacles filled at or beyond capacity?				
Location:				
Location:				
Location:				

INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
Location:				
<b>Temporary Water Body Crossing or Encroachment</b>				
Are temporary water body crossings and encroachments constructed appropriately?				
Does the project conform to the requirements of the 404 permit and/or 1601 agreement?				
Location:				
Location:				
Location:				
Location:				
<b>Illicit Connection/ Discharge</b>				
Is there any evidence of illicit discharges or illegal dumping on the project site?				
If yes, has the Owner/Operator been notified?				
Location:				
Location:				
Location:				
Location:				
<b>Discharge Points</b>				
Are discharge points and discharge flows free from visible pollutants?				
Are discharge points free of any significant sediment transport?				
Location:				
Location:				
Location:				
Location:				
<b>BMP Implementation Plan Update</b>				
Does the BMP Implementation Plan and Project Schedule adequately reflect the current site conditions and contractor operations?				
Are all BMP shown on the Erosion Control Plans installed in the proper location(s) and according to the details in the BMP Implementation Plan?				
Location:				
Location:				
Location:				
Location:				
<b>General</b>				

INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
Are there any other potential concerns at the site?				
Location:				
Location:				
Location:				
Location:				
<b>Storm Water Monitoring</b>				
Does storm water discharge directly to a water body listed in the General Permit as impaired for sediment/sedimentation or turbidity?				
If yes, were samples for sediment/sedimentation or turbidity collected pursuant to the sampling and analysis plan in the BMP Implementation Plan?				
Did the sampling results indicate that the discharges are causing or contributing to further impairment?				
If yes, were the erosion/sediment control BMP improved or maintained to reduce the discharge of sediment to the water body?				
Were there any BMP not properly implemented or breaches, malfunctions, leakages or spills observed which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				
If sampling indicated pollution of the storm water, were the leaks, breaches, spills, etc. cleaned up and the contaminated soil properly disposed of?				
Were the BMP maintained or replaced?				
Were soil amendments (e.g., gypsum, lime) used on the project?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan in the BMP Implementation Plan?				
If sampling indicated pollution of the storm water by the use of the soil amendments, is there a contingency plan for retention onsite of the polluted storm water?				
Did storm water contact stored materials or waste and run off the construction site? (Materials not in watertight containers, etc.)				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan in the BMP Implementation Plan?				





<hr/> OWNER Project Number
-------------------------------

**Los Angeles Unified School District  
As OWNER  
ATTACHMENT "B"**

STATE OF CALIFORNIA STATE WATER BOARD WDID  NO.
---

**COMPLIANCE CERTIFICATION**

School Name: _____	Contract Number _____
Project Description: _____	

**ANNUAL CERTIFICATION**

I certify the Project has met the following conditions: All elements of the BMP Implementation Plan are in place; construction materials and equipment maintenance waste have been disposed of properly; and the Project site is in compliance with all local storm water management requirements including erosion/sediment control requirements, and the appropriate use permits have been obtained.

CONTRACTOR: \_\_\_\_\_

Print Name: \_\_\_\_\_ Title: \_\_\_\_\_

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

**SUBSTANTIAL COMPLETION CERTIFICATION**

I certify the Project has been completed and the following conditions have been met: All elements of the BMP Implementation Plan have been completed; construction materials and equipment maintenance waste have been disposed of properly; the Project site is in compliance with all local storm water management requirements including erosion/sediment control requirements and the appropriate use permits have been obtained; and a post-construction storm water operation, and management plan is in place.

CONTRACTOR: \_\_\_\_\_

Print Name: \_\_\_\_\_ Title: \_\_\_\_\_

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



Los Angeles Unified School District  
Facilities Services Division

REPORT DATE
-------------

ATTACHMENT "B" (CONT.)

**CERTIFICATION CHECK LIST**

SITE

PROJECT NUMBER \_\_\_\_\_

IS BMP IMPLEMENTATION PLAN ONSITE AND UPDATED	<input type="checkbox"/> YES	<input type="checkbox"/> NO
TRAINING RECORDS	<input type="checkbox"/> YES	<input type="checkbox"/> NO
CONSTRUCTION SCHEDULE	<input type="checkbox"/> YES	<input type="checkbox"/> NO
EROSION CONTROL PLAN	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Property Line Dileanated	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Active / Inactive Areas	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Drainage Patterns	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Discharge Points	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Sampling Points	<input type="checkbox"/> YES	<input type="checkbox"/> NO
BMPs with legend	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Staging Areas, Stockpiles, entrance exit	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Vehicle Storage, concrete wahsout	<input type="checkbox"/> YES	<input type="checkbox"/> NO
WEEKLY REPORTS FILED	<input type="checkbox"/> YES	<input type="checkbox"/> NO
WEATHER REPORTS	<input type="checkbox"/> YES	<input type="checkbox"/> NO
QUARTERLY NON-STORM	<input type="checkbox"/> YES	<input type="checkbox"/> NO
	LATEST DATED: _____	

BMP IMPLEMENTATION PLAN REVISIONS DOCUMENTED	<input type="checkbox"/> YES	<input type="checkbox"/> NO
--	------------------------------	-----------------------------

PERMIT FEES PAID AND REPORTS FILED	<input type="checkbox"/> YES	<input type="checkbox"/> NO
	LATEST DATED: _____	

DATE OF LAST OEHS INSPECTION VISIT	LATEST DATED: _____
WERE OEHS RECOMMENDATION IMPLEMENTED	<input type="checkbox"/> YES <input type="checkbox"/> NO

CERTIFICATION OF CONTRACTORS QSP

Name	_____
Agency	_____
Number	_____
Expiration Date	_____
Email	_____
Phone	_____

COMMENTS

OAR NAME	CONTRACTOR NAME
SIGNATURE	SIGNATURE
DATE	DATE



**Los Angeles Unified School District  
Facilities Services Division**

**Attachment "C"  
Quarterly / Annual Non-Storm Water Form**

**I. WDID NO.** \_\_\_\_\_

**II. FACILITY OPERATOR INFORMATION**

Facility Name \_\_\_\_\_ Contact Person \_\_\_\_\_

\_\_\_\_\_

Mailing Address \_\_\_\_\_ Title \_\_\_\_\_

\_\_\_\_\_

City \_\_\_\_\_ State **CA** Zip \_\_\_\_\_ Phone \_\_\_\_\_

\_\_\_\_\_

**III. FACILITY SITE INFORMATION**

Facility Name \_\_\_\_\_ Contact Person \_\_\_\_\_

\_\_\_\_\_

Location \_\_\_\_\_ Title \_\_\_\_\_

\_\_\_\_\_

City \_\_\_\_\_ State **CA** Zip \_\_\_\_\_ Phone \_\_\_\_\_

\_\_\_\_\_

**IV. PERMIT LANGUAGE**

All dischargers are required to conduct quarterly, non-storm water visual inspections. For these inspections, the discharger must visually observe each drainage area for the presence of (or indications of prior) unauthorized and authorized non-storm water discharges and their sources.

CGP Section II.E describes authorized non-storm water discharges including those from de-chlorinated potable water sources such as: fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water

ARROYO HIGH SCHOOL  
GREENHOUSE

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BMP IMPLEMENTATION PLAN  
01 7417-21

## ATTACHMENT "C" (Cont.)

dewatering, and other discharges not subject to a separate general NPDES permit adopted by a region. Additionally, authorized non-storm water discharges must not be used to clean up failed or inadequate construction or post-construction BMP designed to keep materials onsite. Authorized non-storm water dewatering discharges may require a permit because some Regional Water Boards have adopted General Permits for dewatering discharges. The General Permit prohibits the discharge of storm water that causes or threatens to cause pollution, contamination, or nuisance.

Non-storm water discharges directly connected to receiving waters or the storm drain system have the potential to negatively impact water quality. The discharger must implement measures to control all non-storm water discharges during construction, and from dewatering activities associated with construction. Examples include; properly washing vehicles in contained areas, cleaning streets, and minimizing irrigation runoff.

Non-storm water discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Non-storm water discharges may non-storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

**V. DOCUMENT CHECKLIST** (Please check each item to verify that the documents are attached)

- |   |  |
|---|--|
| <input type="checkbox"/> Did Authorized Discharge take place  | <input type="checkbox"/> Did Unauthorized Discharge take place |
| <input type="checkbox"/> Form 2 Attached  | <input type="checkbox"/> Form 3 Attached                       |
| <input type="checkbox"/> Complete Form 1 once a Quarter and prior to fire hydrant testing or other authorized discharges. |  |

Attachment "C" (Cont.)  
FORM 1

<b><u>Structural Best Management Practices</u></b> <b><u>Housekeeping for Non-Visible Pollutants</u></b>	<b><u>BMP Conditions</u></b> <b><u>E, NM, N/A</u></b> <b><u>YES OR NO</u></b>	<b><u>Actions Taken or BMP Added</u></b>
Drainage Areas		
Free of Floating & Suspended Material		
Free of Sheen/Discoloration		
Free of Turbidity		
Free of Odor		
<b><u>Construction Materials Storage Areas</u></b>		
Materials Properly Stored		
Pollutants Covered		
Pollutants Bermed		
<b><u>Construction Waste Management</u></b>		
Containment Stockpiled Waste		
Containment Sanitary Facilities		
Containment Waste Watertight Containers		
<b><u>Vehicle Storage/Fueling/Spill Prevention</u></b>		
Fueling Procedures/Designated Areas		
Vehicle Storage with Containment		
Spill Kit Onsite		
<b><u>Concrete Residuals &amp; Washouts Wastes</u></b>		
Properly Placed Washout		
Secondary Containment		
<b><u>Landscape Materials</u></b>		
Stored Away from Flow Lines		
Containment Fertilizers/Soil Amendments		
Secondary Containment Plants		
<b>Observations/Comments:</b>		
<b>E-EFFECTIVE N/M-NEEDS MAINTENANCE N/A-NOT APPLICABLE</b> <b>YES or NO</b>		

## Attachment "C" (Cont.)

**REPORT – PART A FORM 2 QUARTERLY VISUAL OBSERVATIONS OF  
AUTHORIZED NON STORM WATER DISCHARGES (NSWDs)**

- Quarterly dry weather visual observations are required of each authorized NSWD.
- Observe each authorized NSWD source, impacted drainage area, and discharge location.
- Authorized NSWDs must meet the conditions provided in Section D (pages 5-6), of the General Permit.
- Make additional copies of this form as necessary.

QUARTER: <b>JULY-SEPT. DATE:</b>  _	Observers Name: _  Title: Signature:	<b>WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER?</b> <b>YES</b> <input type="checkbox"/> If <b>YES</b> , complete Part B of this form. <b>NO</b> <input type="checkbox"/>
QUARTER:  <b>OCT.-DEC. DATE:</b>  _	Observers Name: _  Title: Signature:	<b>WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER?</b> <b>YES</b> <input type="checkbox"/> If <b>YES</b> , complete Part B of this form. <b>NO</b> <input type="checkbox"/>
QUARTER:  <b>JAN.-MARCH DATE:</b>  _	Observers Name: _  Title: Signature:	<b>WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER?</b> <b>YES</b> <input type="checkbox"/> If <b>YES</b> , complete Part B of this form. <b>NO</b> <input type="checkbox"/>
QUARTER:  <b>APRIL-JUNE DATE:</b>  _	Observers Name: _  Title: Signature:	<b>WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER? NO</b> <b>YES</b> <input type="checkbox"/> If <b>YES</b> , complete Part B of this form. <b>NO</b> <input type="checkbox"/>

Attachment "C" (Cont.)

**REPORT  
FORM 2 – QUARTERLY VISUAL OBSERVATIONS OR AUTHORIZED  
NON-STORM WATER DISCHARGES (NSWDs)**

DATE/TIME OF OBSERVATION	SOURCE AND LOCATION OF AUTHORIZED NSWD  <u>Example:</u> Air conditioner Units on Building C	NAME OF AUTHORIZED NSWD  <u>Example:</u> Air conditioner condensate	DESCRIBE AUTHORIZED NSWD CHARACTERISTICS Indicate weather authorized NSWD is clear, cloudy, or discolored, causing staining, contains floating objects or an oil sheen, has odors, etc.		DESCRIBE ANY REVISED OR NEW BMP's AND PROVIDE THEIR IMPLEMENTATION DATE
			At the NSWD Source	At the NSWD Drainage Area and Discharge Location	
_____ _____ <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____ _____ <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____ _____ <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____ _____ <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____ _____ <input type="checkbox"/> AM <input type="checkbox"/> PM					



Attachment "C" (Cont.)

**REPORT – PART A FORM 3 QUARTERLY VISUAL OBSERVATIONS OF  
UNAUTHORIZED NON STORM WATER DISCHARGES (NSWDs)**

- Unauthorized NSWDs are discharges (such as wash or rinse waters) that do not meet the conditions provided in Section D (pages 5-6) of the General Permit.
- Quarterly visual observations are required to observe current and detect prior unauthorized NSWD.
- Quarterly visual observations are required during dry weather and at all facility drainage areas.
- Each unauthorized NSWD source, impacted drainage area, and discharge location must be identified and observed.
- Unauthorized NSWDs that can not be eliminated within 90 days of observation must be reported to the OWNER in accordance with Section A.10.e of the General Permit.
- Make additional copies of this form as necessary.

<p>QUARTER: <b>JULY-SEPT.</b> DATE/TIME OF OBSERVATIONS _____ <input type="checkbox"/> AM _____ <input type="checkbox"/> PM</p>	<p>Observers Name: _  Title:  Signature:</p>	<p><b>WERE ANY AUTHORIZED NSWDs OBSERVED?</b> YES <input type="checkbox"/> NO <input type="checkbox"/> <b>WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NAWDS?</b> YES <input type="checkbox"/> NO <input type="checkbox"/> If YES, complete Part B of this form.</p>
<p>QUARTER: <b>OCT.-DEC.</b> DATE/TIME OF OBSERVATIONS _____ <input type="checkbox"/> AM _____ <input type="checkbox"/> PM</p>	<p>Observers Name: _  Title:  Signature:</p>	<p><b>WERE ANY AUTHORIZED NSWDs OBSERVED?</b> YES <input type="checkbox"/> NO <input type="checkbox"/> <b>WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NAWDS?</b> YES <input type="checkbox"/> NO <input type="checkbox"/> If YES, complete Part B of this form.</p>
<p>QUARTER: <b>JAN.-MARCH</b> DATE/TIME OF OBSERVATIONS _____ <input type="checkbox"/> AM _____ <input type="checkbox"/> PM</p>	<p>Observers Name: _  Title:  Signature:</p>	<p><b>WERE ANY AUTHORIZED NSWDs OBSERVED?</b> YES <input type="checkbox"/> NO <input type="checkbox"/> <b>WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NAWDS?</b> YES <input type="checkbox"/> NO <input type="checkbox"/> If YES, complete Part B of this form.</p>
<p>QUARTER: <b>APRIL-JUNE</b> DATE/TIME OF OBSERVATIONS _____ <input type="checkbox"/> AM _____ <input type="checkbox"/> PM</p>	<p>Observers Name: _  Title:  Signature:</p>	<p><b>WERE ANY AUTHORIZED NSWDs OBSERVED?</b> YES <input type="checkbox"/> NO <input type="checkbox"/> <b>WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NAWDS?</b> YES <input type="checkbox"/> NO <input type="checkbox"/> If YES, complete Part B of this form.</p>

Attachment "C" (Cont.)

**REPORT**  
**FORM 3 – QUARTERLY VISUAL OBSERVATIONS OR UNAUTHORIZED**  
**NON-STORM WATER DISCHARGES (NSWDs)**

OBSERVATION DATE (FROM REVERSE SIDE)	NAME OF UNAUTHORIZED NSWD  Example: Vehicle Wash Water	SOURCE AND LOCATION OF AUTHORIZED NSWD  Example: NW Corner of Parking Lot	DESCRIBE UNAUTHORIZED NSWD CHARACTERISTICS Indicate weather unauthorized NSWD is clear, cloudy, or discolored, causing stains, contains floating objects or an oil sheen, has odors, etc.		DESCRIBE CORRECTIVE ACTIONS TO ELIMINATE UNAUTHORIZED NSWD AND TO CLEAN IMPACTED DRAINAGE AREAS. PROVIDE UNAUTHORIZED NSWD ELIMINATION DATE
			AT THE UNAUTHORIZED NSWD SOURCE	AT THE UNAUTHORIZED NSWD DRAINAGE AREA AND DISCHARGE LOCATION	
_____  <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____  <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____  <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____  <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____  <input type="checkbox"/> AM <input type="checkbox"/> PM					



ATTACHMENT "D"  
LAUSD CONSTRUCTION STORM WATER TRAINING FORM

**CONTRACTOR MAY USE HIS OWN FORM.**

MEETING DATE	PROJECT	PROJECT NUMBER
--------------	---------	----------------

ATTENDANCE-SIGNATURE (Add additional sheets if required)		
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

STORM WATER TOPICS DISCUSSED

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---

SUGGESTIONS / COMMENTS

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OAR COMMENTS

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OAR SIGNATURE	DATE	CONTRACTOR	DATE
---------------	------	------------	------

SUGGESTED TOPICS FOR DISCUSSION

<input type="checkbox"/> PREPARING FOR A STORM EVENT	<input type="checkbox"/> GOOD HOUSEKEEPING	<input type="checkbox"/> MAINTENANCE POST BMPS
<input type="checkbox"/> MAINTAINING STOCKPILES	<input type="checkbox"/> SOURCE CONTROL	<input type="checkbox"/> CASQA MANUAL
<input type="checkbox"/> DUST CONTROL	<input type="checkbox"/> OAR ROLE & RESPONSIBILITY	<input type="checkbox"/> SWPPP UPDATING
<input type="checkbox"/> TRAINING NEW STAFF	<input type="checkbox"/> CONTRACTOR ROLE	<input type="checkbox"/> SCHEDULING
<input type="checkbox"/> RECORD KEEPING	<input type="checkbox"/> FREQUENTLY ASKED QUESTIONS	<input type="checkbox"/> PREVENTING FLOODING

END OF ATTACHMENTS

## SECTION 01 7417

## BMP IMPLEMENTATION PLAN

(FOR SITES WITH LAND DISTURBANCE OF LESS THAN ONE ACRE)

## PART 1 - GENERALA

## 1.01 SUMMARY

## C. Section Includes:

4. Storm water permitting and certification as required by local regulations.
5. Preparation, implementation, upkeep and monitoring of BMP Implementation Plan.
6. Control runoff and pollutants from the site during construction activities

## D. Related Requirements:

3. Division 01 – General Requirements.
4. Section 33 4000 – Storm Drainage Utilities.

## 1.02 ACRONYMS AND DEFINITIONS

BMP	Best Management Practice.
CAN	Corrective Action Notice.
CASQA	California Stormwater Quality Association.
CGP	NPDES General Permit for Storm Water Discharges Associated with Construction Activities.
DWQ	Division of Water Quality.
LARWQCB	Los Angeles Regional Water Quality Control Board.
NPDES	National Pollutant Discharge Elimination System.
OEHS	LAUSD Office of Environmental Health and Safety.
QRE	Qualifying Rain Event, is an event that produces 0.5 inches of precipitation with a 48 hour or more period between rain events.
QSD	Qualified SWPPP Developer.
QSP	Qualified SWPPP Practitioner.
RISK LEVEL	As defined by CGP.
SWPPP	Storm Water Pollution Prevention.

SWRCB            State Water Resources Control Board.  
WPCD            Water Pollution Control Drawing.

### 1.03            REQUIREMENTS

- F.            CONTRACTOR shall assign a QSP and QSD for the Work of this Section.
- G.            Prior to start of Construction, CONTRACTOR shall:
6.            Submit QSP and QSD qualifications.
  7.            Develop a BMP implementation, inspection, and maintenance plan, certified by QSD, in accordance with CGP Attachment C - Risk Level 1 Requirements, which shall include:
    - f.            Provide WPCD to reflect proposed construction staging, phasing, schedule and other construction activities.
    - g.            Good Site Management "Housekeeping".
    - h.            Erosion, Sediment, Tracking, and Wind Erosion Control BMPs.
    - i.            Non-storm Water Control BMPs.
    - j.            Waste Management BMPs.
  8.            Incorporate BMP activities into the Project Schedule.
  9.            Secure and pay for deposits, permits inspections.
  10.          Inform CONTRACTOR and Subcontractors personnel on the BMP procedures to prevent pollutants from entering the storm drain system, before they start construction activities.
- H.            During Construction:
13.          Implement, install and maintain BMPs. Insure that BMPs are designed to protect all exposed portions of the site.
  14.          Conduct and document storm water training of CONTRACTOR site personnel and provide records of training to OAR. See Attachment "D" for sample training log. Keep personnel informed of the BMP implementation process and changes.
  15.          Conduct site inspection of pollution prevention controls and provide Site Monitoring Reports:
    - 1)          At least weekly.
    - 2)          Within 48 hours prior to a QRE.
    - 3)          Within 48 hours after a QRE, conduct a post-storm event inspection to identify whether BMPs are adequately designed, implemented,

and effective. Identify additional BMPs necessary and revise the BMP Implementation Plan accordingly.

- 4) Before and after a QRE.
- 5) At least once each 24 hours during extended storm events.
- 6) Conduct quarterly non-storm water inspection (per Attachment "C").
16. Prepare and maintain, at the Project site, a log of each inspection using Site Monitoring Report forms (Attachment "A", at the end of this Section.
17. Conduct quarterly non-storm water inspection (per Attachment "C").
18. Provide verification annually, no later than July 15, that construction activities are in compliance with BMP Implementation Plan (Attachment "B"). Non-compliance shall be reported to OAR immediately.
19. Provide to OAR Site Inspection reports, BMP plan revisions, and Compliance Certifications.
20. Participate in quarterly BMP inspections with representative from OWNER'S OEHS. Correct CAN items issued by OEHS.
21. Update Post Construction BMP Installation and Maintenance Log per Section 33 4000, Storm Drainage Utilities.
22. Markup the Post-Construction BMP Maintenance Plan provided by the ARCHITECT to reflect as-built conditions and submit to OAR.
23. Retain the BMP Implementation Plan on site and keep it updated until Substantial Completion.
24. Pay fines and penalties from regulatory agencies against OWNER due to CONTRACTOR'S non-compliance with storm water regulations. OWNER shall recover costs of fines and penalties by appropriate OWNER assessment. Review of the BMP Implementation Plan and inspection log by OAR shall not relieve CONTRACTOR from liabilities arising from non-compliance of storm water pollution regulations.

I. At Substantial Completion:

6. Handover maintenance log and maintenance plan to OAR.
7. Provide Site Monitoring Reports, BMP Implementation Plan revisions, Annual Compliance Certifications and related documents to OAR.
8. Conduct Post-Construction BMP training of OWNER personnel.
9. Notify OAR to schedule a meeting with OEHS to confirm Substantial Completion of BMP Implementation Plan.
10. Submit to OWNER Substantial Completion Certification that the Project has met all of the conditions of the BMP implementation Plan (Attachment "B"). Post-construction storm water operation and management plan as

mentioned in the compliance certifications are considered to be in place at Substantial Completion.

J. OWNER:

3. OWNER'S Project Inspector and OEHS Inspector will conduct inspection and examination of the BMP Implementation Plan.
4. OWNER Maintenance and Operations will maintain prevention controls left in place after CONTRACTOR receives Substantial Completion.

1.04 SUBMITTALS

C. BMP Implementation Plan:

3. Submit two compact disks of BMP Implementation Plan.
4. Provide the following documentation to OAR:
  - g. BMP material quality, grade, type as specified in the CASCA BMP Handbook.
  - h. QSP and QSD training and qualifications.
  - i. Electronic copy of weekly and quarterly inspection reports and annual compliance certifications.
  - j. Training records of CONTRACTOR site personnel.
  - k. BMP implementation schedule.
  - l. WPCD revisions..

D. Closeout Documents: At Substantial Completion provide one hard copy and two CD's with electronic files in PDF format of the documents listed below to OAR. OAR will forward records electronically to OWNER Supervising Civil Engineer for retention period of three years.

8. BMP implementation and Monitoring Program.
9. Inspection Records.
10. Annual Compliance Certifications and Check Lists.
11. Training Records for CONTRACTOR and OWNER personnel.
12. Maintenance records for post construction BMP.
13. Post Construction BMP Maintenance Plan.
14. Substantial Completion Certification.

1.05 QUALITY ASSURANCE

C. Regulatory Requirements: Comply with the following requirements:

ARROYO HIGH SCHOOL  
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BMP IMPEMETATION PLAN  
01 7417-32

[Redacted]

- 4. National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Lands Disturbance Activities; ORDER NO. 2009-0009-DWQ; NPDES NO. CAS000002, adopted by the State Water Resources Control Board.
- 5. Regulations of the California Environmental Protection Agency, State Water Resources Control Board; Los Angeles Regional Water Control Board, and local ordinances.
- 6. CASQA Stormwater Best Management Practice Handbook for Construction Activity (BMP Handbook) current adopted edition.

[Redacted]

D. CONTRACTOR’s QSP/QSD shall meet the following qualifications:

- 3. Current certification as a CASQA Qualified SWPPP Practitioner/Developer.
- 4. Two years minimum experience in erosion and sediment control and knowledgeable in the requirements of SWPPP, Best Management Practices and CGP.

1.06 STORAGE AND PROTECTION

- B. Provide proper storage of materials and equipment to prevent rain and storm water runoff to come in contact with pollutants, such as soil stabilizers, paint or fluids from vehicles.

1.07 TRAINING OF OWNER PERSONNEL

[Redacted]

- B. Training of Owner’s personnel shall include 8 hours of on-site overview and maintenance of the following Post Construction BMPs:

- 6. Bioretention Facilities, Planter Boxes and Proprietary Biotreatment Devices.
- 7. Vegetated Swales, Vegetated Filter Strips and Green Roofs.
- 8. Sand Filters and Cartridge Media Filters.
- 9. Infiltration Trenches, Dry Wells, Proprietary Infiltration Devices and Permeable Pavement.
- 10. Hydrodynamic Devices and Catch Basin Inserts.



- B. Training of Owner’s personnel on the Post Construction BMPs shall be per Section 33 4000, Storm Drainage Utilities.

1.08 ATTACHMENTS

- B. The following attachments are included at the end of this Section:
  - 5. Attachment “A” - Site Monitoring Report.
  - 6. Attachment “B” - Compliance Certification and Checklist.
  - 7. Attachment “C” – Quarterly Non-Storm Water Form.
  - 8. Attachment “D” – Sample LAUSD Construction Storm Water Training Form.
- B. The following attachments are included at the end of Section 33 4000:
  - 2. Attachment “A” - Post-Construction BMP Maintenance Plan.

PART 2 - PRODUCTS

2.01 MATERIALS

- B. Provide quality, grade and type of materials as specified in CASQA Stormwater Best Management Practice, Handbook.

PART 3 – EXECUTION

3.01 IMPLEMENTATION

- I. Install perimeter controls prior to starting Work at the Project site.
- J. Implement BMP plan to contain on-site storm water on the Project site. Provide storm drain inlet protection. Do not drain on-site water directly into the storm drain without proper BMP in place.
- K. Prevent pollutant discharges into the storm drain system. Prevent storm water from coming into contact with pollutants, such as sediment, material spills, or leakage from storage tanks, waste containers or transfer areas. In the event contamination is found CONTRACTOR shall immediately notify OAR who will contact the OEHS.
- L. Protect exposed dirt, such as stockpiles, landscaping areas, and hillsides.
- M. Properly manage non-storm water discharges such as ground water, broken utility lines and fire hydrant testing per BMP Implementation Plan.
- N. Adjust BMP’s locations and layouts in accordance to construction progress to assure compliance to regulations.

- O. Conduct inspections of pollution prevention controls and provide Site Monitoring Report to OAR immediately if pollutants are discharged into the site runoff. CONTRACTOR shall remediate contaminated water.
- P. Upon Substantial Completion: Maintain and leave post-construction storm water pollution prevention controls in place and remove those that are not needed as determined by the QSD and OAR.

3.02 CLOSEOUT

- B. Verify the following prior to Substantial Completion:
  - 8. Elements of the BMP Implementation Plan have been completed.
  - 9. Final stabilization of site has been demonstrated.
  - 10. There is no potential for construction related storm water pollutants to be discharged into site runoff.
  - 11. Construction related equipment and temporary BMP have been removed from site.
  - 12. Rubbish, debris, and waste materials have been removed and legally disposed of off the Project site.
  - 13. OEHS CAN items have been closed and signed-off.
  - 14. Post-Construction BMP Maintenance plan has been established.

END OF SECTION

_____ — OWNER Project Number
------------------------------------

**Los Angeles Unified School District  
As OWNER  
ATTACHMENT "A"  
STORM WATER POLLUTION  
PREVENTION  
SITE MONITORING REPORT**

STATE OF CALIFORNIA STATE WATER RESOURCES CONTROL BOARD
---

School Name: _____	Contract Number
Project Description: _____	

**I. Type of Examination:** (Use one form for each type of examination):

- Prior to Anticipated Storm Event     
  After Actual Storm Event     
  Weekly

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

**II. Check the response for each BMP Implementation Plan question below:**

	YES	NO
7. Do you have an updated Storm Water Pollution Prevention Plan (BMP Implementation Plan) and a BMP Handbook on the Project site?	<input type="checkbox"/>	<input type="checkbox"/>
8. Does your BMP Implementation Plan incorporate an up-to-date erosion control plan?	<input type="checkbox"/>	<input type="checkbox"/>
9. Is the erosion control installed per plan?	<input type="checkbox"/>	<input type="checkbox"/>
10. Is the Work at a stage where the erosion control plan can not be constructed, is the erosion control at the Maximum Extent Practicable for the stage you are in?	<input type="checkbox"/>	<input type="checkbox"/>
11. Did you observe the presence of any floating materials such as oil, grease, pieces of wood, paper, etc., odor, toxics, and/ or sediments?	<input type="checkbox"/>	<input type="checkbox"/>
12. If yes, what is it that you observed? _____		

**III. Check the status of the following items as observed:**

BMP Implementation Plan Items	Not Applicable	Acceptable	Not Acceptable	Repairs Required	Date Repairs Completed
18. De-silting Basins (Cleaned)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
19. Water Quality Basin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
20. Silt Fences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
21. Hay bales/ Check dams/ Sandbags	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
22. Berms and Dikes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
23. Sand/Gravel Inlet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
24. Slope Protection - Polymer and Mulch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
25. Vegetation / Re-vegetation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
26. Dust Control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
27. Surface Erosion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
28. Slope Instability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
29. Storage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
30. Disposal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
31. Spills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
32. Clean-up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
33. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>
34. _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	<input type="checkbox"/>

**IV. Describe any problems or required repairs checked above and the necessary actions needed:**

Item	Description of Problem or Required Repair	Action Needed
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Examination Performed by  
CONTRACTOR:

\_\_\_\_\_ By (Print Name and Title) \_\_\_\_\_ Date

Verified by Inspector:

\_\_\_\_\_ By (Print Name and Title) \_\_\_\_\_ Date



## Detailed Storm Water Quality Construction Site Inspection Checklist

ATTACHMENT "A" (Cont.)

<b>GENERAL INFORMATION</b>				
Project Name				
Project Number	LAUSD Ref. No.			
Contractor				
Inspector's Name				
Inspector's Title				
Signature				
Date of Inspection				
Inspection Type (Check Applicable)	<input type="checkbox"/> Prior to forecast rain		<input type="checkbox"/> After a rain event	
	<input type="checkbox"/> 24-hr intervals during extended rain		<input type="checkbox"/> Other <u>Weekly</u> or <u>Quarterly</u>	
Season (Check Applicable)	<input type="checkbox"/> Rainy		<input type="checkbox"/> Non-Rainy	
Storm Data	Storm Start Date & Time:		Storm Duration (hrs):	
	Time elapsed since last storm (Circle Applicable Units)	Min. Hr. Days	Approximate Rainfall Amount (inches)	

<b>PROJECT AREA SUMMARY AND DISTURBED SOIL AREA (DSA) SIZE</b>	
Total Project Area	_____ Acres
Field Estimate of Active DSAs	_____ Acres
Field Estimate of Non-Active DSAs	_____ Acres

INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
<b>Preservation of Existing Vegetation</b>				
Is temporary fencing provided to preserve vegetation in areas where no construction activity is planned?				
Location:				
Location:				
Location:				
Location:				
<b>Erosion Control</b>				
Does the applied temporary erosion control provide 100% coverage for the affected areas?				
Are any non-vegetated areas that may require temporary erosion control?				
Is the area where erosion controls are used required free from visible erosion?				
Location:				
Location:				
Location:				
Location:				
<b>Temporary Linear Sediment Barriers (Silt Fence, Fiber Rolls, Sandbag Barriers, etc.)</b>				
Are temporary linear sediment barriers properly installed, functional and maintained?				
Are temporary linear sediment barriers free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				
Are cross barriers installed where necessary and properly spaced?				
Location:				
Location:				
Location:				
Location:				
Location:				
<b>Storm Drain Inlet Protection</b>				
Are storm drain inlets internal to the project properly protected?				
Are storm drain inlet protection devices in working order and being properly maintained?				
Location:				
Location:				
Location:				
Location:				

INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
Location:				
<b>Sediment Basins</b>				
Are basins designed in accordance with the requirements of the General Permit?				
Are basins maintained to provide the required retention/detention?				
Are basin controls (inlets, outlets, diversions, weirs, spillways, and racks) in working order?				
Location:				
Location:				
Location:				
Location:				
<b>Stockpiles</b>				
Are all locations of temporary stockpiles, including soil, hazardous waste, and construction materials in approved areas?				
Are stockpiles protected from run-on, run-off from adjacent areas and from winds?				
Are stockpiles located at least 15 m from concentrated flows, downstream drainage courses and storm drain inlets?				
Are required covers and/or perimeter controls in place?				
Location:				
Location:				
Location:				
Location:				
<b>Concentrated Flows</b>				
Are concentrated flow paths protected and free from visible erosion?				
Location:				
Location:				
Location:				
Location:				
<b>Tracking Control</b>				
Is the entrance stabilized to prevent tracking				
Is the stabilized entrance inspected daily to ensure that it is working properly				
Are points of ingress/egress to public/private roads inspected and swept and vacuumed as needed?				
Are all paved areas free of visible sediment tracking or other particulate matter?				
Location:				



INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
Location:				
Location:				
Location:				
<b>Wind Erosion Control</b>				
Is dust control implemented?				
Location:				
Location:				
Location:				
Location:				
<b>Dewatering Operations</b>				
Are all one-time dewatering operations covered by the General Permit inspected before and as they occur and BMP implemented as necessary during discharge?				
Is ground water dewatering handled in conformance with the dewatering permit issued by the LARWQCB?				
Is required treatment provided for dewatering effluent?				
Location:				
Location:				
Location:				
Location:				
<b>Vehicle &amp; Equipment Fueling, Cleaning, and Maintenance</b>				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				
Are dedicated fueling, cleaning, and maintenance areas located at least 15 m away from downstream drainage facilities and watercourses and protected from run-on and runoff?				
Is wash water contained for infiltration/ evaporation and disposed of appropriately?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
On each day of use, are vehicles and equipment inspected for leaks and if necessary, repaired?				
Location:				
Location:				
Location:				

INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
Location:				
<b>Waste Management &amp; Materials Pollution Control</b>				
Are material storage areas and washout areas protected from run-on and runoff, and located at least 15 m from concentrated flows and downstream drainage facilities?				
Are all material handling and storage areas clean; organized; free of spills, leaks, or any other deleterious material; and stocked with appropriate clean-up supplies?				
Are liquid materials, hazardous materials, and hazardous wastes stored in temporary containment facilities?				
Are bagged and boxed materials stored on pallets?				
Are hazardous materials and wastes stored in appropriate, labeled containers?				
Are proper storage, clean-up, and spill-reporting procedures for hazardous materials and wastes posted in open, conspicuous and accessible locations adjacent to storage areas?				
Are temporary containment facilities free of spills and rainwater?				
Are temporary containment facilities and bagged/boxed materials covered?				
Are temporary concrete washout facilities designated and being used?				
Are temporary concrete washout facilities functional for receiving and containing concrete waste and are concrete residues prevented from entering the drainage system?				
Do temporary concrete washout facilities provide sufficient volume and freeboard for planned concrete operations?				
Are concrete wastes, including residues from cutting and grinding, contained and disposed of off-site or in concrete washout facilities?				
Are spills from mobile equipment fueling and maintenance properly contained and cleaned up?				
Is the site free of litter?				
Are trash receptacles provided in the yard, field trailer areas, and at locations where workers congregate for lunch and break periods?				
Is litter from work areas collected and placed in watertight dumpsters?				
Are waste management receptacles free of leaks?				
Are the contents of waste management receptacles properly protected from contact with storm water or from being dislodged by winds?				
Are waste management receptacles filled at or beyond capacity?				
Location:				
Location:				
Location:				

INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
Location:				
<b>Temporary Water Body Crossing or Encroachment</b>				
Are temporary water body crossings and encroachments constructed appropriately?				
Does the project conform to the requirements of the 404 permit and/or 1601 agreement?				
Location:				
Location:				
Location:				
Location:				
<b>Illicit Connection/ Discharge</b>				
Is there any evidence of illicit discharges or illegal dumping on the project site?				
If yes, has the Owner/Operator been notified?				
Location:				
Location:				
Location:				
Location:				
<b>Discharge Points</b>				
Are discharge points and discharge flows free from visible pollutants?				
Are discharge points free of any significant sediment transport?				
Location:				
Location:				
Location:				
Location:				
<b>BMP Implementation Plan Update</b>				
Does the BMP Implementation Plan and Project Schedule adequately reflect the current site conditions and contractor operations?				
Are all BMP shown on the Erosion Control Plans installed in the proper location(s) and according to the details in the BMP Implementation Plan?				
Location:				
Location:				
Location:				
Location:				
<b>General</b>				

INSPECTION OF BMP - ATTACHMENT "A" (Cont.)				
BMP	Yes	No	N/A	Corrective Action
Are there any other potential concerns at the site?				
Location:				
Location:				
Location:				
Location:				
<b>Storm Water Monitoring</b>				
Does storm water discharge directly to a water body listed in the General Permit as impaired for sediment/sedimentation or turbidity?				
If yes, were samples for sediment/sedimentation or turbidity collected pursuant to the sampling and analysis plan in the BMP Implementation Plan?				
Did the sampling results indicate that the discharges are causing or contributing to further impairment?				
If yes, were the erosion/sediment control BMP improved or maintained to reduce the discharge of sediment to the water body?				
Were there any BMP not properly implemented or breaches, malfunctions, leakages or spills observed which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				
If sampling indicated pollution of the storm water, were the leaks, breaches, spills, etc. cleaned up and the contaminated soil properly disposed of?				
Were the BMP maintained or replaced?				
Were soil amendments (e.g., gypsum, lime) used on the project?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan in the BMP Implementation Plan?				
If sampling indicated pollution of the storm water by the use of the soil amendments, is there a contingency plan for retention onsite of the polluted storm water?				
Did storm water contact stored materials or waste and run off the construction site? (Materials not in watertight containers, etc.)				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan in the BMP Implementation Plan?				



<hr/> <p>OWNER Project Number</p>
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**Los Angeles Unified School District  
As OWNER  
ATTACHMENT "B"**

<p>STATE OF CALIFORNIA STATE WATER BOARD WDID NO.</p>
---

**COMPLIANCE CERTIFICATION**

School Name: _____	Contract Number _____
Project Description: _____	

**ANNUAL CERTIFICATION**

I certify the Project has met the following conditions: All elements of the BMP Implementation Plan are in place; construction materials and equipment maintenance waste have been disposed of properly; and the Project site is in compliance with all local storm water management requirements including erosion/sediment control requirements, and the appropriate use permits have been obtained.

CONTRACTOR: \_\_\_\_\_

Print Name: \_\_\_\_\_ Title: \_\_\_\_\_

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

**SUBSTANTIAL COMPLETION CERTIFICATION**

I certify the Project has been completed and the following conditions have been met: All elements of the BMP Implementation Plan have been completed; construction materials and equipment maintenance waste have been disposed of properly; the Project site is in compliance with all local storm water management requirements including erosion/sediment control requirements and the appropriate use permits have been obtained; and a post-construction storm water operation, and management plan is in place.

CONTRACTOR: \_\_\_\_\_

Print Name: \_\_\_\_\_ Title: \_\_\_\_\_

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



Los Angeles Unified School District  
Facilities Services Division

REPORT DATE
-------------

ATTACHMENT "B" (CONT.)

**CERTIFICATION CHECK LIST**

SITE		
PROJECT NUMBER _____		
IS BMP IMPLEMENTATION PLAN ONSITE AND UPDATED	<input type="checkbox"/> YES	<input type="checkbox"/> NO
TRAINING RECORDS	<input type="checkbox"/> YES	<input type="checkbox"/> NO
CONSTRUCTION SCHEDULE	<input type="checkbox"/> YES	<input type="checkbox"/> NO
EROSION CONTROL PLAN	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Property Line Dileanated	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Active / Inactive Areas	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Drainage Patterns	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Discharge Points	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Sampling Points	<input type="checkbox"/> YES	<input type="checkbox"/> NO
BMPs with legend	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Staging Areas, Stockpiles, entrance exit	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Vehicle Storage, concrete wahsout	<input type="checkbox"/> YES	<input type="checkbox"/> NO
WEEKLY REPORTS FILED	<input type="checkbox"/> YES	<input type="checkbox"/> NO
WEATHER REPORTS	<input type="checkbox"/> YES	<input type="checkbox"/> NO
QUARTERLY NON-STORM	<input type="checkbox"/> YES	<input type="checkbox"/> NO
	LATEST DATED: _____	

BMP IMPLEMENTATION PLAN REVISIONS DOCUMENTED	<input type="checkbox"/> YES	<input type="checkbox"/> NO
--	------------------------------	-----------------------------

PERMIT FEES PAID AND REPORTS FILED	<input type="checkbox"/> YES	<input type="checkbox"/> NO
	LATEST DATED: _____	

DATE OF LAST OEHS INSPECTION VISIT	LATEST DATED: _____
WERE OEHS RECOMMENDATION IMPLEMENTED	<input type="checkbox"/> YES <input type="checkbox"/> NO

CERTIFICATION OF CONTRACTORS QSP	
Name	_____
Agency	_____
Number	_____
Expiration Date	_____
Email	_____
Phone	_____

COMMENTS	
OAR NAME	CONTRACTOR NAME
SIGNATURE	SIGNATURE
DATE	DATE



**Los Angeles Unified School District  
Facilities Services Division**

**Attachment "C"  
Quarterly / Annual Non-Storm Water Form**

**I. WDID NO.** \_\_\_\_\_

**II. FACILITY OPERATOR INFORMATION**

Facility Name \_\_\_\_\_ Contact Person \_\_\_\_\_

\_\_\_\_\_

Mailing Address \_\_\_\_\_ Title \_\_\_\_\_

\_\_\_\_\_

City \_\_\_\_\_ State **CA** Zip \_\_\_\_\_ Phone \_\_\_\_\_

\_\_\_\_\_

**III. FACILITY SITE INFORMATION**

Facility Name \_\_\_\_\_ Contact Person \_\_\_\_\_

\_\_\_\_\_

Location \_\_\_\_\_ Title \_\_\_\_\_

\_\_\_\_\_

City \_\_\_\_\_ State **CA** Zip \_\_\_\_\_ Phone \_\_\_\_\_

\_\_\_\_\_

**IV. PERMIT LANGUAGE**

All dischargers are required to conduct quarterly, non-storm water visual inspections. For these inspections, the discharger must visually observe each drainage area for the presence of (or indications of prior) unauthorized and authorized non-storm water discharges and their sources.

CGP Section II.E describes authorized non-storm water discharges including those from de-chlorinated potable water sources such as: fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water

ARROYO HIGH SCHOOL  
GREENHOUSE

DSA SUBMITTAL 01/17/20  
BMP IMPLEMENTATION PLAN  
01 7417-49



## ATTACHMENT "C" (Cont.)

dewatering, and other discharges not subject to a separate general NPDES permit adopted by a region. Additionally, authorized non-storm water discharges must not be used to clean up failed or inadequate construction or post-construction BMP designed to keep materials onsite. Authorized non-storm water dewatering discharges may require a permit because some Regional Water Boards have adopted General Permits for dewatering discharges. The General Permit prohibits the discharge of storm water that causes or threatens to cause pollution, contamination, or nuisance.

Non-storm water discharges directly connected to receiving waters or the storm drain system have the potential to negatively impact water quality. The discharger must implement measures to control all non-storm water discharges during construction, and from dewatering activities associated with construction. Examples include; properly washing vehicles in contained areas, cleaning streets, and minimizing irrigation runoff.

Non-storm water discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Non-storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

**V. DOCUMENT CHECKLIST** (Please check each item to verify that the documents are attached)

- |   |  |
|---|--|
| <input type="checkbox"/> Did Authorized Discharge take place  | <input type="checkbox"/> Did Unauthorized Discharge take place |
| <input type="checkbox"/> Form 2 Attached  | <input type="checkbox"/> Form 3 Attached                       |
| <input type="checkbox"/> Complete Form 1 once a Quarter and prior to fire hydrant testing or other authorized discharges. |  |

Attachment "C" (Cont.)  
FORM 1

<b><u>Structural Best Management Practices</u></b> <b><u>Housekeeping for Non-Visible Pollutants</u></b>	<b><u>BMP Conditions</u></b> <b><u>E, NM, N/A</u></b> <b><u>YES OR NO</u></b>	<b><u>Actions Taken or BMP Added</u></b>
Drainage Areas		
Free of Floating & Suspended Material		
Free of Sheen/Discoloration		
Free of Turbidity		
Free of Odor		
<b><u>Construction Materials Storage Areas</u></b>		
Materials Properly Stored		
Pollutants Covered		
Pollutants Bermed		
<b><u>Construction Waste Management</u></b>		
Containment Stockpiled Waste		
Containment Sanitary Facilities		
Containment Waste Watertight Containers		
<b><u>Vehicle Storage/Fueling/Spill Prevention</u></b>		
Fueling Procedures/Designated Areas		
Vehicle Storage with Containment		
Spill Kit Onsite		
<b><u>Concrete Residuals &amp; Washouts Wastes</u></b>		
Properly Placed Washout		
Secondary Containment		
<b><u>Landscape Materials</u></b>		
Stored Away from Flow Lines		
Containment Fertilizers/Soil Amendments		
Secondary Containment Plants		
<b>Observations/Comments:</b>		
<b>E-EFFECTIVE N/M-NEEDS MAINTENANCE N/A-NOT APPLICABLE</b> <b>YES or NO</b>		

## Attachment "C" (Cont.)

**REPORT – PART A FORM 2 QUARTERLY VISUAL OBSERVATIONS OF  
AUTHORIZED NON STORM WATER DISCHARGES (NSWDs)**

- Quarterly dry weather visual observations are required of each authorized NSWD.
- Observe each authorized NSWD source, impacted drainage area, and discharge location.
- Authorized NSWDs must meet the conditions provided in Section D (pages 5-6), of the General Permit.
- Make additional copies of this form as necessary.

QUARTER: <b>JULY-SEPT. DATE:</b>  _	Observers Name: _  Title: Signature:	<b>WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER?</b> <b>YES</b> <input type="checkbox"/> If <b>YES</b> , complete Part B of this form. <b>NO</b> <input type="checkbox"/>
QUARTER:  <b>OCT.-DEC. DATE:</b>  _	Observers Name: _  Title: Signature:	<b>WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER?</b> <b>YES</b> <input type="checkbox"/> If <b>YES</b> , complete Part B of this form. <b>NO</b> <input type="checkbox"/>
QUARTER:  <b>JAN.-MARCH DATE:</b>  _	Observers Name: _  Title: Signature:	<b>WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER?</b> <b>YES</b> <input type="checkbox"/> If <b>YES</b> , complete Part B of this form. <b>NO</b> <input type="checkbox"/>
QUARTER:  <b>APRIL-JUNE DATE:</b>  _	Observers Name: _  Title: Signature:	<b>WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER? NO</b> <b>YES</b> <input type="checkbox"/> If <b>YES</b> , complete Part B of this form. <b>NO</b> <input type="checkbox"/>

Attachment "C" (Cont.)

**REPORT  
FORM 2 – QUARTERLY VISUAL OBSERVATIONS OR AUTHORIZED  
NON-STORM WATER DISCHARGES (NSWDs)**

DATE/TIME OF OBSERVATION	SOURCE AND LOCATION OF AUTHORIZED NSWD  <u>Example:</u> Air conditioner Units on Building C	NAME OF AUTHORIZED NSWD  <u>Example:</u> Air conditioner condensate	DESCRIBE AUTHORIZED NSWD CHARACTERISTICS Indicate weather authorized NSWD is clear, cloudy, or discolored, causing staining, contains floating objects or an oil sheen, has odors, etc.		DESCRIBE ANY REVISED OR NEW BMP's AND PROVIDE THEIR IMPLEMENTATION DATE
			At the NSWD Source	At the NSWD Drainage Area and Discharge Location	
_____ ____ <input type="checkbox"/> AM ____ <input type="checkbox"/> PM					
_____ ____ <input type="checkbox"/> AM ____ <input type="checkbox"/> PM					
_____ ____ <input type="checkbox"/> AM ____ <input type="checkbox"/> PM					
_____ ____ <input type="checkbox"/> AM ____ <input type="checkbox"/> PM					
_____ ____ <input type="checkbox"/> AM ____ <input type="checkbox"/> PM					

Attachment "C" (Cont.)

**REPORT – PART A FORM 3 QUARTERLY VISUAL OBSERVATIONS OF  
UNAUTHORIZED NON STORM WATER DISCHARGES (NSWDs)**

- Unauthorized NSWDs are discharges (such as wash or rinse waters) that do not meet the conditions provided in Section D (pages 5-6) of the General Permit.
- Quarterly visual observations are required to observe current and detect prior unauthorized NSWD.
- Quarterly visual observations are required during dry weather and at all facility drainage areas.
- Each unauthorized NSWD source, impacted drainage area, and discharge location must be identified and observed.
- Unauthorized NSWDs that can not be eliminated within 90 days of observation must be reported to the OWNER in accordance with Section A.10.e of the General Permit.
- Make additional copies of this form as necessary.

<p>QUARTER: <b>JULY-SEPT.</b> DATE/TIME OF OBSERVATIONS _____ <input type="checkbox"/> AM _____ <input type="checkbox"/> PM</p>	<p>Observers Name: _  Title:  Signature:</p>	<p>WERE ANY AUTHORIZED NSWDs OBSERVED? YES <input type="checkbox"/> NO <input type="checkbox"/> WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NAWDS? YES <input type="checkbox"/> NO <input type="checkbox"/> If YES, complete Part B of this form.</p>
<p>QUARTER: <b>OCT.-DEC.</b> DATE/TIME OF OBSERVATIONS _____ <input type="checkbox"/> AM _____ <input type="checkbox"/> PM</p>	<p>Observers Name: _  Title:  Signature:</p>	<p>WERE ANY AUTHORIZED NSWDs OBSERVED? YES <input type="checkbox"/> NO <input type="checkbox"/> WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NAWDS? YES <input type="checkbox"/> NO <input type="checkbox"/> If YES, complete Part B of this form.</p>
<p>QUARTER: <b>JAN.-MARCH</b> DATE/TIME OF OBSERVATIONS _____ <input type="checkbox"/> AM _____ <input type="checkbox"/> PM</p>	<p>Observers Name: _  Title:  Signature:</p>	<p>WERE ANY AUTHORIZED NSWDs OBSERVED? YES <input type="checkbox"/> NO <input type="checkbox"/> WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NAWDS? YES <input type="checkbox"/> NO <input type="checkbox"/> If YES, complete Part B of this form.</p>
<p>QUARTER: <b>APRIL-JUNE</b> DATE/TIME OF OBSERVATIONS _____ <input type="checkbox"/> AM _____ <input type="checkbox"/> PM</p>	<p>Observers Name: _  Title:  Signature:</p>	<p>WERE ANY AUTHORIZED NSWDs OBSERVED? YES <input type="checkbox"/> NO <input type="checkbox"/> WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NAWDS? YES <input type="checkbox"/> NO <input type="checkbox"/> If YES, complete Part B of this form.</p>

Attachment "C" (Cont.)

**REPORT**  
**FORM 3 – QUARTERLY VISUAL OBSERVATIONS OR UNAUTHORIZED**  
**NON-STORM WATER DISCHARGES (NSWDs)**

OBSERVATION DATE (FROM REVERSE SIDE)	NAME OF UNAUTHORIZED NSWD  <u>Example:</u> Vehicle Wash Water	SOURCE AND LOCATION OF AUTHORIZED NSWD  <u>Example:</u> NW Corner of Parking Lot	DESCRIBE UNAUTHORIZED NSWD CHARACTERISTICS Indicate weather unauthorized NSWD is clear, cloudy, or discolored, causing stains, contains floating objects or an oil sheen, has odors, etc.		DESCRIBE CORRECTIVE ACTIONS TO ELIMINATE UNAUTHORIZED NSWD AND TO CLEAN IMPACTED DRAINAGE AREAS. PROVIDE UNAUTHORIZED NSWD ELIMINATION DATE
			AT THE UNAUTHORIZED NSWD SOURCE	AT THE UNAUTHORIZED NSWD DRAINAGE AREA AND DISCHARGE LOCATION	
_____ <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____ <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____ <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____ <input type="checkbox"/> AM <input type="checkbox"/> PM					
_____ <input type="checkbox"/> AM <input type="checkbox"/> PM					



ATTACHMENT "D"  
LAUSD CONSTRUCTION STORM WATER TRAINING FORM

**CONTRACTOR MAY USE HIS OWN FORM.**

MEETING DATE	PROJECT	PROJECT NUMBER
ATTENDANCE-SIGNATURE (Add additional sheets if required)		
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

STORM WATER TOPICS DISCUSSED

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SUGGESTIONS / COMMENTS

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OAR COMMENTS

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OAR SIGNATURE	DATE	CONTRACTOR	DATE
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SUGGESTED TOPICS FOR DISCUSSION

<input type="checkbox"/> PREPARING FOR A STORM EVENT	<input type="checkbox"/> GOOD HOUSEKEEPING	<input type="checkbox"/> MAINTENANCE POST BMPS
<input type="checkbox"/> MAINTAINING STOCKPILES	<input type="checkbox"/> SOURCE CONTROL	<input type="checkbox"/> CASQA MANUAL
<input type="checkbox"/> DUST CONTROL	<input type="checkbox"/> OAR ROLE & RESPONSIBILITY	<input type="checkbox"/> SWPPP UPDATING
<input type="checkbox"/> TRAINING NEW STAFF	<input type="checkbox"/> CONTRACTOR ROLE	<input type="checkbox"/> SCHEDULING
<input type="checkbox"/> RECORD KEEPING	<input type="checkbox"/> FREQUENTLY ASKED QUESTIONS	<input type="checkbox"/> PREVENTING FLOODING

END OF ATTACHMENTS

SECTION 01 7419  
CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

## PART 1 - GENERAL

## 1.01 SUMMARY

- A. Section Includes: Preparation and implementation, including reporting and documentation, of a Waste Management Plan for reusing, recycling, salvage or disposal of non-hazardous waste materials generated during demolition and new construction (Construction and Demolition (C&D) Waste), to foster material recovery and re-use and to minimize disposal in land fills.
- B. Related Requirements
  - 1. Section 01 3300 - Submittal Procedures.
  - 2. Section 01 5000 - Construction Facilities and Temporary Controls.
  - 3. Section 01 7700 - Contract Closeout.

## 1.02 REFERENCES

- A. California Integrated Waste Management Act of 1989 (AB 939).
- B. California Code of Regulations Title 14, Section 18700 et seq.
- C. California Green Building Standards Code.

## 1.03 SYSTEM DESCRIPTION

- A. Collection and separation of all C&D waste materials generated on-site, reuse or recycling on-site, transportation to approved recyclers or reuse organizations, or transportation to legally designated landfills, for the purpose of recycling salvaging and reusing a minimum of 75 percent of the C&D waste generated.

## 1.04 SUBMITTALS

- A. C&D Waste Management Plan (Exhibit 1): Within 10 calendar days after the Notice to Proceed and prior to any waste removal, submit the following to the OAR for review and approval. Update quarterly. Include:
  - 1. Materials to be recycled, reused, or salvaged, either onsite or offsite.
  - 2. Estimates of C&D waste quantity (in tons) by type of material. (If waste is measured by volume, give factors for conversion to weight in tons.)
  - 3. Procedures for recycling and reuse program.
  - 4. Permit or license and location of Project waste-disposal areas.
  - 5. Site plan for placement of waste containers.
- B. C&D Waste Management Monthly Progress Report (Exhibit 2): Summary of waste generated by Project, monthly with Application for Payment. Include:
  - 1. Firms accepting the recovered or waste materials.
  - 2. Type and location of accepting facilities (landfill, recovery facility, used materials yard, etcetera). If materials are reused or recycled on the Project site, location should be designated as "on-site reuse and recycling".
  - 3. Type of materials and net weight (tons) of each.
  - 4. Value of the materials or disposal fee paid.



5. Attach weigh bills and other documentation confirming amount and disposal location of waste materials.
- C. C&D Waste Management Final Compliance Report: Final update of Waste Management Plan to provide summary of total waste generated by Project.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 IMPLEMENTATION

- A. Implement approved Waste Management Plan including collecting, segregating, storing, transporting and documenting each type of waste material generated, recycled or reused, or disposed in landfills.
- B. Designate an on-site person to be responsible for instructing workers and overseeing the sorting and recording of waste/ recyclable materials.
- C. Include waste management and recycling in worker orientation and as an agenda item for regular Project meetings.
- D. Recyclable and waste bin areas shall be limited to areas approved on the Waste Management Plan. Keep recycling and waste bins neat and clearly marked to avoid contamination of materials.

3.02 ATTACHMENTS

- A. Exhibit 1: Waste Management Plan
- B. Exhibit 2: Waste Management Monthly Progress Report.

**EXHIBIT 1**

**WASTE MANAGEMENT PLAN  
CONSTRUCTION/ MAINTENANCE/ALTERATION & DEMOLITION PROJECTS**

PROJECT NAME: «PROJECTTITLE» «CONTRACTTITLE»  
 PROJECT NO: «Project Number»  
 NAME OF COMPANY: \_\_\_\_\_  
 CONTACT PERSON: \_\_\_\_\_  
 TELEPHONE: \_\_\_\_\_  
 PROJECT SITE LOCATION: \_\_\_\_\_  
 PROJECT TYPE:  NEW CONSTRUCTION  DEMOLITION  
 MAINTENANCE/ALTERATION PROJECTS  
 PROJECT SIZE (SQ. FT.): \_\_\_\_\_  
 DATE & ESTIMATED PERIOD \_\_\_\_\_

(1) Material Type	(2) Tons Estimated Recycle	(3) Tons Estimated Reuse	(4) Tons Estimated Salvage	(5) Tons Estimated Landfill	(6) Proposed Disposal or Recycling Facility (e.g., Onsite, Name of Facility)
<b>Total</b>					
<b>Diversion Rate: Columns [(2)+(3)+(4)] / [(2)+(3)+(4)+(5)]</b>					<b>=</b>

Signature	Title	Date
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- Column 1 "Material Types" – Enter type of materials targeted for recycling, reuse, and/or salvage, either on- or off-site, and include a category for waste materials requiring disposal.
- Columns 2 thru 4 "Estimated Generation" - Enter estimated quantities (tons) of recyclable, reusable, or salvageable waste materials anticipated to be generated and state number of salvageable items.
- Column 5 "Estimated Landfill" - Enter quantities (tons) of materials to be disposed in landfill.
- Column 4 "Disposal Location" - Enter end-destination of recycled, salvaged, and disposed materials.
- General : (1) Attach proposed Recycling and Waste Bin Location Plan.  
 (2) Attach name and contact data for each recycling or disposal destination to be used.

**EXHIBIT 2**

**WASTE MANAGEMENT PROGRESS REPORT  
CONSTRUCTION/ MAINTENANCE/ALTERATION & DEMOLITION PROJECTS**

PROJECT NAME: «PROJECTTITLE» «CONTRACTTITLE»  
 PROJECT NO: «Project Number»  
 NAME OF COMPANY: \_\_\_\_\_  
 CONTACT PERSON: \_\_\_\_\_  
 TELEPHONE: \_\_\_\_\_  
 PROJECT SITE LOCATION: \_\_\_\_\_  
 PROJECT TYPE:  NEW CONSTRUCTION  DEMOLITION  
 MAINTENANCE/ALTERATION PROJECTS  
 PROJECT SIZE (SQ. FT.): \_\_\_\_\_  
 PERIOD \_\_\_\_\_ to \_\_\_\_\_

(1) Material Type	(2) Tons Actual Recycle	(3) Tons Actual Reuse	(4) Tons Actual Salvage	(5) Tons Actual Landfill	(6) Disposal or Recycling Facility (e.g., Onsite, Name of Facility)
<b>Total</b>					
<b>Diversion Rate: Columns [(2)+(3)+(4)] / [(2)+(3)+(4)+(5)]</b>					<b>=</b>

Signature	Title	Date
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- Column 1 "Material Types" – Enter type of materials targeted for recycling, reuse, and/or salvage, either on- or off-site, and include a category for waste materials requiring disposal.
- Columns 2 thru 4 "Estimated Generation" - Enter estimated quantities (tons) of recyclable, reusable, or salvageable waste materials anticipated to be generated and state number of salvageable items.
- Column 5 "Estimated Landfill" - Enter quantities (tons) of materials disposed.
- Column 4 "Disposal Location" - Enter end-destination of recycled, salvaged, and disposed materials.
- General : (1) Attach proposed Recycling and Waste Bin Location Plan.  
 (2) Attach name and contact data for each recycling or disposal destination to be used.

**END OF SECTION**



## SECTION 01 7700

## CONTRACT CLOSEOUT

## PART 1 - GENERAL

## 1.01 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for Contract Closeout, including but not limited to, the following:
1. Inspection procedures.
  2. Project record documents submittal.
  3. Operation and maintenance manual submittal.
  4. OWNER orientation and instruction.
  5. Final cleaning.

## 1.02 RELATED REQUIREMENTS:

1. Section 01 2976 - Progress Payment Procedures.
2. Section 01 3213 - Construction Schedule.
3. Section 01 3229 - Project Forms.
4. Section 01 3300 - Submittal Procedures.
5. Section 01 4525- Testing, Adjusting, and Balancing of HVAC.
6. Section 01 5000 - Construction Facilities and Temporary Controls.
7. Section 01 7836 - Warranties.

## PART 2 – PRODUCTS (Not used)

## PART 3 - EXECUTION

## 3.01 SUBSTANTIAL COMPLETION

- A. Inspection Procedures: On receipt of the Request For Certificate of Substantial Completion, OAR will authorize commencement of inspection. INSPECTOR, OAR, CONTRACTOR and ARCHITECT will inspect the Work.
1. If after inspection of the Work, OAR does not consider the Work substantially complete, OAR will notify CONTRACTOR.
  2. If after inspection, OAR considers the Work substantially complete, INSPECTOR shall prepare a comprehensive Punch List of items to be corrected.
    - a. INSPECTOR may repeat inspection to assure the Work is corrected.

- b. Results of the completed inspection will form a partial basis of the requirements for Release of Retention.

### 3.02 ADMINISTRATIVE CLOSEOUT

- A. Re-inspection Procedures: INSPECTOR, OAR, CONTRACTOR and ARCHITECT may inspect the Work upon notice, including final inspection of Punch List items from earlier inspections, has been corrected, except for items whose completion is delayed under circumstances acceptable to OAR.
  - 1. OWNER has the right to preclude CONTRACTOR from Punch List correction and documents submittals after the Contract Completion date; unless OWNER elects to authorize CONTRACTOR to extend Administrative Contract duration. CONTRACTOR will be assessed actual cost for the unsettled items. Withholds amounts exceeding actual costs to correct or to obtain deliverable will be released.
  - 2. If allowed by the OAR, re-inspection will be repeated, but may be assessed against CONTRACTOR if OWNER is subject to additional professional service and or additional costs of inspection.

### 3.03 PROJECT RECORD DOCUMENT SUBMITTAL

- A. General: Do not use project record documents for construction purposes. Protect record documents from deterioration and loss. Provide access to record documents for ARCHITECT, INSPECTOR and OAR reference during normal working hours. Project record document shall be updated on a weekly basis. Prior to submitting each application for payment, secure INSPECTOR and ARCHITECT approval of project record documents.
- B. Record Drawings: Maintain a clean, undamaged set of prints of Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark the Drawing that is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Drawings. Provide detailed and accurate field dimensions for concealed elements that would be difficult to measure and record at a later date.
  - 1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work. Date and number entries in the same format as submitted. Call attention to entry by a "cloud" around the affected areas.
  - 2. Mark new information important to OWNER but was not shown on Drawings or Shop Drawings.
  - 3. Utility location and depth below finished grade and above ceilings and attic spaces shall be fully dimensioned and indicated on record drawings. Dimensions shall be measured from building lines or permanent landmarks and shall be triangulated to those features.

4. Note related Change Order or Construction Directive numbers where applicable. RFC submissions shall be referenced on each affected sheet, Drawing and Shop Drawing.
  5. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
  6. Prior to Contract Completion of the Work, review of the project record drawings by ARCHITECT; prepare a final set of project record drawings using reproducible vellum. Submit final set of transparencies to ARCHITECT.
- C. Record Specifications: Maintain two complete copies of the Specifications, including Addenda. Include with the Specifications two copies of other written Contract Documents, such as Change Orders or Construction Directives issued during construction.
1. Mark these record documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
  2. Give particular attention to substitutions and selection of options and information on concealed Work that cannot otherwise be readily discerned later by direct observation.
  3. Note related record document information with Product Data.
  4. Prior to Contract Completion of the Work, submit record Specifications to ARCHITECT for OWNER records.
- D. Record Product Data: Maintain two copies of each Product Data submittal. Note related Change Orders and Construction Directives and mark-up of record drawings and Specifications.
1. Mark these documents to illustrate significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the Project site and from the manufacturer's installation instructions and recommendations.
  2. Provide detailed and accurate information regarding concealed products and portions of Work that cannot otherwise be readily discerned later by direct observation.
  3. Prior to Contract Completion, submit complete set of record Product Data to ARCHITECT for OWNER records.
- E. Record Samples: Immediately prior to Substantial Completion, CONTRACTOR shall meet with ARCHITECT and OAR at the Project site to determine which Samples are to be transmitted to OWNER for record purposes. Comply with OAR instructions regarding delivery to OWNER storage area.

- F. Miscellaneous Records: Refer to other Specification sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Prior to the date of Contract Completion, complete and compile miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to Architect for OWNER records.
- G. Maintenance Manuals: Prior to Substantial Completion, organize operation and maintenance data into suitable two sets of manageable size. Bind properly indexed data in individual, heavy-duty, two to three-inch 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Submit to ARCHITECT for OWNER records. Include the following types of information.
1. Emergency instructions.
  2. Spare parts list.
  3. Copies of warranties.
  4. Wiring diagrams.
  5. Recommended “turn-around” cycles.
  6. Inspection procedures.
  7. Shop Drawings and Product Data.
  8. Fixture lamping schedule.
- H. Verified Reports: Construction progress of the Work shall be reported to DSA via a duly verified report as per Title 24, Part 1, Sections 4-336 and 4-343.c of the California Building Standards Commission’s, California Administrative Code.

#### 3.04 OPERATION AND MAINTENANCE:

- A. Operation and Maintenance Instructions: Prior to Substantial Completion, arrange for each installer of equipment that requires regular operation and maintenance to meet with designated OWNER personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer’s representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
1. Maintenance manuals.
  2. Spare parts and materials.
  3. Tools.
  4. Lubricants.
  5. Fuels.
  6. Identification systems.
  7. Control sequences.



8. Hazards.
  9. Cleaning.
  10. Warranties and bonds.
  11. Maintenance agreements and similar continuing commitments.
- B. As part of instruction for operating equipment, demonstrate the following procedures:
1. Start-up.
  2. Shutdown.
  3. Emergency operations.
  4. Noise and vibration adjustments.
  5. Safety procedures.
  6. Economy and efficiency adjustments.
  7. Effective energy utilization.
- C. Notice Of Termination: CONTRACTOR shall submit a Notice of Termination (NOT) to the local Regional Water Quality Control Board, RWQCB. Provide a copy of NOT to OAR.

### 3.05 FINAL CLEANING

- A. General: Related sections of the Contract Documents specify general cleaning during performance of the Work. General cleaning is included in Division 01 Section "Construction Facilities and Temporary Controls".
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
1. Complete the following cleaning operations before requesting inspection for a certificate of Substantial Completion.
    - a. Remove labels that are not permanent labels.
    - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
    - c. Clean exposed exterior and interior hard-surfaced finished to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
    - d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

- e. Clean the Project site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

END OF SECTION

## SECTION 01 7836

## WARRANTIES

## PART 1 - GENERAL

## 1.01 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for warranties, including manufacturers and installer's standard warranties on products and special product warranties.
  - 1. Refer to the General Conditions for terms of the guarantee period for the Work.

## 1.02 RELATED REQUIREMENTS

- A. Section 01 6000 - Product Requirements.
- B. Section 01 7329 - Cutting and Patching.
- C. Section 01 7700 - Contract Closeout.

## PART 2 - PRODUCTS (Not applicable)

## PART 3 - EXECUTION

## 3.01 WARRANTY REQUIREMENTS

- A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties shall not relieve CONTACTOR of the warranty of the Work incorporating such materials, products, and equipment. Manufacturer's disclaimers and limitations on warranties do not relieve suppliers, manufacturers, installers, and Subcontractors of the requirement to countersign special warranties with CONTRACTOR.
- B. Standard warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to OWNER.
- C. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for OWNER.
- D. Related Damages and Losses: When correcting failed or defective warranted Work, remove and replace Work that has been damaged as a result of such failure or which must be removed and replaced to provide access for correction of warranted Work.
- E. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement with the reinstated warranty equal to the original warranty.

- F. Replacement Cost: Upon determination the Work covered by a warranty has failed and/or is defective, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. CONTRACTOR is responsible for the cost of replacing or rebuilding defective Work regardless of whether OWNER has benefited from use of the Work through a portion of its anticipated useful service life.
- G. OWNER Recourse: Expressed warranties made to OWNER are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which OWNER can enforce such other duties, obligations, rights, or remedies.
- H. Rejection of Warranties: OAR reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- I. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, OAR reserves the right to refuse to accept the Work until CONTRACTOR presents evidence the entities required to countersign such commitments have done so.

### 3.02 SUBMITTALS

- A. Submit written preliminary warranties prior to Substantial Completion and final warranties prior to Contract Completion. If the certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, submit written warranties as set forth in the certificate of Substantial Completion.
  - 1. When a designated portion of the Work is partially used and/or occupied by OWNER, submit properly executed warranties to ARCHITECT within fifteen days of the Partial Use or Occupancy of the designated portion of the Work.
- B. When the Contract Documents require CONTRACTOR, or CONTRACTOR and a Subcontractor, installer, supplier or manufacturer to execute a special warranty, prepare a written document containing appropriate terms and identification, ready for execution by the required parties. Submit a draft to OAR, through the ARCHITECT, for approval prior to final execution.
  - 1. Refer to Divisions 02 through 49 for specific content requirements and particular requirements for submitting special warranties.
- C. Form of Submittal: Prior to Contract Completion, compile two copies of each required final warranty properly executed by CONTRACTOR, or by CONTRACTOR and Subcontractor, installer, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the Specifications.

- D. Bind warranties and bonds in heavy-duty, commercial-quality, durable three ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8½ by 11 paper.
1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the item or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the installer.
  2. Identify each binder on the front and spine with the typed or printed title “WARRANTIES,” Project title and/or name, and name of CONTRACTOR.
  3. When warranted Work requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

END OF SECTION

## SECTION 01 9113

## GENERAL COMMISSIONING REQUIREMENTS

## PART 1 – GENERAL

## 1.01 SECTION INCLUDES

- A. This Section defines the Contractor's responsibilities with respect to Commissioning. The Contractor shall include this scope in the bid. This includes administrative and procedural requirements as well as a detailed execution of Commissioning. This Section supplements Section 01 4523 – Testing and Inspection, Section -01 4525 Testing, Adjusting, and Balancing for HVAC, as well as the Divisions 22 - Plumbing, Division 23 – Mechanical, and Division 26 – Electrical sections which specify testing procedures. This Section also defines the systems and equipment to be commissioned. For projects that have Specification Section 01 4516 or 01 4519, Contractor Construction Quality Control, the Commissioning schedule and activities as defined in the approved Commissioning Plan shall be incorporated by Contractor into the Construction Quality Control (CQC) plan. The Commissioning Services Provider will be part of the Owner's Quality Assurance (QA) Team and participate in the review and execution of the Project Construction Quality Control (CQC) plan, along with the Contractor, Owner's Authorized Representative (OAR), Project Inspector (PI), and Architect of Record (AOR).

## 1.02 DEFINITIONS

- A. Commissioning (Cx): A systematic process which verifies that the building systems perform according to the Owner's Design Intent/Basis of Design (ODI/BOD). Commissioning includes system documentation, equipment startup, control system calibration, Testing, Adjusting and Balancing (TAB) verification, performance testing, and training.
- B. Commissioning Services Provider (CxSP): A District appointed entity that plans and coordinates all activities which implement Commissioning as outlined by the Owner's Design Intent/Basis of Design (ODI/BOD). The CxSP has overall responsibility for planning and coordinating Commissioning. Commissioning activities that take place during construction shall be based on the Contractor's construction schedule.
- C. Commissioning Plan (CxP): A contract document that identifies the project Commissioning goals, Owner's Design Intent/Basis of Design, commissioning milestones, coordination requirements, and project specific Pre-functional Equipment Checklists and Functional Performance Test Checklists. The CxP shall be incorporated by Contractor into the Construction Quality Control Plan.
- D. Pre-functional Equipment Checklist (PEC): A form for each piece of equipment referenced in '1.08 SYSTEMS TO BE COMMISSIONED' that must be completed by the Contractor as a prerequisite to the equipment's Functional Performance Test (FPT). Sample checklists and PEC forms are included in the CxP. The checklists and forms are completed by the Contractor and verified by the CxSP.
- E. Functional Performance Test (FPT): A documented test designed by the Commissioning Services Provider to verify the dynamic functioning and operation of

equipment and systems with the goal of verifying that the Owners' Design Intent, Owner's Project Requirements, and Basis of Design (BOD) are met. Sample testing requirements and forms are included in the CxP. Test procedures are performed by the Contractor and witnessed by the INSPECTOR and CxSP.

- F. Acceptance - A formal action, taken by a person with appropriate authorization, to declare that some aspect of the project meets defined requirements – thereby permitting subsequent activities to proceed.
- G. Checklists - Documents that are developed and used during all phases of commissioning to verify that the Owner's intent is being achieved. This includes checklists for general verification, testing, training, and other specific requirements. Various checklists are prepared by the CxSP and the contractor to document completion of testing and/or commissioning of equipment and systems.
- I. Coordination Drawings - Drawings showing the work of all trades to illustrate that equipment can be installed in the space allocated without compromising equipment function or access for maintenance and replacement. These drawings graphically illustrate and dimension manufacturers' recommended maintenance clearances.
- K. Control system – A component of an environmental, HVAC, electrical, lighting, or energy management system for the reporting, monitoring and/or issuing of commands to and/or from field devices.
- L. Data logging -The monitoring and recording of flows, currents, status, pressures, etc., of equipment using stand-alone data recorders separate from the installed control system or the trending capabilities of those control systems.
- M. Deficiency - A condition that is not in compliance with the contract documents relative to the installation or function of a component, piece of equipment, or system.
- N. Factory Testing - Testing of equipment at the factory or on-site by factory personnel with, or without, an owner's representative present.
- O. Issues Log - A formal and ongoing record of problems or concerns – and their resolution – that have been raised by members of the commissioning team during the course of commissioning.
- P. Seasonal Performance Tests - Tests that are performed when weather conditions are comparable to the design conditions based or the design conditions can be simulated.
- R. Simulated Condition - Condition that is created for the purpose of testing the response of a system (for example: raising/lowering the set point of a thermostat to see the response in a VAV box).
- S. Startup - The initial starting or activating of dynamic equipment.
- T. Systems Manual - A system-focused composite document that includes the operation manual, maintenance manual, manufacturer's technical diagrams and additional information of use to the owner during facility occupancy and operation.
- U. Test Procedure - A written protocol that defines methods, procedures, personnel, and expected outcomes for tests conducted on components, equipment, assemblies, systems, and interfaces among systems. The test procedures are specified in the Commissioning Plan and Technical Specifications sections of the contract documents and the CxP.

- V. Training Plan - A written document that details the expectations, schedule, budget, and deliverables of commissioning activities related to the training of facility operating and maintenance personnel, users, and occupants.
- X. Verification - The process by which specific documents, components, equipment, assemblies, systems, and interfaces among systems are confirmed to comply with the criteria described in the Owner's Design Intent/Basis of Design. Verification testing is performed per the prescribed test procedure(s) by the contractor and witnessed by the INSPECTOR and CxSP.
- Y. Trending – The analysis of system performance gathered over a period of time by a building management system or other electronic data gathering equipment.

### 1.03 RELATED REQUIREMENTS

- A. Section 00 7300 – Supplementary Conditions.
- B. Section 01 1216 – Phasing of the Work.
- C. Section 01 2100 – Allowances.
- D. Section 01 2513 – Product Substitution Procedures.
- E. Section 01 3113 – Project Coordination.
- F. Section 01 3119 – Project Meetings.
- G. Section 01 3213 – Construction Schedule.
- H. Section 01 3300 - Submittal Procedures.
- I. Section 01 4516 or 01 4519 – Contractor Construction Quality Control.
- J. Section 01 4523 - Testing and Inspection.
- K. Section 01 4525 - Testing, Adjusting, and Balancing for HVAC.
- L. Section 01 5000 – Construction Facilities and Temporary Controls.
- M. Section 01 7700 – Contract Close-Out.
- N. Section 01 7836 – Warranties.
- O. Section 01 7900 – Maintenance & Operation Staff Demonstration and Training.
- P. Section 23 0800 – HVAC Systems Commissioning.
- Q. Section 23 0813 – Environmental Controls and Energy Management Systems Commissioning.
- R. Section 26 0800 – Electrical Systems Commissioning.

### 1.04 REFERENCES

- A. Guideline 1.1-2007 -- HVAC&R Technical Requirements for the Commissioning Process.
- B. Associated Air Balance Council Commissioning Guidelines.
- C. CHPS Best Practices Manual, Volume V: Commissioning.



D. Sample Commissioning Plan Documentation.

1.05 COORDINATION

- A. Items listed below require coordination between the Contractor, OAR, INSPECTOR, and CxSP. Details regarding each item are provided through out this Section and/or Sections 01 7900, 23 0800, 23 0813 and 26 0800.
1. Cx Schedule and Meeting Venue.
  2. Commissioning Meeting Attendance.
  3. Completion of Pre-functional Equipment Checklists (PEC).
  4. Functional Performance Testing (FPT).
  5. Operations & Maintenance Manual Submittal and Training.
  6. Documentation of Pre-functional Equipment Checklists (PEC) & Functional Performance Testing (FPT) Inspections.
- B. For projects using Specification Section 01 4516 or 01 4519, the CxSP shall coordinate with the Contractor's designated Quality Control representative, OAR and INSPECTOR.

1.06 SUBMITTALS

- A. Submittal documentation required for the commissioning work will be identified by the CxSP and integrated into the normal submittal process and protocol of the construction team. At minimum, the CxSP's documentation request will identify the manufacturer and model number, the manufacturer's printed installation and detailed startup procedures, full sequences of operation, O&M data, performance data, any performance test procedures, control drawings and details of owner contracted tests. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted. All such documentation will be included by subcontractors in their O&M manual submittals.
- B. The CxSP will review and recommend acceptance or any required revision to the OAR for all submittals related to the commissioned equipment for conformance with the contract documents as they relate to commissioning, performance of the equipment, and their adequacy of test procedures. This review is intended primarily to aid in the development of performance procedures and only secondarily to verify compliance with equipment specifications. The CxSP will notify the OAR of items missing or areas that are not in conformance with contract documents and which require resubmission. Submittal of O&M manual documentation does not constitute compliance. The CxSP will review all such document submittals and recommend to OAR their acceptance or any required revisions.
- C. Submittal documentation specified in Specifications 23 0800, 23 0813 and 26 0800.

1.07 CONTRACTOR RESPONSIBILITIES

- A. The general responsibilities of Contractor and Subcontractors in commissioning are defined in this section. The specific responsibilities are in the Division 22 and 23 and Division 26 Technical Specifications. All parties shall:
1. Follow the Commissioning Plan.
  2. Attend commissioning meetings.
- B. Contractor, its design team, subcontractors and vendors shall assign representatives with expertise and authority to act on their behalf and schedule them to participate in and perform required commissioning activities including, but not limited to, providing all tools, or the use of tools, to start, check-out and test equipment and systems, except for specified testing with portable data recorders which shall be supplied and installed by the CxSP. Contractor and subcontractors shall:
1. Facilitate coordination of Commissioning.
  2. Incorporate Commissioning activities (the CxP) into the Project Schedule.
  3. Coordinate and direct Commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
  4. Participate in up to three meetings specifically for Commissioning-related items as scheduled by the OAR.
  5. Review and accept construction checklists developed by the CxSP.
  6. Provide information required to perform commissioning tasks, including O&M materials, contractor startup and checkout lists.
  7. No later than 60 days prior to startup of the first piece of major equipment, meet with the CxSP and OAR to finalize the detailed commissioning procedures and schedule.
  8. Before startup, provide detailed startup procedures including current control sequences and interlocks to comply with the detailed functional test plans.
  9. Provide one additional copy of all submittals required in Section 01 3300 for all systems being commissioned for review of compliance with commissioning needs by the CxSP.
  10. Develop and coordinate a startup and initial systems checkout plan with subcontractors and ensure that all subcontractors and vendors execute their commissioning responsibilities according to the contract documents.
  11. Review TAB execution plan.
  12. Oversee sufficient testing of the control system before TAB is executed.
  13. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
  14. Coordinate retesting as necessary until satisfactory performance is achieved

15. Complete checklists as work is completed and provide to OAR on a weekly basis.
16. Review equipment warranties to ensure that the owner's responsibilities to keep warranties in force are clearly defined.
17. Oversee and coordinate the training of the owner's personnel.
18. Review and approve the preparation of the O&M manuals including clarifying and updating of original sequences of operation to as-built/as-tested conditions.
19. Coordinate development of a systems manual

#### 1.08 SYSTEMS TO BE COMMISSIONED

- A. Systems to be commissioned for this project include, but are not limited to, those for which Specifications are included in Contract Documents and as listed in:
  1. Section 23 0800, Article 1.06 - Equipment And Systems To Be Commissioned.
  2. Section 23 0813.
  3. Section 26 0800, Paragraph 3.01.B.

### PART 2 – PRODUCTS

#### 2.01 TEST EQUIPMENT

- A. Standard testing equipment required to perform startup and initial checkout and required performance testing shall be provided by the contractor for the equipment being tested. This includes, but is not limited to, two-way radios and meters, etc. Testing specified as requiring portable data recorders will be performed with data recorders supplied and installed by the CxSP.
- B. Testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance within the tolerances specified in the specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a current certified calibration to an accuracy of 0.5 degree F and a resolution of plus or minus 0.1 degree F. Pressure sensors shall have an accuracy of plus or minus 2.0 percent of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

### PART 3 – EXECUTION

#### 3.01 MEETINGS

- A. Commissioning Kick-off Meeting: Within 15 days following issuance of Notice-to-Proceed 1 (NTP 1), the OAR will schedule a Construction Quality Control kick-off meeting. The INSPECTOR, Cx team and Contractor Quality Control representative will be in attendance. CxSP shall prepare and distribute a list of commissioning topics to be placed on the meeting agenda. Attendance at this meeting and participation in the Commissioning topics is mandatory for the following Contractor personnel:

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1. Contractor's Quality Control Engineer and Commissioning Representative.
  2. Contractor's Project Scheduling personnel.
  3. Mechanical Subcontractors.
  4. Electrical Subcontractors.
  5. TAB Subcontractor.
  6. Controls Subcontractors.
- B. Other Commissioning Meetings. Other Cx meetings will routinely be scheduled and generally be conducted in conjunction with regularly scheduled site meetings as the Construction progresses. The Commissioning portion of meetings will cover upcoming implementation and coordination of the CxP, deficiency resolution, and planning issues with particular subcontractors.

### 3.02 STARTUP, CONSTRUCTION CHECKLISTS, AND INITIAL CHECKOUT

- A. The following procedures apply to all equipment/systems to be commissioned:
1. General: Contractor shall use PECs to verify that the equipment and systems are fully connected and operational. PECs for a given system must be successfully completed and accepted prior to startup and formal performance testing of equipment or subsystems of the given system.
  2. Startup and Checkout Plan: The CxSP will assist the project commissioning team members responsible for startup of any equipment. The primary role of the CxSP in this process is to ensure that there is written documentation and that each of the manufacturer-recommended procedures has been completed. The CxSP shall provide all the required pre-functional checklists and forms to be completed by Contractor in the CxP. The CxSP will ensure that the INSPECTOR and/or District Special Inspectors are informed as to the planned and scheduled startup and checkout procedures.
    - a. Sample Pre-Functional checklists are provided as an attachment to the CxP. These checklists indicate required procedures to be executed prior to equipment startup.
    - b. Contractor shall determine which trade is responsible for executing and documenting each of the line item tasks and transmit the checklists to the responsible subcontractors. Each form may have more than one trade responsible for its execution.
    - c. The contractor/subcontractor responsible for the purchase and/or installation of the equipment shall develop a comprehensive startup plan (with assistance from the CxSP) by combining the manufacturer's detailed startup and checkout procedures and the pre-functional checklists.
    - d. The contractor/subcontractor shall submit the full startup plan to the CxSP for review and approval.
    - e. INSPECTOR will review and accept, based on CxSP recommendation, the procedures and the documentation format for reporting. The CxSP

will return the procedures and the documentation format to Contractor through the OAR.

- f. Contractor shall transmit the full startup plan to the subcontractors for their review and use.
- B. Sensor and Actuator Calibration. All field-installed temperature, relative humidity, CO, CO<sub>2</sub>, refrigerant, O<sub>2</sub>, and/or pressure sensors and gages, and all actuators (dampers and valves) on all equipment shall be calibrated. Verify that all locations are appropriate and away from causes of erratic operation. Submit to the CxSP through the OAR the calibration methods and results. All test instruments shall have had a current certified calibration record. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated. Contractor to field verify all installed sensors.
1. Sensor Calibration Methods:
    - a. All Sensors: Verify that all sensor locations are appropriate and away from causes of erratic operation. Verify that sensors with shielded cable are grounded only at one end. For sensor pairs that are used to determine a temperature or pressure difference, make sure they are reading within 0.2 degrees F of each other for temperature and within a tolerance equal to 2 percent of the reading of each other for pressure.
    - b. Sensors Without Transmitters: Standard Application. Make a reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the sensor reading (via the permanent thermostat, gage or building automation system (BAS)) is within the tolerances in the table below of the instrument-measured value. If not, install offset in BAS, calibrate or replace sensor.
    - c. Sensors With Transmitters: Standard Application. Make a reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the sensor reading (via the permanent thermostat, gage or building automation system (BAS)) is within the tolerances in the table below of the instrument-measured value. If not, install offset in BAS and calibrate or replace sensor.
  2. Tolerances, Standard Applications:

<u>Sensor</u>	<u>Required Tolerance (+/-)</u>
Cooling coil, chilled and condenser water temps	0.4F
AHU wet bulb or dew point	2.0F
Hot water coil and boiler water temp	1.5F
Outside air, space air, duct air temps	0.4F
Wattour, voltage & amperage	1 percent of design
Pressures, air, water and gas	3 percent of design

Flow rates, air, water	10 percent of design
Flow rates, water Relative humidity	4 percent of design
Combustion flue temps	5.0F
Oxygen or CO <sub>2</sub> monitor	0.1 percent pts
CO monitor	0.01 percent pts
Natural gas and oil flow rate	1 percent of design
Barometric pressure	0.1 inch of Hg

3. Valve and Damper Stroke Setup and Check EMS Readout: For all valve and damper actuator positions checked, verify the actual position against the BAS readout. Set pumps or fans to normal operating mode. With the command calve and damper closed, visually verify that the command valve or damper is closed and adjust output zero signal as required. With the command valve or damper open, visually verify that the position is full open and adjust output signal as required. Set command valve or damper to a few intermediate positions. If actual valve or damper position doesn't reasonably correspond, repair or replace actuator.
4. Closure for heating coil valves (NO): Set heating set point 20 degrees F above room temperature. Visually observe valve open. Set heating set point to 20 degrees F below room temperature. Visually observe the valve close. Restore to normal.
5. Closure for cooling coil valves (NC): Set cooling set point 20 degrees F above room temperature. Visually observe the valve close. Set cooling set point to 20°F below room temperature. Visually observe valve open. Restore to normal.

C. Execution of Construction Checklists and Startup:

1. Four weeks prior to the scheduled startup, Contractor shall coordinate startup and checkout with the INSPECTOR and CxSP. The execution and approval of the PECs, startup, and checkout shall be directed and performed by Contractor, subcontractor or vendor. Signatures are required of the applicable subcontractors for verification of completion of their work.
2. The INSPECTOR shall observe, as a minimum, the procedures performed for each piece of primary equipment, unless there are multiple units; in which case a sampling strategy may be used. The CxSP shall observe all testing.
3. For lower-level components of equipment, (e.g., sensors, controllers), the CxSP shall observe a sampling of the startup procedures.
4. Pre-functional checklist documentation, identified in the CxP, is to be used by the sub-contractor to document that equipment is ready for startup.
5. The subcontractors and vendors shall execute startup and provide the CxSP, through the OAR, with a signed and dated copy of the completed startup and construction checklists.

6. Only individuals of the contractor or sub-contractor (technicians, engineers, manufacturer's representatives/vendors, supervisors, etc.) who have direct knowledge and have witnessed that a line item task on the construction checklist was actually performed shall check off that item.
- D. Deficiencies, Non-Conformance, and Approval in Checklists and Startup (Issues Log):
1. The contractor shall ensure that the subcontractors clearly list any outstanding items of the initial startup and construction checklist procedures that were not completed successfully, on an attached sheet. The form and any outstanding deficiencies shall be provided, through the INSPECTOR, to the CxSP within two days of test completion.
  2. The CxSP will review the report and issue either a non-compliance report or acceptance form, through the INSPECTOR, to Contractor. The installing subcontractors or vendors shall correct all areas that are deficient or incomplete in the checklists and tests in a timely manner, shall notify the INSPECTOR as soon as outstanding items have been corrected, and resubmit an updated startup report with a Statement of Correction on the original non-compliance report. When satisfactorily completed, the CxSP will recommend approval of the execution of the checklists and startup of each system.
  3. Items left incomplete, which later cause deficiencies or delays during performance testing, may result in assessments to Contractor. Refer to Paragraph 3.05, herein, for details.

### 3.03 GENERAL REQUIREMENTS FOR TESTING

- A. Complete the following at least two weeks prior to Functional Performance Testing:
1. Arrange for Commissioning observations to be performed by the CxSP.
  2. Completion and acceptance of the Start-up Plan by the CxSP.
  3. Correction of deficiencies identified during start-up.
  4. Recording of pretest set points.

### 3.04 FUNCTIONAL PERFORMANCE TESTING (FTP)

- A. Undertake functional testing after the testing requirements listed in Paragraph 3.02 are completed.
- B. Equipment: Refer to Part 2 of this Section for test equipment requirements.
- C. Perform FPT under the observation of the CxSP who will verify the results of the functional test procedures documented by Contractor.
- D. Perform all specified tests according to approved testing procedures / plan.
1. Verify and test performance using actual conditions whenever possible.
  2. Simulate conditions when it is not practical to test under actual conditions or when required seasonal testing conditions are not present. The procedure to be used shall be submitted to the OAR for INSPECTOR and CxSP review and

- acceptance at least one week before simulated testing is to occur. After test, return settings to normal operating conditions.
3. Alter set points when simulating conditions is not practical and when written approval to do so is received from OAR.
  4. Override sensor values with a signal generator when actual or simulated conditions and altering set points are not practical. Do not use the sensor to act as the signal generator to simulate conditions or override values.
- E. Functional Performance Testing (FPT) Documentation: This Section specifies the general description of the minimum Divisions 22, 23 and 26 Functional Performance Testing documentation requirements that the Contractor shall provide. The CxSP will develop testing procedures in accordance to the requirements of this Section and incorporate into the Cx Plan that Contractor must follow and document. The testing documentation must include the following information:
1. Test number.
  2. Date and time of the test.
  3. Indication of whether the record is for a first test or retest following correction of a problem or issue.
  4. Identification of the system, subsystem, assembly, or equipment.
  5. Conditions under which the test was conducted, including (as applicable) ambient conditions, set points, override conditions, and status and operating conditions that impact the results of the test.
  6. Expected performance of the systems and assemblies at each step of the test.
  7. Narrative description of observed performance of the system, equipment, or assembly.
  8. Notation to indicate whether the observed performance at each step meets the expected results.
  9. Issue number, if any, generated as the result of the test.
  10. Dated signatures of the person performing the test and a witness.
- F. The CxSP and INSPECTOR will review and OAR, if applicable, accept functional testing results. Deficiencies found during testing shall be submitted to the OAR and, if required, based on the recommendation of INSPECTOR, by the OAR, corrected by the Contractor and retested. Where there is a dispute over a deficiency, OAR, based on the recommendation of ARCHITECT and INSPECTOR, shall be the final authority.
- G. Problem Solving: The burden of responsibility to solve, correct and retest problems is with the Contractor and the design team with OAR, based on the recommendations of the ARCHITECT, CxSP and INSPECTOR, having final responsibility for acceptance of the Work.
- H. Substantial Completion: All testing, retesting, and acceptance of Functional Performance Testing shall be completed prior to issuing the Certificate of Substantial Completion. FPT may be conducted following building occupancy; however, all



associated and reasonable additional costs incurred by the CxSP shall be assessed against Contractor Retention or Withhold funds.

- I. Deficiencies in the Cx Plan Functional Performance Test Checklist: If there is any Functional Performance Test Checklist missing for any particular piece of equipment, the Contractor shall inform the CxSP and ask for an updated Functional Performance Test Checklist.

### 3.05 RETESTING

- A. Retesting shall be required when a specific Pre-functional Checklist or Start-up test item, reported to have been successfully completed by Contractor or determined during functional testing to be faulty or incomplete, is identified.
- B. Contractor shall be provided one retest opportunity at no additional cost when Contractor can make corrections within two hours of identification of the need to retest. Costs for retesting beyond one retest, or when Contractor cannot make corrections within two hours of identification of the need to retest, will be assessed against Contractor funds if OAR determines, based upon the recommendation of the INSPECTOR and CxSP, that the Contractor is responsible for the deficiency. These costs shall include all reasonable expenses incurred by the CxSP.
- C. For a deficiency identified during functional testing, but not included in the approved Start-up Plan, OAR will direct retesting of the equipment with no costs assessed against Contractor for this initial retesting. Costs for retesting, when Contractor cannot effect corrections within two hours of identification of the need to retest, will be assessed against Contractor funds if OAR determines, based upon the recommendation of the INSPECTOR and CxSP, that the Contractor is responsible for the deficiency. These costs shall include all reasonable expenses incurred by the CxSP.
- D. Retesting shall not be considered a reason for a claim of delay or for a time extension by the Contractor.

### 3.06 DEFERRED TESTING

- A. Unforeseen Deferred Tests: Checks or tests not completed due to the incomplete Work, required occupancy conditions, or other conditions may be delayed upon approval of the OAR based upon the recommendation of the INSPECTOR and CxSP. These tests may be conducted in the same manner as the seasonal tests.
- B. Seasonal Testing: Complete seasonal testing, when weather or other testing conditions do not emulate the system's design conditions, employing simulated conditions acceptable to OAR based upon the recommendation of the INSPECTOR and CxSP. The OAR will coordinate with Contractor, and CxSP validate, this activity. Tests shall be executed, documented and deficiencies corrected by the Contractor, with the INSPECTOR and the CxSP witnessing. The Contractor shall make adjustments to the Operations and Maintenance Data, as necessary.

### 3.07 DOCUMENT REVIEW

- A. General: See paragraph 1.06 for submittal requirements.

- B. Operations and Maintenance Manuals: Refer to Section 01 7900 for specific requirements.

3.08 OPERATOR TRAINING

- A. The CxSP, under the direction of the OAR, coordinates and verifies training completion as shown in Section 01 7900. Forms and procedures are also described in the CxP.

END OF SECTION

## SECTION 02 4116

### DEMOLITION

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Section Includes: Furnishing labor, materials and equipment necessary for demolition, dismantling, cutting and alterations as indicated, specified, or required for completion of the Work. Includes items such as the following:
  - 1. Protection of existing improvements to remain.
  - 2. Cleaning existing improvements to remain.
  - 3. Disconnecting and capping utilities.
  - 4. Removing debris, waste materials, and equipment.
  - 5. Removal of items for performance of the Work.
  - 6. Salvageable items to be retained by the Owner.
- B. Related Requirements:
  - 1. Division 01 - General Requirements.

##### 1.02 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings indicating the extent of items and systems to be removed. Indicate items to be salvaged or items to be protected during demolition. Indicate locations of utility terminations and the extent of abandoned lines to be removed. Include details indicating methods and location of utility terminations.

##### 1.03 QUALITY ASSURANCE

- A. Perform the Work of this section by workers skilled in the demolition of buildings and structures. Perform the Work of this section under direct superintendence at all times.
- B. Prior to commencement of Work, schedule a walkthrough with the OAR, to confirm Owner property items have been removed from scheduled Work areas. Identify and mark remaining property items and schedule their removal.
- C. Coordinate demolition for the correct sequence, limits, and methods. Schedule demolition Work to create least possible inconvenience to the public and facility operations.
- D. Related Standard: ANSI/ASSE A10.6.

##### 1.04 PROJECT CONDITIONS

- A. Drawings may not indicate in detail all demolition Work to be performed. Examine existing conditions to determine the full extent of required demolition.
- B. Repair damage to existing improvements or damage due to excessive demolition.
- C. Provide all measures to avoid excessive damage from inadequate or improper means and methods, improper shoring, bracing or support.
- D. If conditions are encountered that varies from those indicated, promptly notify the Architect for clarification before proceeding.

## PART 2 - PRODUCTS

### 2.01 HANDLING OF MATERIALS

- A. Items scheduled for salvage by the Owner shall be delivered to a location designated by the OAR. Items shall be cleaned, packaged and labeled for storage.
- B. Items scheduled for reuse shall be stored on the Project site and protected from damage, theft and other deleterious conditions.

## PART 3 - EXECUTION

### 3.01 GENERAL

- A. Protection:
  - 1. Do not commence demolition until safety partitions, barricades, warning signs and other forms of protection are installed. Refer to Section 01 5000 - Construction Facilities and Temporary Controls.
  - 2. Provide safeguards, including warning signs, lights and barricades, for protection of workers, occupants, and the public.
- B. If safety of existing construction appears to be endangered, take immediate measures to correct such conditions; cease operations and immediately notify the OAR.

### 3.02 DEMOLITION

- A. Do not throw or drop materials. Furnish ramps or chutes as required by the Work.
- B. Remove existing construction only to extent necessary for proper installation of Work and interfacing with existing construction. Cut back finished surfaces to straight, plumb or level lines as required for a smooth transition.
- C. Where openings are cut oversize or in improper locations, replace or repair to required condition.

### 3.03 CUTTING EXISTING CONCRETE

- A. Cutting of existing concrete shall be performed by skilled workers familiar with the requirements and space necessary for placing concrete. Perform concrete cutting with concrete cutting wheels and hand chisels. Do not damage concrete intended to remain.

- B. Extent of cutting of structural concrete shall be as indicated on Drawings. Cutting of non-structural concrete shall be as indicated on Drawings or as reviewed by the Architect or structural engineer. Replace concrete demolished in excess of amounts indicated.
- C. Prior to cutting or coring concrete, determine locations of hidden utilities or other existing improvements and provide necessary measures to protect them from damage.

3.04 REMOVAL OF EXISTING PLUMBING AND ELECTRICAL EQUIPMENT AND SERVICES

- A. Remove existing plumbing and electrical equipment fixtures and services not indicated for reuse and not necessary for completion of the Work. Remove abandoned lines and cap unused portions of existing lines.

3.05 REMOVAL OF OTHER MATERIALS

- A. Masonry: Cut back to joint lines and remove mortar without damaging units to remain. Allow space for repairs to backing where applicable.
- B. Woodwork: Cut or remove to a joint or panel line.
- C. Roofing: Remove as required, including accessory components such as insulation and flashings. At penetrations through existing roofing, trim cut edges back to sound roofing with openings restricted to the minimum size necessary to receive Work.
- D. Sheet Metal: Remove back to joint, lap, or connection. Secure loose and unfastened ends or edges and provide a watertight condition. Re-seal as required.
- E. Glass: Remove broken or damaged glass and clean rebates and stops of glazing channels.
- F. Modular materials such as acoustical ceiling panels, resilient tile, or ceramic tile: Remove to a natural joint without leaving damaged or defective Work where joining new Work. After flooring removal, clean substrates to remove setting materials and adhesives.
- G. Gypsum Board: Remove to a panel joint line on a stud or support line.
- H. Plaster: Saw cut plaster on straight lines, leaving a minimum 2-inch width of firmly attached metal lath for installing new lath and plaster.
- I. Remove existing improvements not specifically indicated or required but necessary to perform Work. Cut to clean lines, allowing for installation of Work.

3.06 PATCHING

- A. Patch or repair materials to remain when damaged by the performance of the Work of this section. Finish material and appearance of patch and/or repair Work shall match existing.

3.07 CLEANING

- A. Clean existing materials to remain with appropriate tools and equipment.
- B. Protect existing improvements during cleaning operations.
- C. Debris shall be dampened by fog water spray prior to transporting by truck.
- D. Debris pick-up area shall be kept broom-clean and shall be washed daily with clean water.
- E. Remove waste and debris, other than items to be salvaged. Turn over salvaged items to Owner, or store and protect for reuse where required. Continuously clean up and remove items as demolition Work progresses.
- F. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 031000  
CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.01 SECTIONS INCLUDES

- A. Forms for all cast-in-place concrete indicated on the Drawings and subsequent removal of forms, except those earth forms described in this Section.

1.02 RELATED SECTIONS

- A. Section 03 20 00 - Concrete Reinforcing.
- B. Section 03 30 00 - Cast-in-Place Concrete.

1.03 QUALITY ASSURANCE

- A. Qualifications of workmen: All workmen shall be experienced mechanics. Provide one person who shall be present at all time during execution of this portion of the work who shall be thoroughly familiar with the type of material being installed, the referenced standards and the requirement of this Work and shall direct all Work performed under this Section.
- B. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations contained in "Recommended Practice for Concrete Formwork," publication ACI 347R and ACI 318, Section 6.1.
- C. Where provisions of pertinent codes and standards conflict with the requirement of this Section, the more stringent provision shall govern.
- D. All Structural Concrete foundations, curbs, floors and any other structural component requiring structural forming or shoring shall be Engineer Designed Systems with calculations and erection drawings provided by the Contractor. Contractor is to secure the services of a California Registered Structural Engineer for the design of Forming Systems.

1.04 PRODUCT HANDLING

- A. Protection: Contractor is to protect all formwork materials before, during and after installation.
- B. Damaged Forms: In the event of damage or misalignment, immediately make all repairs and replacement necessary at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Form lumber: All form lumber shall be new except as allowed for re-use of forms in Part 3 of this Specification, and all form lumber shall be one of the following, a combination thereof, or an equal approved in advance by the Architect.
  - 1. Plywood forms may be Plyform, Plyron, and bearing the label of the Douglas Fir Plywood Association.
  - 2. Form-lumber may be; fir, larch, hemlock, or approved equal seasoned lumber and surfaced on all four sides.
  - 3. Form sealers shall be liquid form oil.
- B. Not used.
- C. Other form materials and/or forming systems may be used if approved by the Owner, Architect and Structural Engineer. A complete list of materials, manufacturers and methods of application are to be submitted to the Architect, in accordance with Division 01.

## 2.02 TIES AND SPREADERS

- A. Form ties shall be of proven types and shall be a type which does not leave an open hole through the concrete and which permits patching at every hole.
- B. When forms are removed, all metal ties shall be removed and shall be flush with the concrete surface. No metal ties shall be exposed on the exterior of the walls.

## 2.03 ALTERNATE FORMING SYSTEMS

- A. Not used.

## 2.04 OTHER MATERIALS

- A. All other form materials, not specifically described herein, but required for proper completion of concrete formwork, shall be as selected by the Contractor subject to approval by the Owner or Architect.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Contractor shall verify and be responsible for all-existing dimensions and elevations before any Work is done.
- B. Inspect the installed Work of all other trades; verify that all such Work is complete, and that the installation of Formwork may begin.
- C. Verify that forms have been constructed in accordance with all pertinent codes and regulations, referenced standards and the design.



- D. Discrepancies: Do not proceed with installation in areas of discrepancy. Notify the Architect of all discrepancies. All discrepancies are to be fully resolved before proceeding with installation.

### 3.02 CONSTRUCTION FORMS

- A. Forms are to be constructed sufficiently tight to prevent leakage of concrete, and able to withstand excessive deflection when filled with wet concrete. Forms shall be braced, anchored and properly aligned.
- B. Layout and form all required cast-in-place concrete to the required dimensions indicated on the Drawings.
- C. Care shall be exercised in the layout of forms to avoid the necessity for cutting, patching, or repair of concrete after it is in place.
- D. Make provisions for all openings, offsets, recesses, anchorage, blocking and other requirements of the Work.
- E. Perform all forming required for Work of other trades and do all cutting and repairing of forms required to permit such installations.
- F. Carefully examine the Drawing and Specifications and verify with other trades for openings, reglets, chases, and other items that are required in the forms.
- G. Forms for pre-cast concrete shall be constructed to provide for shrinkage of the concrete, and shall be adequately braced. All edges shall have chamfer strips except as noted on Drawings.
- H. Construct all forms true, plumb, and square within a tolerance of 1/8" in 12 feet.

### 3.03 EMBEDDED ITEMS

- A. Provide, install and check all required steel frames, angles, grilles, bolts, inserts and other such items required to be anchored in the forms before the concrete is placed.

### 3.04 BRACING

- A. Properly brace and tie the forms together so as to maintain size, shape, and alignment, and to provide safety to personnel.
- B. Construct all bracing and supporting members of ample size and strength to safely support, without excessive deflection, all dead and live loads to which they may be subjected.

### 3.05 PLYWOOD FORMS

- A. Plywood forms shall be designed for loads imposed. Nail the plywood panels directly to studs and apply in a manner to minimize the number of joints.

- B. Make all panel joints tight butt joints with all edges true and square, if necessary, use tape to prevent excessive leakage.

### 3.06 FOOTING FORMS

- A. Foundation forms are to be wood forms.
- B. Earth forms may be used for footings provided the soil will stand without caving, as determined by the Architect (Structural Engineer) and the sides of the bank are made with a neat cut to the minimum dimensions indicated.

### 3.07 REUSE FORMS

- A. Reuse of forms shall be subject to approval of the I.O.R.
- B. Reuse of forms shall not delay or change the schedule for placement of concrete from the schedule if all forms were new.
- C. Reuse of forms shall not affect the structural stability of the forms or the appearance of the finished concrete.

### 3.08 REMOVAL OF FORMS

- A. Side forms of foundations may be removed 48 hours after placement of concrete. Where foundations are supporting lateral loads, forms shall not be removed until approved by the I.O.R.
- B. Use care and diligence, and protect workmen, passers-by, and the installed work and materials of other trades. Forms shall not be removed until the concrete can support all loads.
- C. Cut nails, tie wires and form ties off flush, leave all surfaces smooth and clean.
- D. Remove metal spreader ties and fill in the resulting pockets to match the surrounding areas with grout or dry pack. Sack all exposed faces.
- E. Fill all holes resulting from the use of bolts, ties, spreaders and sleeve nuts with cement grout applied under pressure by means of a grouting gun; grout shall be one part Portland cement, to two parts sand; apply grout immediately after removing forms.

### 3.09 CLEANING

- A. Remove all forming material from the site and dispose of in approved dumps.
- B. Clean area of all left over debris including stakes, ties, form boards, wires, concrete spills, etc., and leave area in a neat clean condition.

END OF SECTION

SECTION 032000  
CONCRETE REINFORCING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Concrete steel reinforcement as indicated.

B. Section Includes:

1. Section 03 10 00 - Concrete Forming and Accessories.
2. Section 03 30 00 - Cast-in-Place Concrete.

1.02 SYSTEM DESCRIPTION

- A. Regulatory Requirements: Fabrication and placement of reinforcing shall be in accordance with requirements of CBC, Chapter 19A.

1.03 SUBMITTALS

- A. Shop Drawings: Submit steel reinforcement Shop Drawings in accordance with ACI 315. Include assembly diagrams, bending charts and slab plans. Indicate lengths and location of splices, size and lengths of reinforcing steel.
- B. Closeout Submittals: Record exact locations of reinforcing that vary from Shop Drawings.

1.04 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement:

1. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice.
2. American Welding Society (AWS).
3. American Concrete Institute (ACI).
4. CBC, Chapter 19A, Concrete.

- B. Source Quality Control: Refer to Division 01 Sections for general requirements and to following paragraphs for specific procedures. Testing laboratory retained by the Owner shall perform following conformance testing, select test Samples of bars, ties, and stirrups from the material at the Project site or from the place of distribution, with each Sample consisting of not less than two 18-inch-long pieces, and perform the following tests according to ASTM A 615.

1. Identified Bars: If Samples are obtained from bundles as delivered from the mill, identified as to heat number, accompanied by mill analyses and mill test

reports, and properly tagged with the identification certificate so as to be readily identified, perform one tensile and one bend test for each 10 tons or fraction thereof of each size of bars. Submit mill reports when Samples are selected.

2. Unidentified Bars: When positive identification of reinforcing bars cannot be performed and when random Samples are obtained, perform tests for each 2.5 tons or fraction thereof, one tensile and one bend test from each size of bars.
- C. Certification of Welders: Shop and Project site welding shall be performed by certified welding operators.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Avoid exposure to dirt, moisture or conditions harmful to reinforcing.
- B. Reinforcing steel bars, wire, and wire fabric shall be stored on the Project site to permit easy access for examination and identification of each shipment. Material of each shipment shall be separated for size and shape.

### PART 2 - PRODUCTS

#### 2.01 GENERAL

- A. Provide reinforcing of sizes, gages and lengths indicated, bent to indicated shapes.

#### 2.02 MATERIALS

- A. Steel Reinforcing Bars: ASTM A 615 and A 706 for welding, grade 60 billet steel unless otherwise specified or indicated.
- B. Bars or Rod Mats: ASTM A 184.
- C. Wire Fabric for Reinforcement: ASTM A 185.
- D. Tie Wire: ASTM A 82, fully annealed, copper-bearing steel wire, 16 gage minimum.
- E. Chairs, Spacers, Supports, and Other Accessories: Standard manufacture conforming to ACI-315 fabricated from steel wire of required types and sizes. For reinforcement supported from grade, provide properly sized dense precast blocks of concrete.

#### 2.03 FABRICATION OF REINFORCING BARS

- A. Comply with CRSI Manual of Standard Practice for Reinforced Concrete Construction for fabrication of reinforcing steel.
- B. Bending and Forming: Fabricate bars of the indicated sizes and bend and form to required shapes and lengths by methods not injurious to materials. Do not heat reinforcement for bending. Bend bars No. 6 size and larger in the shop only. Bars with unscheduled kinks or bends are not permitted. Provide only tested and permitted bar materials.

- C. Welding: Provide only ASTM A 706 steel where welding is indicated. Perform welding by the direct electric arc process in accordance with AWS D1.4 and specified low-hydrogen electrodes. Preheat 6 inches each side of joint. Protect joints from drafts during the cooling process; accelerated cooling is not permitted. Do not tack weld bars. Clean metal surfaces to be welded of loose scale and foreign material. Clean welds each time electrode is changed and chip burned edges before placing welds. When wire brushed, the completed welds must exhibit uniform section, smooth welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion and penetration into the base metal. Cut out welds or parts of welds deemed defective, using chisel, and replace with proper welding. Prequalification of welds shall be in accordance with CBC requirements.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Bars shall be bent cold. Bars partially embedded in concrete shall not be field bent except as indicated on reviewed Shop Drawings. Before installation, clean reinforcing of loose scale, rust, oil, dirt and any coating that could reduce bond.
- B. Accurately position, install, and secure reinforcing to prevent displacement during the placement of concrete.
- C. Provide metal chairs to hold reinforcement the required distance above form bottoms. Space chairs so that reinforcement will not be displaced during installation. Provide metal spacers to secure proper spacing. Stirrups shall be accurately and securely wired to bars at both top and bottom. At slabs, footings, and beams in contact with earth, provide concrete blocks to support reinforcement at required distance above grade.
- D. Install and secure reinforcement to maintain required clearance between parallel bars and between bars and forms. Lapped splices shall be installed wherever possible in a manner to provide required clearance between sets of bars. Stagger lapped splices. Dowels and bars extending through construction joints shall be secured in position against displacement before concrete is installed and subsequently cleaned of concrete encrustation's while they are still soft.
- E. Do not install reinforcing in supported slabs and beams until walls and columns have been installed to underside of slabs and beams or until construction joints have been thoroughly cleaned. Reinforcing shall be inspected before placement of concrete and cleaned as required.
- F. Use deformed bars unless otherwise indicated, except for spiral reinforcement.

### 3.02 CLEAN UP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

### 3.03 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 033000  
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Cast-in-place concrete placement and finishing.
2. Related Sections:
  - a. Section 03 10 00 - Concrete Forming and Accessories.
  - b. Section 03 20 00 - Concrete Reinforcing.

1.02 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings indicating locations of cast-in-place concrete Work and accessory items such as vapor barriers. Include details and locations of reinforcing, embedded items, and interfacing with other Work.

B. Product Data:

1. Mix Design: Submit a concrete mix design for each mix that will be provided for the Work. Include water/ cement ratio, size of coarse aggregate and amount of any admixture. Predict minimum compressive strength, maximum slump and air content percentage.
2. Manufacturer of ready-mixed concrete shall deliver to the job a certificate with each mixer truck. Certificate shall bear the signature of representative of the testing laboratory, and shall state quantity of cement, water, fine and coarse aggregate and admixtures.

C. Material Samples: Submit Samples illustrating concrete finishes, minimum 12 inches x 12 inches in size.

D. Certificates: Submit a notarized certificate that each of following conforms to standards indicated:

1. Aggregates - ASTM Standards C33
2. Admixtures - ASTM Standards C260
3. Curing materials - ASTM Standards C171

1.03 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement.

B. American Concrete Institute (ACI) Publication:



1. ACI 211 - Recommended Practice for Selecting Proportions of Concrete.
2. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
3. ACI 305 - Recommended Practice for Hot Weather Concreting.
4. ACI 306 - Recommended Practice for Cold Weather Concreting.
5. ACI 308 - Recommended Practice for Curing Concrete.
6. ACI 309 - Recommended Practice for Consolidation of Concrete.

C. American Society for Testing and Materials (ASTM) Standards:

1. ASTM A 185 - Welded Steel Wire Fabric For Concrete Reinforcement.
2. ASTM C 31 - Making and Curing Concrete Test Specimens in the Field.
3. ASTM C 33 - Concrete Aggregates.
4. ASTM C 39 - Compressive Strength of Cylindrical Concrete Specimens.
5. ASTM C 88 - Soundness of Aggregates by use of Sulphate or Magnesium Sulphate.
6. ASTM C 94 - Ready-Mixed Concrete.
7. ASTM C 143 - Slump of Hydraulic Cement Concrete.
8. ASTM C 150 - Portland Cement.
9. ASTM C 171 - Sheet Materials for Curing Concrete.
10. ASTM C 172 - Sampling Freshly Mixed Concrete.
11. ASTM C 173 - Air Content of Freshly Mixed Concrete by the Volumetric Method.
12. ASTM C 227 - Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method).
13. ASTM C 231 - Air Content of Freshly Mixed Concrete by the Pressure Method.
14. ASTM C 260 - Air-Entraining Admixtures for Concrete.
15. ASTM C 289 - Potential Reactivity of Aggregates (Chemical Method).
16. ASTM D 1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

- D. Continuous inspection shall be provided at the batch plant and for transit-mixed concrete to run check sieve analysis of aggregate, check moisture content of fine aggregate, check design of mix, check cement being used with test reports, check loading of mixer trucks, and certify to quantities of materials placed in each mixer truck.
- E. Inspection shall be performed by a representative of a testing laboratory selected by the Owner. Owner will pay for inspection costs. Notify the laboratory 24 hours in advance of time concrete is to be mixed. Notify the laboratory of postponement or cancellation of mixing within at least 24 hours of scheduling time.
- F. Continuous batch plant inspection requirement may be waived in accordance with CBC Section 1705A.3.3.1. Waiver shall be in writing, including DSA approval.
- G. Strength Test of Concrete: Refer to Section 01 45 33 - Code-Required Special Inspections.

#### 1.04 DELIVERY, STORAGE AND HANDLING

- A. Mixing and Placing Concrete: Refer to Section 01 45 33 - Code-Required Special Inspections.
- B. Ready-mix concrete shall be mixed and delivered in accordance with ASTM C 94 and CBC Standard 19A-3 and 19A-4. Each batch of concrete delivered to the Project site shall be accompanied by a time slip bearing departure time and signature of batch plant supervisor. Concrete shall be placed within 90 minutes after start of mixing.
- C. Store cement and aggregate materials so as to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be furnished.

#### 1.05 JOB CONDITIONS

- A. Cold Weather Requirements:
  1. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near-freezing weather. Surfaces, in which concrete is to come in contact with, shall be free from frost or ice. No frozen materials or materials containing ice shall be furnished.
  2. When placing concrete during freezing or near-freezing weather the mix shall have a temperature of at least 50 degrees F., but not more than 90 degrees F. when cement is added. Concrete shall be maintained at a temperature of at least 50 degrees F. for at least 72 hours after placing or until it has thoroughly hydrated. When necessary, concrete materials shall be heated before mixing. Special precautions shall be provided for protection of transit-mixed concrete.
- B. Hot Weather Requirements:
  1. During hot weather, proper attention shall be provided for ingredients, production methods, handling, placing, protection and curing, to prevent excessive concrete temperatures or water evaporation which could impair required strength or durability.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Ready-Mixed Concrete: Mix and deliver in accordance with requirements of CBC Chapter 1905A.
- B. Strength of Concrete: Concrete, unless otherwise indicated or specified, shall be provided with a minimum ultimate 28-day strength of 3000 psi (fc). For high-early-strength concrete, age for reaching the fc shall be as indicated on Drawings.

2.02 MATERIALS

- A. Cement: ASTM C 150 Type II Portland Cement. Furnished cement shall be as selected and reviewed for concrete proportioning.
- B. Aggregates: Aggregates shall conform to ASTM C 33 and C 227 except as modified herein. Any suitable individual grading of coarse aggregate may be furnished, provided Grading of Combined Aggregate indicated in following table is obtained. Refer to Section 01 45 23: Testing and Inspection.

GRADING OF COMBINED  
AGGREGATE

Sieve Number or Size in inches	1-1/2"	1"	3/4"
	Maximum	Maximum	Maximum
Passing a 2"	-----	-----	-----
Passing a 1-1/2"	95-100	-----	-----
Passing a 1"	70-90	90-100	-----
Passing a 3/4"	50-80	70-95	90-100
Passing a 3/8"	40-60	45-70	55-75
Passing a No. 4	35-55	35-55	40-60
Passing a No. 8	25-40	27-45	30-46
Passing a No. 16	16-34	20-38	23-40
Passing a No. 30	12-25	12-27	13-28
Passing a No. 50	2-12	5-15	5-15
Passing a No. 100	0-3	0-5	0-5

- C. Water: Water shall be potable and free from deleterious matter.
- D. Admixtures: CBC Chapter 19A, Section 1903A.6, Type A or D.
- E. Expansion Joint Fillers: Preformed strips, non-extruding and resilient bituminous type, of thickness indicated, conforming to ASTM D 1751.
- F. Curing Paper and Liquid Curing Compounds:

1. Curing Paper: A standard brand conforming to ASTM C 171, Type 1 - Regular, Kure-N-Seal.
  2. Liquid Curing Compounds: A standard brand, clear liquid conforming to ASTM C 309, Master Builders, Grace, Antihydro.
- G. Abrasive Aggregate: Norton Alundum, Union Carbide Carborundum, or equal, graded #12 through #30 sizes, color as selected by Architect.
- H. Underlayment: Latex underlayment for filling low spots in concrete shall be Tile-Tex by Flintkote Co., Webtex #60 or Fixallatex by Dowman Products Co.
- I. Vapor Retarder: See Section 07 26 16 - Under-Slab Vapor Retarder.
- J. Stair Strips and Nosing:
1. Fabricated from 6063-T5 extruded aluminum, mill finish. Anti-slip filler shall contain at least 60 percent virgin grain aluminum oxide abrasive. Binder shall be fully cured resilient type epoxy, with binder-to-filler ratio of 13 percent. The epoxy-abrasive filler shall extend over the curved front edge of the nosing and shall be securely bonded to the extruded aluminum base.
  2. Manufactured by Wooster Products Inc. American Safety Tread Co. Inc., or equal.
  3. Nosing and strips for concrete casting shall be provided with Sure-Hold anchors, chevron shaped continuous full length of nosing or strip.
  4. Nosings and anchors for attachment to hydrated concrete stairs and wood stairs shall be similar to those specified below, except they shall be provided with countersunk holes for screws and fasteners.
  5. Colors: As selected by Architect to contrast with stair color. Colors shall extend uniformly through the filler.
  6. Strip and Nosing Types
    - a. Nosings for sloped riser steel pan stairs: Type WP4J, 4-1/16 inches wide, 3/8 inch thick.
    - b. Nosings for new concrete stairs: Type WP4C, 4-1/16 inches wide, 3/8 inch thick, nose projects down 1/4 inch.
    - c. Nosings for square edged steel pan stairs: Type WP4SP, 4-1/16 inches wide, 3/8 inch thick nose.
    - d. Strips for recessing into concrete stairs: Type WP1A, except 2-1/4 inches wide, 3/8 inch thick. American Safety Tread Co., Type 24, or equal.
    - e. Strips for adhering to existing or hydrated concrete: Flex-Tred anti-safety strips, minimum 2-1/4 inches wide. Cut from rolls and round corners.

- f. Strips for anchoring into wood or stone: American Safety Tread Co., Type 24H, or equal, with holes for fasteners, 2-1/4 inches wide.

## PART 3 - EXECUTION

### 3.01 GENERAL

- A. Time of Placing: Do not place concrete until reinforcement, conduits, outlet boxes, anchors, hangers, sleeves, bolts, and other embedded materials are securely fastened in place. Contact the IOR at least 24 hours before placing concrete; do not place concrete until inspected by the IOR.
- B. Pouring Record: A record shall be kept on the Project site of time and date of placing concrete in each portion of structure. Such record shall be maintained on the Project site until Substantial Completion and shall be available for examination by the Architect and DSA.

### 3.02 PREPARATION

- A. Vapor Retarder: See Section 07 26 16 - Under-Slab Vapor Retarder.
- B. Reglets and Rebates:
  - 1. Form reglets and rebates in concrete to receive flashing, frames and other equipment as detailed and required. Coordinate dimensions and locations required with other related Work.
  - 2. If concrete slabs on grade adjoin a wall or other perpendicular concrete surface, form a reglet in wall to receive and carry horizontal concrete Work. Reglet shall be full thickness of the slab and shall be 3/4 inch wide, unless otherwise indicated. Requirement does not apply to exterior walks, unless specifically indicated.
- C. Not used.
- D. Screeds: Install screeds accurately and maintain at required grade or slab elevations after steel reinforcement has been installed, but before starting to place concrete. Install screeds adjacent to walls and in parallel rows not to exceed 8 feet on centers.

### 3.03 INSTALLATION

- A. Conveying and Placing:
  - 1. Concrete shall be placed only under direct observation of the IOR. Do not place concrete outside of regular working hours, unless the IOR has been notified at least 48 hours in advance.
  - 2. Concrete shall be conveyed from mixer to location of final placement by methods, which will prevent separation or loss of materials.
  - 3. Concrete shall be placed as nearly as practicable to its final position to avoid segregation due to re-handling or flowing. No concrete that has partially

hydrated or has been contaminated by foreign materials shall be placed, nor shall re-tempered concrete or concrete which has been remixed after initial set be placed.

4. In placing concrete in thin sections, provide openings in forms, elephant trunks, tremies or other recognized devices, to prevent segregation and accumulation of partially hydrated concrete on forms or metal reinforcement above level of concrete being placed. Such devices shall be installed so that concrete will be dropped vertically. Unconfined vertical drop of concrete from end of such devices to final placement surface shall not exceed 6 feet.
5. Concrete shall be placed as a continuous operation until placing of panel or section is completed. Top surfaces of vertically formed lifts shall be level.
6. Concrete shall be thoroughly consolidated during placement, and shall be worked around reinforcement and embedded fixtures with mechanical vibrators.
7. Where conditions make consolidation difficult, or where reinforcement is congested, batches of mortar containing same proportions of cement, sand, and water as provided in the concrete, shall first be deposited in the forms to a depth of at least one inch.

B. Compaction and Screeding:

1. Tamp freshly placed concrete with a heavy tamper until at least 3/8 inch of mortar is brought to surface. Concrete shall then be tamped with a light tamper and screeded with a heavy straightedge until depressions and irregularities are eliminated, and surface is true to finish grades or elevations. Remove excess water and debris.
2. Where slabs are to receive separate cement finish or mortar setting bed, continued tamping to raise mortar to surface is not performed. Laitance shall be removed by brushing with a stiff brush or by light sandblasting to expose clean top surface of coarse aggregate.

C. Floating and Troweling:

1. When concrete has hydrated sufficiently, it shall be floated to a compact and smooth surface. After floating, wait until concrete has reached proper consistency before troweling. Top surfaces shall receive at least 2 troweling operations with steel hand trowel. Prior to and during final troweling, apply a fine mist of water frequently with an atomizing type fog sprayer. Omit troweling for slabs to receive a separate cement finish.
2. For interior finish slabs, final troweling shall provide a hard, impervious, and non-slip surface, free from defects and blemishes. Finished surface shall be

within a tolerance of 1/8 inch in 10 feet. Avoid burnishing. Do not add cement or sand to absorb excess moisture.

3. Exterior Paving and Cement Walks: Finish as specified above, except surface shall be given a non-slip broom finish to match Sample reviewed by the Architect.
4. Vertical concrete surfaces shall be finished smooth and free from marks or other surface defects.

D. Curing:

1. Concrete shall be maintained above 50 degrees F., and in a moist condition for 7 days after placing, except that high early strength concrete shall be maintained in a moist condition for 3 days.
2. Before applying curing paper, interior floor treated with colored hardener shall be given a heavy protective coat of colored wax left unpolished, and then immediately covered with paper. If wax is not applied within two hours after final troweling, concrete shall be sprayed with a fine water mist and maintained continuously moist until wax is applied, unless spraying is not recommended by hardener manufacturer. After other Work such as plastering and painting has been completed, curing paper shall be removed and waxed floors cleaned of protective wax coating.
3. Forms containing concrete, top of concrete between forms, and exposed concrete surfaces after removal of forms shall be maintained in a thoroughly wet condition for at least 7 consecutive days after placing.
4. If weather is hot or surface has dried out, spray surface of concrete slabs and paving with fine mist of water, starting not later than 2 hours after final troweling and continuing until sunset. Surface of finish shall be kept continuously wet until curing medium has been installed.
5. Immediately after finishing, roof slabs and monolithic floor finish to receive resilient floor covering shall be uniformly and completely coated with liquid curing compound.
  - a. Install compound in a manner and quantity sufficient to produce a uniform continuous thin film of water-impervious membrane. Compound shall be installed in accordance with manufacturer's directions.
  - b. Protect adjoining surfaces from damage during installation. If curing compound is not applied immediately, cover finished concrete with wet burlap or curing paper and keep concrete surface wet for a period not to exceed thirty hours following finishing of concrete. At end of that time,

burlap or paper shall be removed and curing compound installed as specified above.

- c. Immediately after finishing, monolithic floor slabs not scheduled to receive resilient floor covering shall be covered with curing paper. Paper shall be lapped 3 inches at joints and sealed with waterproof sealer. Edges shall be cemented to finish. Repair or replace paper damaged during construction operations.
- d. Within 24 hours after finishing, exterior slabs and paving, and interior slabs to receive cement topping or mortar setting beds, shall be covered with sand to a depth of 2 inches and kept thoroughly wet for 7 days.
  - 1) Instead of sand covering, exterior walks and paving where no other surface treatment is specified, may be cured with clear liquid curing compound immediately installed in accordance with manufacturer's directions.

E. Filling, Leveling and Patching:

- 1. Concrete slabs exhibiting high or low spots and indicated to receive resilient floor covering or soft floor covering, shall have surfaces repaired. High spots shall be honed, or ground with power-driven machines to required tolerances. Low spots shall be filled with latex underlayment, installed in strict accordance with manufacturer's written recommendations.
- 2. Holes resulting from form ties or sleeve nuts shall be solidly packed, through exterior walls, by pressure grouting with cement grout, as specified. Grouted holes on exposed surfaces shall be screeded flush and finished to match adjoining surfaces.

F. Cement Base: Cement base shall be of the height, thickness, and shape detailed. Base shall be reinforced with one inch mesh, 18 gage, zinc-coated wire fabric. Base finish mixture shall be one part Portland cement, 2 parts of fine aggregate and one part pea gravel. Colored cement base shall include a chemically inert mineral oxide pigment in the mix.

### 3.04 FINISHING

- A. Soda and Acid Wash: Concrete surfaces to receive plaster, paint or other finish, and which have been formed by oil coated forms, shall be scrubbed with a solution of 1-1/2 pounds of caustic soda to one gallon of water. Surfaces where smooth wood or waste molds have been furnished shall be scrubbed with a solution of 20 percent muriatic acid. Wash with clean water after scrubbing.
- B. Sacking: Exposed concrete curbs, walls, and other surfaces shall be sacked by an application of Portland cement grout, floated, and rubbed. Sacking shall not be



performed until patching and filling of holes has been completed. Entire sacking operation for any continuous area shall be started and completed within the same day.

1. Mix one part Portland cement and 1-1/2 parts fine sand with sufficient water to produce a grout having consistency of thick paint. Wet surface of concrete sufficiently to prevent absorption of water from grout. Apply grout uniformly with a brush or spray gun, then immediately float surface with a cork or other suitable float, scouring wall vigorously.
  2. While grout is still plastic, finish surface with a sponge-rubber float, removing excess grout. Allow surface to dry thoroughly, then rub vigorously with dry burlap to completely remove dried grout. No visible film or grout shall remain after rubbing with burlap.
- C. Sandblasting: Exterior concrete surfaces to receive stucco dash coat finish, where plywood or other smooth forms have been furnished, shall be uniformly sand-blasted with sharp quartz sand under sufficient air pressure to remove dirt, form oil and other foreign materials, and roughen surface to provide a proper bond. Such surfaces shall be thoroughly washed with clean water after sandblasting.
- D. Abrasive: Concrete stair treads, landings, ramps and steps on interior and exterior of buildings, and interior exposed concrete floors in shop buildings shall receive an abrasive finish. Abrasive grains in amount of 30 pounds per 100 square feet shall be evenly installed by dust-on method and embedded into surface during first troweling operation. Additional abrasive grains, in amount of 30 pounds per 100 square feet, shall then be evenly installed and embedded into surface during final troweling operation.
- E. Floor Hardener: Exposed interior concrete floors throughout shall be treated with floor hardener, as specified. Install hardener after surface of concrete has reached the point where no excess moisture is present, but while it is still plastic. Hardener shall be installed as follows:
1. Colored Hardener: Install at rate of 40 pounds per 100 square feet of surface for initial application.
  2. Gray (natural) Hardener: Install at rate of 20 pounds per 100 square feet of surface for initial application.
  3. Hardener shall be evenly distributed and thoroughly floated into surface mortar with a wood float. An additional 20 pounds of hardener, colored or gray, specified as above, shall be installed over each 100 square feet, and troweled to an even surface having uniform color and texture.
- F. Cement Grout and Dry-Pack Concrete: Cement grout shall be mixed at the Project site and shall be composed of one volume of Portland cement and 2-1/2 volumes of fine aggregate. Materials shall be mixed dry with sufficient water added to make mixture

flow under its own weight. When grout is used as a dry pack concrete, add sufficient water to provide a stiff mixture, which can be molded into a sphere.

- G. Broom Finish: Exterior stair treads and landings shall be provided with a non-slip broom finish in addition to abrasive finish specified.
- H. Abrasive Stair Nosing: Nosing shall be installed according to manufacturer's written recommendations.

### 3.05 EXPANSION AND CONSTRUCTION JOINTS

- A. Construction Joints: Details and proposed location of construction joints shall be as indicated on the Drawings, located to least impair strength of structure, in accordance with the following:
  - 1. Thoroughly clean contact surface by sand blasting entire surface not earlier than 5 days after initial placement.
  - 2. A mix containing same proportion of sand and cement provided in concrete plus a maximum of 50 percent of coarse aggregate shall be placed to a depth of at least one inch on horizontal joints. Vertical joints shall be wetted and coated with a neat cement grout immediately before placing of new concrete.
  - 3. Should contact surface become coated with earth, sawdust, or deleterious material of any kind after being cleaned, entire surface shall be re-cleaned before applying mix.
- B. Expansion Joints: Provide expansion joints where indicated in walks and exterior slabs. Space approximately 20 feet apart, unless otherwise indicated. Joints shall extend entirely through slab with joint filler in one piece for width of walk or slab. Joint filler shall be 3/8 inch thick, unless otherwise indicated.
- C. Tooled Joints: Slabs, walks and paving shall be marked into areas as indicated with markings made with a V-grooving tool. Marks shall be round-edged, free from burrs or obstructions, with clean cut angles and shall be straight and true. Walks, if not indicated, shall be marked off into rectangles of not more than 12 square feet and shall have a center marking where more than 5 feet wide.

### 3.06 TESTING

- A. Molded Cylinder Tests:
  - 1. Owner Consultant will prepare cylinders. Each cylinder shall be dated, given a number, point in structure from which sample was obtained, mix design number, mix design strength and result of accompanying slump test noted.
  - 2. Separate tests of molded concrete cylinders obtained at same place and time shall be made at age of 3 days, 7 days, and 28 days. A strength test shall be the

average of the compressive strength of 2 cylinders, obtained from the same sample of concrete and tested at 28 days or at test age designated for determination of  $f(c)$ .

3. Test cylinders shall be prepared at the Project site and stored in testing laboratory in accordance with ASTM C 31, and tested in accordance with ASTM C 39.
- B. Core Test: At request of the Architect, cores of hardened concrete shall be cut from portions of hydrated structures for testing, in accordance with CBC and ASTM C 42.
1. Provide 4-inch diameter cores at representative places throughout the structure as designated by the Architect.
  2. In general, provide sufficient cores to represent concrete placed with at least one core for each 4,000 square feet of building area, and at least 3 cores total for each Project.
  3. Where cores have been removed, fill voids with drypack, and patch the finish to match the adjacent existing surfaces.
- C. Concrete Consistency: Measure consistency according to ASTM C 143. Test twice each day or partial day's run of the mixer.
- D. Adjustment of Mix: If the strength of any grade of concrete for any portion of Work, as indicated by molded test cylinders, fall below minimum 28 days compressive strength specified or indicated, adjust mix design for remaining portion of construction so that resulting concrete meets minimum strength requirements.
- E. Defective Concrete:
1. Should strength of any grade of concrete, for any portion of Work indicated by tests of molded cylinders and core tests, fall below minimum 28 days strength specified or indicated, concrete will be deemed defective Work and shall be replaced or adequately strengthened in a manner acceptable to the Architect and DSA.
  2. Concrete Work that is not formed as indicated, is not true within 1/250 of span, not true to intended alignment, not plumb or level where so intended, not true to intended grades and levels, contains sawdust shavings, wood or embedded debris, or does not fully conform to Contract provisions, shall be deemed to be defective Work and shall be removed and replaced.
- F. Concrete for Equipment Pads, Mechanical and Electrical Work: Unless otherwise indicated, strength shall be 3,000 psi concrete. Exposed concrete shall be provided with a hand trowel finish with radius corners and edges. Form and place concrete where necessary as described in Section 30 10 00: Concrete Forms and Accessories, and reinforced as described in Section 03 20 00: Concrete Reinforcement. Calcium

chloride shall not be furnished in any concrete mix provided for the installation of underground electrical conduits. For concrete encasement of more than one conduit, furnish 3/4 inch to 1 inch aggregate as specified for concrete mix.

3.07 CLEAN UP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.08 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 08 71 00  
DOOR HARDWARE

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions of Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following, but is not necessarily limited to:
  - 1. Door Hardware, including electric hardware.
  - 2. Storefront and Entrance door hardware.
  - 3. Thresholds, gasketing and weather-stripping.
  - 4. Door silencers or mutes.
- C. Related Sections: The following sections are noted as containing requirements that relate to this Section, but may not be limited to this listing.
  - 1. Division 8: Section - Steel Doors and Frames.
  - 2. Division 8: Section - Wood Doors.
  - 3. Division 8: Section - Aluminum Storefront
  - 4. Division 28: Section - Fire/Life-Safety Systems & Security Access Systems.

1.03 REFERENCES (USE DATE OF STANDARD IN EFFECT AS OF BID DATE.)

- A. 2019 California Building Code, CCR, Title 24.
- B. BHMA – Builders’ Hardware Manufacturers Association
- C. CCR – California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.
- D. DHI – Door and Hardware Institute
- E. NFPA - National Fire Protection Association.
  - 1. NFPA 80 - Fire Doors and Other Opening Protectives
  - 2. NFPA 105 - Smoke and Draft Control Door Assemblies

- F. UL - Underwriters Laboratories.
  - 1. UL 10C - Fire Tests of Door Assemblies
  - 2. UL 305 - Panic Hardware

G. WHI - Warnock Hersey Incorporated

H. SDI - Steel Door Institute

1.04 SUBMITTALS & SUBSTITUTIONS

- A. General: Submit in accordance with Conditions of the Contract and Division 1 Specification sections.
- B. Submit product data (catalog cuts) including manufacturers' technical product information for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Submit six (6) copies of schedule organized vertically into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
  - 1. Include a Cover Sheet with;
    - a. Job Name, location, telephone number.
    - b. Architects name, location and telephone number.
    - c. Contractors name, location, telephone number and job number.
    - d. Suppliers name, location, telephone number and job number.
    - e. Hardware consultant's name, location and telephone number.
  - 2. Job Index information included;
    - a. Numerical door number index including; door number, hardware heading number and page number.
    - b. Complete keying information (referred to DHI hand-book "Keying Systems and Nomenclature"). Provision should be made in the schedule to provide keying information when available; if it is not available at the time the preliminary schedule is submitted.
    - c. Manufacturers' names and abbreviations for all materials.
    - d. Explanation of abbreviations, symbols, and codes used in the schedule.
    - e. Mounting locations for hardware.
    - f. Clarification statements or questions.
    - g. Catalog cuts and manufacturer's technical data and instructions.
  - 3. Vertical schedule format sample:

Heading Number 1 (Hardware group or set number – HW -1)					
			(a) 1 Single Door #1 - Exterior from Corridor 101	(b) 90°	(c) RH

			(d) 3' 0"x7' 0" x 1-3/4" x (e) 20 Minute (f) WD x HM		
(g) 1	(h)	(i) ea	(j) Hinges - (k) 5BB1HW 4.5 x 4.5 NRP (l) 1/2 TMS	(m) 626	(n) IVE
2	6AA	1 ea	Lockset - ND50PD x RHO x RH x 10-025 x JTMS	626	SCH

(a) - Single or pair with opening number and location. (b) - Degree of opening (c) - Hand of door(s) (d) - Door and frame dimensions and door thickness. (e) - Label requirements if any. (f) - Door by frame material. (g) - (Optional) Hardware item line #. (h) - Keyset Symbol. (i) - Quantity. (j) - Product description. (k) - Product Number. (l) - Fastenings and other pertinent information. (m) - Hardware finish codes per ANSI A156.18. (n) - Manufacture abbreviation.

- D. Make substitution requests in accordance with Division 1. Substitution requests must be made prior to bid date. Include product data and indicate benefit to the project. Furnish samples of any proposed substitution.
- E. Wiring Diagrams: Provide product data and wiring and riser diagrams for all electrical products listed in the Hardware Schedule portion of this section.
- F. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- G. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- H. Furnish as-built/as-installed schedule with close-out documents, including keying schedule and transcript, wiring/riser diagrams, manufacturers' installation and adjustment and maintenance information.
- I. Fire Door Assembly Testing: Submit a written record of each fire door assembly to the Owner to be made available to the Authority Having Jurisdiction (AHJ) for future building inspections.
- J. LEED Certification Points: Submit information and certifications necessary to achieve maximum points for LEED certification; coordinate and cooperate with Owner and Architect in providing information necessary for required LEED rating.

#### 1.05 QUALITY ASSURANCE

- A. Obtain each type of hardware (latch and lock sets, hinges, closers, exit devices, etc.) from a single manufacturer.

- B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
  - 1. Responsible for detailing, scheduling and ordering of finish hardware.
  - 2. Meet with Owner to finalize keying requirements and to obtain final instructions in writing.
  - 3. Stock parts for products supplied and are capable of repairing and replacing hardware items found defective within warranty periods.
- C. Hardware Installer: Company specializing in the installation of commercial door hardware with five years documented experience.
- D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not.
  - 1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".
- E. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- F. Product packaging to be labelled in compliance with CA Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986.

#### 1.06 DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery of packaged hardware items to the appropriate locations (shop or field) for installation.
- B. Hardware items shall be individually packaged in manufacturers' original containers, complete with proper fasteners. Clearly mark packages on outside to indicate contents and locations in hardware schedule and in work.
- C. Provide locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, etc.
- D. Contractor to inventory door hardware jointly with representatives of hardware supplier and hardware installer until each all are satisfied that count is correct.



1.07 WARRANTY

A. Provide warranties of respective manufacturers' regular terms of sale from day of final acceptance as follows:

1. Locksets: "L" Series (3) years – "ND" Ten (10) years.
2. Electronic: One (1) year.
3. Closers: Thirty (30) years.
4. Exit devices: Three (3) years.
5. All other hardware: Two (2) years.

1.08 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

1.09 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference at least one week prior to beginning work of this section.
- B. Attendance: Architect, Construction Manager, Contractor, Security Contractor, Hardware Supplier, Installer, Key Owner Personnel, and Project Inspector.
- C. Agenda: Review hardware schedule, products, installation procedures and coordination required with related work. Review Owner's keying standards.

**PART 2 - PRODUCTS**

2.01 MANUFACTURERS

<u>Item</u>	<u>Manufacturer</u>	<u>Acceptable Substitutes</u>
Hinges	Ives	Hager, Stanley, McKinney
Locks, Latches & Cylinders	Schlage	Or Approved Equal
Exit Devices	Von Duprin	Or Approved Equal
Closers		LCN Or Approved Equal
Push, Pulls & Protection Plates	Ives	Trimco, BBW, DCI
Flush Bolts	Ives	Trimco, BBW, DCI

Dust Proof Strikes	Ives	Trimco, BBW, DCI
Coordinators	Ives	Trimco, BBW, DCI
Stops	Ives	Trimco, BBW, DCI
Overhead Stops	Glynn-Johnson	Or Approved Equal
Thresholds	Zero	Pemko, National Guard
Seals & Bottoms	Zero	Pemko, National Guard

## 2.02 MATERIALS

- A. Hinges: Exterior out-swinging door butts shall be non-ferrous material and shall have stainless steel hinge pins. All doors to have non-rising pins.
1. Hinges shall be sized in accordance with the following:
    - a. Height:
      - 1) Doors up to 42" wide: 4-1/2" inches.
      - 2) Doors 43" to 48" wide: 5 inches.
    - b. Width: Sufficient to clear frame and trim when door swings 180 degrees.
    - c. Number of Hinges: Furnish 3 hinges per leaf to 7'-5" in height. Add one for each additional 2 feet in height.
  2. Furnish non-removable pins (NRP) at all exterior out-swing doors and interior key lock doors with reverse bevels.
- B. Continuous Hinges: As manufactured by Ives, an Allegion Company. UL rated as required.
- C. Heavy Duty Cylindrical Locks and Latches: Schlage "ND" Series as scheduled with "Rhodes" design, fastened with through-bolts and threaded chassis hubs.
1. Provide cylindrical locksets exceeding the ANSI/BHMA A156.2 Grade 1 performance standards for strength, security, and durability in the categories below:
    - a. Abusive Locked Lever Torque Test – minimum 3,100 inch-pounds without gaining access
    - b. Offset lever pull – minimum 1,600 foot pounds without gaining access
    - c. Vertical lever impact – minimum 100 impacts without gaining access
  2. Cycle life - tested to minimum 16 million cycles per ANSI/BHMA A156.2 Cycle Test with no visible lever sag or use of performance aids such as set screws or spacers
  3. UL 10C for 4'-0" x 10'-0" 3-hour fire door.
  4. Cylinders: Refer to "KEYING" article, herein.

5. Provide solid steel anti-rotation through bolts and posts to control excessive rotation of lever.
6. Provide lockset that allows lock function to be changed to over twenty other common functions by swapping easily accessible parts.
7. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw capable of UL listing of 3 hours on a 4' x 10' opening. Provide proper latch throw for UL listing at pairs.
8. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
9. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
10. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
11. Provide wired electrified options as scheduled in the hardware sets.
  - a. 12 through 24 volt DC operating capability, auto-detecting
  - b. Selectable EL (fail safe)/EU (fail secure) operating mode via switch on chassis
  - c. 0.230A (230mA) maximum current draw
  - d. 0.010A (10mA) holding current
  - e. Modular / "plug in" request to exit switch
12. Lever Trim: Solid cast levers without plastic inserts, and wrought roses on both sides.

D. Schlage "L" Series as scheduled with "06" Style Lever and "A" Style Rose.

1. Locksets to comply with ANSI A156.13, Series 1000, Operational Grade 1 and Security Grade 1 with all standard trims. Locksets shall also comply with UL10C Positive Pressure requirements
2. Lock case shall be manufactured with heavy 12 gauge steel with fully wrapped design. Lock cases with exposed edges are not acceptable. Lock case shall be multi-functional allowing transformation to a different function without opening lock case.
3. Latchbolt shall have 3/4" throw and be non-handed, field reversible without opening the lock case. Solid latchbolts and / or plastic anti-friction devices are not acceptable.
4. The deadbolt, when used, shall be 1" throw stainless steel with a 3/4" internal engagement when fully extended.
5. All trim shall be through-bolted with the spring cages supporting the trim attached to the lock cases to prevent torqueing.
6. Levers to have independent rotation in both directions. Exterior lever assembly to be one-piece design attached by threaded bushing. Interior lever assembly shall be attached by screwless shank
7. Thru-bolt lever assemblies through the door for positive interlock. Locks using a through the door spindle for attachment are not acceptable. Spindles shall be independent, designed to "break-away" at a maximum of 75psi torque.
8. Hand of lock chassis to be changeable by simply moving one screw from one side to the case to the other and pulling and reversing the latchbolt.

9. Cylinders to be secured by a cast stainless steel, dual retainer. Locks utilizing screws and / or stamped retainers are not acceptable.
- E. Deadlocks: Rotating cylinder trim rings of attack-resistant design. Mounting plates and actuator shields of plated cold-rolled steel. Mounting screws of ¼” diameter steel and protected by drill-resistant ball bearings. Steel alloy deadbolt with hardened steel roller. Strike alloy deadbolt with reinforcer and two 3” long screws. ANSI A156.5, 2001 Grade 1 certified.
- F. Exit devices: Von Duprin as scheduled.
1. Provide certificate by independent testing laboratory that device has completed over 1,000,000 cycles and can still meet ANSI/BHMA A156.3 - 2001 standards.
  2. All internal parts shall be of cold-rolled steel with zinc dichromate coating.
  3. Mechanism case shall have an average thickness of .140”.
  4. Compression spring engineering.
  5. Non-handed basic device design with center case interchangeable with all functions.
  6. All devices shall have quiet return fluid dampeners.
  7. All latchbolts shall be deadlocking with ¾” throw and have a self-lubricating coating to reduce friction and wear.
  8. Device shall bear UL label for fire and or panic as may be required.
  9. All surface strikes shall be roller type and utilize a plate underneath to prevent movement.
  10. Lever Trim: “Breakaway” design, forged brass or bronze escutcheon with a minimum of .130” thickness, match lockset lever design.
  11. Removable Mullions: Removable with single turn of building key. Securely reinstalled without need for key.
  12. Furnish glass bead kits for vision lites where required.
  13. All Exit Devices to be sex-bolted to the doors.
  14. Panic Hardware shall comply with CBC Section 11B.404.2.7 and shall be mounted between 34" and 44" above the finished floor surface.
    - a. Provide exit devices UL certified to meet maximum 5 pound requirements according to the California Building Code section 11B-309.4, and UL listed for Panic Exterior Fire Exit Hardware.
  15. Hardware (including panic hardware) shall not be provided with “Night Latch” (NL) function for any accessible doors or gates unless the following conditions are met per DSA Interpretation 10-08 DSA/AC (External), revised 4/28/09). Such conditions must be clearly demonstrated and indicated in the specification:
    - a. Such hardware has a ‘dogging’ feature.
    - b. It is dogged during the time the facility is open.
    - c. Such ‘dogging’ operation is performed only by employees as their job function (non-public use).
- G. Closers: LCN as scheduled. Place closers inside building, stairs, room, etc.

1. Door closer cylinders shall be of high strength cast iron construction with double heat treated pinion shaft to provide low wear operating capabilities of internal parts throughout the life of the installation. All door closers shall be tested to ANSI/BHMA A156.4 test requirements by a BHMA certified testing laboratory. A written certification showing successful completion of a minimum of 10,000,000 cycles must be provided.
2. All door closers shall be fully hydraulic and have full rack and pinion action with a shaft diameter of a minimum of 1 1/16 inch and piston diameter of 1 inch to ensure longevity and durability under all closer applications.
3. All parallel arm closers shall incorporate one piece solid forged steel arms with bronze bushings. 1-9/16" steel stud shoulder bolts, shall be incorporated in regular arms, hold-open arms, arms with hold open and stop built in. All other closers to have forged steel main arms for strength, durability, and aesthetics for versatility of trim accommodation, high strength and long life.
4. All parallel arm closers so detailed shall provide advanced backcheck for doors subject to severe abuse or extreme wind conditions. This advanced backcheck shall be located to begin cushioning the opening swing of the door at approximately 45 degrees. The intensity of the backcheck shall be fully adjustable by tamper resistant non-critical screw valve.
5. Closers shall be installed to permit doors to swing 180 degrees.
6. All closers shall utilize a stable fluid withstanding temperature range of 120 degrees F. to -30 degrees F. without requiring seasonal adjustment of closer speed to properly close the door.
7. Provide the manufactures drop plates, brackets and spacers as required at narrow head rails and special frame conditions. NO wood plates or spacers will be allowed.
8. Maximum effort to operate closers shall not exceed 5 lbs., such pull or push effort being applied at right angles to hinged doors. Compensating devices or automatic door operators may be utilized to meet the above standards. When fire doors are required, the maximum effort to operate the closer may be increased but shall not exceed 15 lbs. when specifically approved by fire marshal. All closers shall be adjusted to operate with the minimum amount of opening force and still close and latch the door. These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position. Per 11B-404.2.8.1, door shall take at least 5 seconds to move from an open position of 90 degrees to a position of 12 degrees from the latch jamb.

#### H. Door Stops:

1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where wall type cannot be used, provide floor type. If neither can be used, provide overhead type.
2. Do not install floor stops more than four (4) inches from the face of the wall or partition (CBC Section 11B-307).
3. Overhead stops shall be made of stainless steel and non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.

- I. Protection Plates: Fabricate either kick, armor, or mop plates with four beveled edges. Provide kick plates 10" high and 2" LDW. Sizes of armor and mop plates shall be listed in the Hardware Schedule. Furnish with machine or wood screws of bronze or stainless to match other hardware.
- J. Thresholds: As Scheduled and per details.
  - 1. Thresholds shall not exceed 1/2" in height, with a beveled surface of 1:2 maximum slope.
  - 2. Set thresholds in a full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 7 "Thermal and Moisture Protection".
  - 3. Use 1/4" fasteners, red-head flat-head sleeve anchors (SS/FHSL).
  - 4. Thresholds shall comply with CBC Section 11B-404.2.5.
- K. Seals: Provide silicone gasket at all rated and exterior doors.
  - 1. Fire-rated Doors, Resilient Seals: UL10C Classified complies with NFPA 80 & NFPA 252. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements.
  - 2. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C Classified complies with NFPA 80 & NFPA 252. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required.
  - 3. Smoke & Draft Control Doors, Provide UL10C Classified complies with NFPA 80 & NFPA 252 for use on "S" labeled Positive Pressure door assemblies.
- L. Door Shoes & Door Top Caps: Provide door shoes at all exterior wood doors and top caps at all exterior out-swing doors.
- M. Silencers: Furnish silencers for interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where sound or light seals occurs, or for fire-resistive-rated door assemblies.

## 2.03 KEYING

- A. Furnish a Proprietary Schlage masterkey system as directed by the district or architect. Key system to be designated and combined by the Schlage Master Key Department even if pinned by the Authorized Key Center, Authorized Security Center or a local authorized commercial dealer.
- B. A detailed keying schedule is to be prepared by the district and/or architect in consultation with a representative of Allegion or an Authorized Key Center or Authorized Security Center. Each keyed cylinder on every keyed lock is to be listed separately showing the door #, key group (in BHMA terminology), cylinder type, finish and location on the door.

- C. Extend the original Schlage masterkey system established for Grant Elementary School.
- D. Furnish all cylinders in the Schlage Full Size Interchangeable Core (FSIC). Pack change keys independently (PKI)
- E. Furnish construction keying for doors requiring locking during construction.
- F. Furnish all keys with visual key control.
  - 1. Stamp key "Do Not Duplicate".
  - 2. Stamp (BHMA) key symbol on key.
- G. Furnish all cylinders with visual key control.
  - 1. Stamp (BHMA) key symbol on side of cylinder (CKC).
- H. Furnish mechanical keys as follows:
  - 1. Furnish 2 cut change keys for each different change key code.
  - 2. Furnish 1 uncut key blank for each change key code.
  - 3. Furnish 6 cut masterkeys for each different masterkey set.
  - 4. Furnish 3 uncut key blanks for each masterkey set.
  - 5. Furnish 2 cut control keys cut to the top masterkey for permanent I/C cylinders.
  - 6. Furnish 1 cut control key cut to each SKD combination.
  - 7. Furnish KS43D2200 padlock for use with non-I/C Schlage cylinders. Furnish 47-413 (conventional) or 47-743-XP (PrimusXP) with above.
  - 8. Furnish KS43G3200 padlock for use with FSIC Schlage cylinders. Furnish 23-030 (Classic / Everest) or 20-740 (PrimusXP) with above.
  - 9. Furnish KS41D1200 padlock for use with SFIC Schlage cylinders. Furnish 80-037 (Everest-B) with above.
- I. Furnish Schlage Padlocks and the cylinders to tie them into the masterkey system for gates, storage boxes, utility valve security, roof hatches and roll-up doors keyed as directed in the keying schedule.
  - 1. Furnish KS43D2200 padlock for use with non-I/C Schlage cylinders. Furnish 47-413 (conventional) or 47-743-XP (PrimusXP) with above.
  - 2. Furnish KS43G3200 padlock for use with FSIC Schlage cylinders. Furnish 23-030 (Classic / Everest) or 20-740 (PrimusXP) with above.
  - 3. Furnish KS41D1200 padlock for use with SFIC Schlage cylinders. Furnish 80-037 (Everest-B) with above.
- J. Furnish one Schlage cabinet lock for each cabinet door or drawer so designated on the drawings or keying schedule to match the masterkey system.
  - 1. Furnish CL100PB for use with non-I/C Schlage cylinders.
  - 2. Furnish CL771R for use with FSIC Schlage cylinders.

3. Furnish CL721G for use with SFIC Schlage cylinders.

#### 2.04 FINISHES

- A. Generally to be satin chrome US26D (626 on bronze and 652 on steel) unless otherwise noted.
- B. Furnish push plates, pull plates and kick or armor plates in satin stainless steel US32D (630) unless otherwise noted.
- C. Door closers shall be powder-coated to match other hardware, unless otherwise noted.
- D. Aluminum items to be finished anodized aluminum except thresholds which can be furnished as standard mill finish.

#### 2.05 FASTENERS

- A. Screws for strikes, face plates and similar items shall be flat head, countersunk type, provide machine screws for metal and standard wood screws for wood.
- B. Screws for butt hinges shall be flathead, countersunk, full-thread type.
- C. Fastening of closer bases or closer shoes to doors shall be by means of sex bolts and spray painted to match closer finish.
- D. Provide expansion anchors for attaching hardware items to concrete or masonry.
- E. All exposed fasteners shall have a phillips head.
- F. Finish of exposed screws to match surface finish of hardware or other adjacent work.
- G. All Exit Devices and Lock Protectors shall be fastened to the door by the means of sex bolts or through bolts.

### **PART 3 - EXECUTION**

#### 3.01 INSPECTION

- A. Verify that doors and frames are square and plumb and ready to receive work and dimensions are as instructed by the manufacturer.
- B. Beginning of installation means acceptance of existing conditions.
- C. Fire-Rated Door Assembly Inspection: Upon completion of the installation, all fire door assemblies shall be inspected to confirm proper operation of the closing device and latching device and that only the manufacturer's furnished fasteners are used for installation and that it meets all criteria of a fire door assembly per NFPA 80 (Standard for Fire Doors and Other Opening Protectives) 2016 Edition. A written



record shall be maintained and transmitted to the Owner to be made available to the Authority Having Jurisdiction (AHJ). The inspection of the swinging fire doors shall be performed by a certified FDAI (Fire Door Assembly Inspector) with knowledge and understanding of the operating components of the type of door being subjected to the inspection. The record shall list each fire door assembly throughout the project and include each door number, an itemized list of hardware set components at each door opening, and each door location in the facility.

### 3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and requirements of DHI.
- B. Use the templates provided by hardware item manufacturer.
- C. Mounting heights for hardware shall be as recommended by the Door and Hardware Institute. Operating hardware will to be located between 34" and 44" AFF.
- D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- F. Set thresholds for exterior doors in full bed of butyl-rubber sealant.
- G. If hand of door is changed during construction, make necessary changes in hardware at no additional cost.
- H. Hardware Installer shall coordinate with security contractor to route cable to connect electrified locks, panic hardware and fire exit hardware to power transfers or electric hinges at the time these items are installed so as to avoid disassembly and reinstallation of hardware.
- I. Hardware Installer shall also be present with the security contractor when the power is turned on for the testing of the electronic hardware applications. Installer shall make adjustments to solenoids, latches, vertical rods and closers to insure proper and secure operation.
- J. All wiring for electro-mechanical hardware mounted on the door shall be connected through the power transfer and terminated in the interface junction box specified for in the Electrical Section.
- K. Conductors shall be minimum 18 gage stranded, multicolored. A minimum 12 in. loop of conductors shall be coiled in the interface junction box. Each conductor shall be permanently marked with its function.

- L. If a power supply is specified in the hardware sets, all conductors shall be terminated in the power supply. Make all connections required for proper operation between the power supply and the electro-mechanical hardware. Provide the proper size conductors as specified in the manufacturer's technical documentation.

### 3.03 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. Clean adjacent surface soiled by hardware installation.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy, return to that work area and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware finishes, during the final adjustment of hardware.
- E. Continued Maintenance Service: Approximately six months after the completion of the project, the Contractor accompanied by the Architectural Hardware Consultant, shall return to the project and re-adjust every item of hardware to restore proper functions of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

### 3.04 HARDWARE LOCATIONS

- A. Conform to CCR, Title 24, Part 2; and ADAAG; and the drawings for access-compliant positioning requirements for the disabled.

### 3.05 FIELD QUALITY CONTROL

- A. Contractor is responsible for providing the services of an Architectural Hardware Consultant (AHC) or a proprietary product technician to inspect installation and certify that hardware and its installation have been furnished and installed in accordance with manufacturers' instructions and as specified herein.

### 3.06 SCHEDULE

- A. The items listed in the following schedule shall conform to the requirements of the foregoing specifications.

- B. While the hardware schedule is intended to cover all doors, and other movable parts of the building, and establish type and standard of quality, the contractor is responsible for examining the Plans and Specifications and furnishing proper hardware for all openings whether listed or not. If there are any omissions in hardware groups in regard to regular doors they shall be called to the attention of the Architect prior to bid opening for instruction; otherwise, list will be considered Complete. No extras will be allowed for omissions.
- C. The Door Schedule on the Drawings indicates which hardware set is used with each door.

**Manufacturers Abbreviations (Mfr.)**

GLY	=	Glynn-Johnson Corporation	Overhead Door Stops
IVE	=	Ives	Hinges, Pivots, Bolts, Coordinators, Dust Proof Strikes, Push Pull & Kick Plates, Door Stops & Silencers
LCN	=	LCN	Door Closers
SCE	=	Schlage Electronics	Electronic Door Components
SCH	=	Schlage Lock Company	Locks, Latches & Cylinders
VON	=	Von Duprin	Exit Devices
ZER	=	Zero International	Thresholds, Gasketing & Weather-stripping

**HARDWARE GROUP NO. 01**

2	EA	CONT. HINGE	224XY EPT	628	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	ELEC PANIC HARDWARE	LD-RX-LC-PA-AX-99-EO	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-J-LRX 4AA BATTERY (PROVIDED BY DIVISION 28)	626	SCE
2	EA	FSIC CORE	23-030	626	SCH
1	EA	MORTISE CYLINDER	26-091 ICX	626	SCH
2	EA	SURFACE CLOSER	4040XP RW/PA MC TBSRT	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS18S	BLK	IVE
1	EA	DOOR SWEEP	328AA	AA	ZER
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	THRESHOLD	PER DETAIL	A	ZER

HARDWARE GROUP NO. 02

2	EA	CONT. HINGE	112XY EPT	628	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
2	EA	ELEC PANIC HARDWARE	LD-RX-LC-PA-AX-99-EO	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-J-LRX 4AA BATTERY (PROVIDED BY DIVISION 28)	626	SCE
2	EA	FSIC CORE	23-030	626	SCH
1	EA	MORTISE CYLINDER	26-091 ICX	626	SCH
2	EA	SURFACE CLOSER	4040XP RW/PA MC TBSRT	689	LCN
2	EA	FLOOR STOP	FS18S	BLK	IVE
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	EA	SEALS	BY DOOR/FRAME MFR.		
1	EA	THRESHOLD	PER DETAIL	A	ZER

HARDWARE GROUP NO. 03

1	EA	CONT. HINGE	224XY	628	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-J 4AA BATTERY (PROVIDED BY DIVISION 28)	626	SCE
1	EA	FSIC CORE	23-030	626	SCH
1	EA	LOCK GUARD	LG13	US32D	IVE
1	EA	SURFACE CLOSER	4040XP RW/PA MC TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS18S	BLK	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR SWEEP	328AA	AA	ZER
1	EA	THRESHOLD	PER DETAIL	A	ZER

HARDWARE GROUP NO. 04

1	EA	CONT. HINGE	224XY	628	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-J 4AA BATTERY (PROVIDED BY DIVISION 28)	626	SCE
1	EA	FSIC CORE	23-030	626	SCH
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA MC ST-2776 TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	DOOR SWEEP	328AA	AA	ZER
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	THRESHOLD	PER DETAIL	A	ZER

HARDWARE GROUP NO. 05

1	EA	CONT. HINGE	224XY	628	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-J 4AA BATTERY (PROVIDED BY DIVISION 28)	626	SCE
1	EA	FSIC CORE	23-030	626	SCH
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA MC ST-2776 TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 06

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-J 4AA BATTERY (PROVIDED BY DIVISION 28)	626	SCE
1	EA	FSIC CORE	23-030	626	SCH
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA MC ST-2776 TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR SWEEP	328AA	AA	ZER
1	EA	THRESHOLD	PER DETAIL	A	ZER

HARDWARE GROUP NO. 07

1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-J 4AA BATTERY (PROVIDED BY DIVISION 28)	626	SCE
1	EA	FSIC CORE	23-030 BALANCE OF HARDWARE EXISTING TO REMAIN	626	SCH

HARDWARE GROUP NO. 08

1	EA	ELEC PANIC HARDWARE	LD-RX-LC-PA-AX-99-EO	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-J-LRX 4AA BATTERY (PROVIDED BY DIVISION 28)	626	SCE
1	EA	FSIC CORE	23-030 BALANCE OF HARDWARE EXISTING TO REMAIN	626	SCH

HARDWARE GROUP NO. 09

1	EA	CONT. HINGE	224XY	628	IVE
1	EA	VANDL	ND95JD RHO XN12-035	626	SCH
		CLASSROOM SEC			
2	EA	FSIC CORE	23-030	626	SCH
1	EA	LOCK GUARD	LG13	US32D	IVE
1	EA	SURFACE CLOSER	4040XP RW/PA MC TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS18S	BLK	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR SWEEP	328AA	AA	ZER
1	EA	THRESHOLD	PER DETAIL	A	ZER

HARDWARE GROUP NO. 10

1	EA	CONT. HINGE	224XY	628	IVE
1	EA	PANIC HARDWARE	CD-PA-AX-99-NL	626	VON
1	EA	MORTISE	26-091 ICX XQ11-948	626	SCH
		CYLINDER			
2	EA	FSIC CORE	23-030	626	SCH
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA MC TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS18S	BLK	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR SWEEP	328AA	AA	ZER
1	EA	THRESHOLD	PER DETAIL	A	ZER

HARDWARE GROUP NO. 11

1	EA	CONT. HINGE	224XY	628	IVE
1	EA	ELEC PANIC HARDWARE	LD-RX-LC-PA-AX-99-EO	626	VON
1	EA	ELEC EXIT DEVICE TRIM	AD-400-993R-50-MT-RHO-J-LRX 4AA BATTERY (PROVIDED BY DIVISION 28)	626	SCE
1	EA	FSIC CORE	23-030	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA MC TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS18S	BLK	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER
1	EA	DOOR SWEEP	328AA	AA	ZER
1	EA	THRESHOLD	PER DETAIL	A	ZER

HARDWARE GROUP NO. 12

3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	PRIVACY W/INDICATOR	L9056J 06A L583-363 L283-722	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA MC ST-2776 TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 13

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	VANDL STOREROOM LOCK	ND96JD RHO	626	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CCV	626	IVE
3	EA	SILENCER	SR64	GRY	IVE



HARDWARE GROUP NO. 14

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	ELEC OFFICE LOCK	AD-400-CY-50-MT-RHO-J 4AA BATTERY (PROVIDED BY DIVISION 28)	626	SCE
1	EA	FSIC CORE	23-030	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401/402CCV	626	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

**END OF SECTION**

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SECTION 10 1400  
SIGNAGE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Interior and exterior accessibility, identification, directional and informational signs.
2. Parking signs.
3. School Name and Address Sign.

B. Related Requirements:

1. Division 01: General Requirements.
2. Section 08 1113: Hollow Metal Doors, Windows and Frames.
3. Section 08 1416: Wood Doors.
4. Division 09: Finishes.
5. Section 14 2423: Hydraulic Elevators.
6. Section 32 1313 - Site Concrete Work.

1.02 REFERENCES

A. ASTM International:

1. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
3. ASTM D4802 - Standard Specification for Poly (Methyl Methacrylate) Acrylic Plastic Sheet.
4. 2019 California Building Code Chapter 11B.

1.03 SUBMITTALS

- A. Product Data: Submit material descriptions, finishes and color charts for each type of sign.
- B. Shop Drawings: Submit Shop Drawings indicating sign style, lettering, overall dimensions and quantities. Submit floor plans showing locations for each sign.
- C. Material Samples: Submit three samples illustrating full size sample sign, of type, style and color specified.
- D. Manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

- A. Pre-Installation Conference: Notify OAR when signs are ready for installation. Arrange for conference at site. Do not proceed with installation until ARCHITECT'S approval of specific locations and methods of attachment has been obtained.
- B. Provide signs from one manufacturer.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site and protect from damage. Store until immediately prior to installation.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Products of following manufacturers are acceptable and are the basis for intended design and quality.
  1. H. Toji and Company.
  2. Karman Ltd., Architectural Signs.
  3. Vomar Products Inc.
  4. ASI-Modulex, Inc.
  5. Mohawk Sign Systems, Inc.
  6. Accent Signage Systems.
  7. The Gruenke Company.
  8. Ada Sign Products.
  9. AccuBraille.
  10. Equal.

#### 2.02 MATERIALS AND FABRICATION

- A. Interior Sign Materials:
  1. Substrate Panel: 1/8 inch minimum thick, integrally colored or clear acrylic plastic, or laminated acrylic. Conforming to ASTM D4802; non-glare (matte), UV stable, suitable for interior and exterior use.
    - a. Corners shall be [radius].
    - b. Edges shall be square and eased.
    - c. Colors as selected by ARCHITECT from manufacturer's custom color range.
  2. Fasteners:
    - a. Stainless steel tamper-proof screws and plastic anchors.
    - b. Signs mounted on fire-rated doors shall be secured with adhesive.
    - c. Adhesives and sealants shall comply with the limits for VOC content and shall be approved by OWNER's Office of Environmental Health Services (OEHS).
- B. Exterior Sign Materials:

1. Sign: ASTM B209 aluminum sheet, 0.080 inch thick with rounded corners of at least 1/8 inch radius and eased edges. White figure on a blue background; non-glare, high contrast signs. The blue shall be equal to color number 15090 in Federal Standard 595B.
  2. Post: 2 by 2 inch galvanized steel tubing, weighing minimum of 4.31 pounds per foot and conforming to ASTM A500, Grade B, 3/16 inch thick wall thickness.
  3. Concrete Post Footings: Refer to Section 32 1313, Site Concrete Work.
  4. Fasteners: Stainless steel carriage bolts with tamper resistant nuts.
- C. Characters and Symbols: Shall be fabricated by one of the processes described below:
1. Computer cut raised characters and graphics shall be cut from 1/16 inch integrally colored acrylic. Raised characters and graphics shall be inlaid 1/32 inch minimum into first surface of sign background, secured with adhesive so it cannot be removed without the use of tools. Raised characters and graphics shall have beveled, eased or rounded edges. Non-tactile text and graphics shall be applied to the second surface, and background color shall be applied to the second surface and protected with film or an additional backplate. Pictograms and other symbols including the International Symbol of Accessibility, which are included on signs with raised characters and Braille, are not required to be raised.
  2. Raised characters and graphics including braille shall be integral to sign face and shall be formed into sign face by high pressure thermoforming using a negative mold. No applied, glued, welded tactile elements are acceptable. Raised characters and graphics shall have beveled, eased or rounded edges. No sharp, square edges are acceptable. Non-tactile text and graphics shall be applied to the second surface, and background color shall be applied to the second surface and protected with vinyl film. Pictograms and other symbols including the International Symbol of Accessibility, which are included on signs with raised characters and Braille, or other signs are not required to be raised.

## 2.03 COMMUNICATION ELEMENTS AND FEATURES

- A. Raised Characters Raised characters shall comply with CBC 11B-703.2.
1. Character Type: Characters on signs shall be raised 1/32 inch minimum above their background and shall be sans serif uppercase characters duplicated in Braille. Characters and Braille shall be in a horizontal format.
  2. Character Height: Character height measured vertically from the baseline of the character shall be 5/8 inch minimum and 2 inch maximum based on the height of the uppercase letter "I".
  3. Character Proportions: Characters shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the letter "I".
  4. Stroke Thickness: Stroke thickness of the uppercase letter "I" shall be 15 percent maximum of the height of the character.
  5. Character and Line Spacing shall be in conformance to CBC 11B-703.2.7 and 11B-703.2.8.
  6. Character Placement: Shall be placed in accordance to Paragraph 2.03, C below.

- B. Visual Characters: Visual characters shall comply with CBC Section 11B-703.5. Characters shall be conventional in form, and shall be uppercase or lowercase or a combination of both, as indicated on the drawings. Characters shall not be italic, oblique, highly decorative, or of other unusual forms.
1. Finish and Contrast: Characters and their backgrounds shall have a non-glare finish. Characters shall contrast with their background with either light characters on a dark background or a dark characters on a light background.
  2. Character Proportions: Characters shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase of the letter "I".
  3. Character Height: Minimum character height shall comply with CBC Table 11B-703.5.5.
  4. Height from Finish Floor or Ground: Visual characters shall be a 40 inches minimum above the finish floor or ground
  5. Stroke Thickness: Uppercase letter "I" shall be 10 percent minimum and 20 percent maximum of the height of the character.
  6. Character and Line Spacing: Shall be in accordance to CBC 11B-703.5.8 and 11B-703.5.9.
- C. Braille: Contracted Grade 2 Braille, conforming to CBC 11B-703.3. Braille characters shall be inlaid optically correct acrylic Raster beads into computer drilled holes in the panel surface.
1. Dimensions and Capitalization: Braille dots shall have a domed or rounded shape and shall comply with CBC Table 11B-703.3.1. The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials, and acronyms.
  2. Position: Braille shall be positioned below the corresponding text in a horizontal format, flush left or centered. If text is multi-lined, Braille shall be placed below the entire line of text. Braille shall be separated 3/8 inch minimum and 1/2 maximum from any other tactile characters and 3/8 inch minimum from raised borders and decorative elements.
- D. Pictograms: In conformance to CBC 11B-703.6. Pictograms shall have a field height of 6 inches minimum. Characters and Braille shall not be located in the pictogram field.
1. Finish and Contrast: Pictograms and their field shall have a non-glare finish. Pictograms shall contrast with their field with either a light pictogram on a dark field or a dark pictogram on a light field.
  2. Text Descriptors: Pictograms shall have text descriptors located directly below the pictogram field, and shall comply with CBC 11B-703.2, 11B-703.3 and 11B-703.4.
- E. International Symbol of Accessibility (ISA): Shall comply with CBC 11B-703.7 and CBC Figure 11B-703.7.2.1. The ISA shall consist of a white figure on a blue background. The blue color shall be approximate to FS. 15090 in Federal Standard 595C.
- F. Mounting Locations and Height: Signs with tactile characters shall be as indicated on the drawings and in conformance to CBC 11B-703.4.
1. Mounting Locations:

- a. Identification signs for rooms and spaces shall be located on the wall adjacent to the latch side of the door, as one enters the room or space.
  - b. Signs that identify exits shall be located at the exit door when approached in the direction of egress travel.
  - c. Signs containing tactile characters shall be located so that a clear floor space 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.
  - d. Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side.
  - e. Where a tactile sign is provided at double doors with one active leaf, the sign shall be located at the inactive leaf.
  - f. Where a tactile sign is provided at double doors with two active leaves, the sign shall be located to the right of the right hand door.
  - g. Where there is no wall space at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall.
2. Mounting height above finish floor or ground: Tactile characters on signs shall be located 48 inches minimum above the finish floor or ground surface, measured from the baseline of the lowest Braille cells and 60 inches maximum above the finish floor or ground surface, measured from the baseline of the highest line of raised characters.

## 2.04 ROOM IDENTIFICATION SIGNS

### A. Room Identification Sign Types:

1. Room Identification Sign with Changeable Insert: 7 inches high by 9 inches wide, minimum, with 4 inches high by 9 inches wide window for name and title removable insert. Locate room name immediately below window, and centered above room number. Room name shall be raised characters 3/4 inches high minimum, and room number 1 inch minimum; and shall be accompanied with Braille indicators.
2. Room Identification Sign with Room Name and Room Number: 7 inches high by 9 inches wide, minimum. Room name shall be raised characters 3/4 inches high minimum, and room number 1 inch minimum; and shall be accompanied with Braille indicators.
3. Room Number Sign: 7 inches wide by 4 inches high; room number, 1 inch high minimum, raised character, accompanied by Braille indicator immediately below.

### B. Room Identification Sign Requirements:

1. Finish and Contrast: Refer to paragraph 2.03.B.
2. Raised Characters and Proportions: Refer to paragraph 2.03.A.
3. Braille: Refer to paragraph 2.03.C.
4. Mounting Location and Height: Refer to paragraph 2.03.F.

## 2.05 RESTROOM SIGNAGE

ARROYO HIGH SCHOOL  
GREENHOUSE

DSA SUBMITTAL 01/17/20  
SIGNAGE  
10 1400-5

- A. Multiple-Occupancy restrooms shall be provided with geometric symbols and wall mounted pictograms with text descriptors.
- B. Geometric Symbols:
1. Doorways leading to toilet rooms shall be identified by a geometric symbol complying with CBC Section 11B-703.7.2.6.
  2. Male Restroom Door Symbol: 1/4 inch thick equilateral triangle with edges 12 inches long, with vertex pointing upward, the triangle symbol shall contrast with the door, either light on a dark background or dark on a light background. A male silhouette shall appear within the equilateral triangle in contrasting color to it.
  3. Female Restroom Door Sign: 1/4 inch thick circle 12-inch diameter, the circle symbol shall contrast with the door, either light on a dark background or dark on a light background. A female silhouette shall appear within the circle in contrasting color to it.
  4. "All Gender" Restroom Door Sign (Single occupancy restrooms): 1/4 inch thick circle, 12-inch diameter with a 1/4 inch thick equilateral triangle with the vertex pointing upward superimposed on the circle and within the 12-inch diameter. Triangle and circle shall be of contrasting colors; the circle symbol shall contrast with the door. A female and male silhouettes shall appear within the equilateral triangle in contrasting color to it, and the word "restroom" shall appear on the bottom part of the circle in contrasting color to it.
  5. Edges and Vertices on Geometric Symbols: Shall be eased or rounded at 1/16 inch minimum, or chamfered at 1/8 inch maximum. Vertices shall be radiused between 1/8 inch minimum and 1/4 inch maximum.
  6. Location and Mounting Height: Symbols shall be mounted at 58 inches minimum and 60 inches maximum above the finish floor or ground surface measured from the centerline of the symbol. Where a door is provided the symbol shall be mounted within one inch of the vertical centerline of the door.
    - a. At locations with no restroom doors, locate sign adjacent to the opening. Tactile room name accompanied by Braille shall be located on symbol sign.
- C. Room Identification for Multiple-Occupancy Restrooms: Provide a 16 inch long by 6 inch tall room identification sign, including a pictogram of the International Symbol of Accessibility on a side. Restroom names shall be "Girls" or "Boys", for students, and "Women" and "Men" for staff. Characters, Braille, pictograms and mounting locations and height shall be in conformance to Article 2.03.
- D. Room Identification for Single-Occupancy Restrooms: Provide a 16 inch long by 6 inch tall room identification sign, including a pictogram of the International Symbol of Accessibility on a side. Text descriptor shall be "All Gender Restroom". Characters, Braille, pictograms and mounting locations and height shall be in conformance to Article 2.03.
- E. Room Identification for Non-Accessible Single-Occupancy Restrooms: Provide an 8 inch long by 3 inch tall room identification sign. Text descriptor shall be "All Gender Restroom". Characters, Braille, and mounting locations and height shall be in conformance to Article 2.03.

## 2.06

## RAISED CHARACTER AND BRAILLE EXIT SIGNS



- A. Tactile Exit Sign Types:
1. "EXIT".
  2. "EXIT STAIR DOWN".
  3. "EXIT RAMP DOWN".
  4. "EXIT STAIR UP".
  5. "EXIT RAMP UP".
  6. "EXIT ROUTE".
  7. "TO EXIT".
  8. "EXIT WITH ALARM", on exit doors with an alarm.
  9. "EXIT ONLY" or "EXIT STAIR ONLY", on exit doors and stair exit doors which lock from outside and does not allow a return.
- B. Sign Requirements:
1. Finish and Contrast: Refer to paragraph 2.03.B.
  2. Raised Characters and Proportions: Refer to paragraph 2.03.A.
  3. Braille: Refer to paragraph 2.03.C.
  4. Mounting Location and Height: Refer to paragraph 2.03.F.

## 2.07 STAIRWAY IDENTIFICATION SIGNS

- A. Provide floor identification signs at the landing of each floor level in interior exit stairway connecting more than three stories, designating the floor level, the terminus of the top and bottom of the interior exit stairway and the identification of the stair.
1. Mount signs 5 feet above each floor landing in a position that is readily visible when doors are in the open and closed positions.
  2. Sign size shall be a minimum of 18 by 12-inch.
  3. The letters designating the identification of the stair, such as "STAIR No. 1", shall be placed at the top of the sign in 1 ½-inches minimum in height block lettering with 1/4 inch strokes.
  4. Upper terminus, such as "ROOF ACCESS" or "NO ROOF ACCESS", shall be placed under the stairway identification in 1 inch high block lettering with 1/4 inch strokes.
  5. The number designating the floor level shall be a minimum of 5 inches in height with 3/4 inch strokes and located in the center of the sign.
    - a. Mezzanine levels shall be identified by letter "M" preceding the floor number.
    - b. Basement levels shall be identified by letter "B" preceding the floor number.
  6. All other lettering and numbers shall be a minimum of one inch in height.
  7. Lower and upper terminus of the stairway shall be placed at the bottom of the sign in 1 inch high block lettering with 1/4 inch strokes.

8. Characters and their background shall have a non-glare finish. Characters shall contrast with their background, with either light characters on a dark background or dark characters on a light background.

B. Tactile Floor Designation Sign in Stairways: Shall be located at the landing of each floor level, placed adjacent to the door on the latch side, to identify the floor level. At the exit discharge level, the sign shall include a raised five-pointed star located to the left of the identifying floor level. The outside diameter of the star shall be the same as the height of the raised characters.

1. Finish and Contrast: Refer to paragraph 2.03.B.

2. Raised Characters and Proportions: Refer to paragraph 2.03.A.

3. Braille: Refer to paragraph 2.03.C.

## 2.09 DIRECTIONAL EXIT SIGNAGE

A. At exits serving a required accessible space but not providing an approved accessible means of egress, at elevator landings and within areas of refuge, provide signage indicating the location of accessible means of egress.

1. Finish and Contrast: Refer to paragraph 2.03.B.

2. Character Height and Proportions: Refer to paragraph 2.03.B.

3. Symbol of Accessibility: Refer to paragraph 2.03.E.

## 2.10 ASSISTIVE LISTENING DEVICE SIGN

A. Include International Symbol of Access for Hearing Loss, CBC Figure 11B-703.7.2.4, with text "Assistive-Listening System Available". Use upper and lower case characters. Sign shall comply with the following requirements:

1. Finish and Contrast: Refer to paragraph 2.03.B.

2. Character Height and Proportions: Refer to paragraph 2.03.B.

3. Symbol of Accessibility: Refer to paragraph 2.03.E.

## 2.11 DESIGNATED AISLE SEAT

A. Designated Aisle Seat: Each designated aisle seat shall be identified by a sign with the International Symbol of Accessibility per paragraph 2.03.E. Additionally, post visual signage at the ticket office, or where indicated on drawings, indicating availability of seats for disabled persons. Visual sign shall be per paragraph 2.03.B.

## 2.12 PUBLIC TELEPHONE WITH VOLUME CONTROL SIGN

A. Sign shall contain a depiction of a telephone handset with radiating sound waves. Symbol shall be white on a blue background. The blue shall be equal to Color No. 15090 in Federal Standard 595B. Symbol shall comply with CBC Figure 11B-703.7.2.3.

## 2.13 ACCESSIBILITY ENTRANCE SIGNS AND PATH OF TRAVEL DIRECTIONAL SIGNS

A. Entrance Sign: Provide at each building entrance an International Symbol of Accessibility sign. Signs shall be visible to persons along approaching pedestrian ways.

- B. Directional Signs: Provide where indicated on the drawings with arrow indicators and International Symbol of Accessibility.
- C. Signs shall be mounted on wall with lower edge between 48 inches and 60 inches above ground surface or finish floor. Pole mounted, overhead and projecting signs shall have the lower edge at least 80 inches from the ground surface or finish floor.
- D. Sign shall comply with the following requirements.
  - 1. Directional Signs: Refer to paragraph 2.03.B.
  - 2. Symbol of Accessibility: Refer to paragraph 2.03.E.
- E. No Smoking Sign: Provide at each building entrance. Reverse cut white vinyl sign with 4 1/2-inch high no smoking symbol, mounted on glass entry doors. Under No Smoking symbol, place words "No Smoking", 1/2 inch high minimum, San Serif upper and lower case characters.

#### 2.14 PARKING SIGNS

- A. Tow-Away Sign: 18 inches by 24 inches with rounded corners. Black graphics on white background, with lettering not less than 1 inch high. Sign to read: "UNAUTHORIZED VEHICLES PARKED IN DESIGNATED ACCESSIBLE SPACES NOT DISPLAYING DISTINGUISHING PLACARDS OR SPECIAL LICENSE PLATES ISSUED FOR PERSONS WITH DISABILITIES WILL BE TOWED AWAY AT THE OWNER'S EXPENSE. TOWED VEHICLES MAY BE RECLAIMED AT [Insert location] OR BY TELEPHONING (213) 625-6631".
- B. Parking Space Identification Sign: 12-inch by 18-inch with rounded corners. White reflectorized graphic on dark blue background, and shall display an 8-inch high International Symbol of Accessibility per paragraph 2.03.E.
  - 1. Additional language or an additional sign below the International Symbol of Accessibility shall state I "Minimum Fine \$250".
  - 2. Signs identifying van accessible parking spaces shall contain additional language or an additional sign with the designation "Van Accessible".
- C. Signs shall be mounted on posts at head of each accessible parking with lower edge 80 inches minimum above ground surface, or mounted on walls at a minimum height of 60 inches from ground surface.
- D. Headroom Signs: On parking structures provide signs indicating headroom clearance height at entries and at any point of a vehicular path where entry clearance height is reduced. Minimum character height shall be 3 inches.

#### 2.15 OCCUPANT LOAD SIGNS

- A. Provide maximum occupancy load signs. Post in a conspicuous place near the main exit or exit access doorway from the room or space of rooms and areas indicated in the drawings.
- B. Minimum size: 4 inches high by 8 inches wide, 7/8 inch high letters, 1 inch high numerals.
- C. Sign to read: "MAXIMUM OCCUPANCY LOAD XXX". Indicate occupant load shown on drawings.

#### 2.16 EMERGENCY GAS SHUT OFF SIGN

- A. Exterior Signs: Painted aluminum, suitable for outdoor use, with pre-drilled mounting holes.
1. Sign Size: Minimum 4 inches high by 8 inches wide.
  2. Color: Subsurface white text, red background.
  3. Character Height: One inch high.
  4. Text:
    - a. Site main gas shut off valve(s): “MAIN SITE EMERGENCY GAS SHUT-OFF VALVE”.
    - b. Building gas shut-off valve(s): “BUILDING EMERGENCY GAS SHUT-OFF VALVE.”
- B. Science Lab Gas-Shut-Off Signs: 1/8 inch thick acrylic.
1. Sign Size: Minimum 4 inches high by 8 inches wide.
  2. Color: Subsurface white text, red background.
  3. Character Height: One inch high.
  4. Text: “EMERGENCY GAS SHUT-OFF VALVE”.

#### 2.17 LADDER TO ROOF SIGN

- A. 1/8 inch thick acrylic.
1. Sign Size: Minimum 4 inches high by 8 inches wide.
  2. Color: Subsurface white text, red background.
  3. Character Height: One inch high.
  4. Text: “LADDER TO ROOF”.

#### 2.18 WHEELCHAIR LIFT SIGNS

- A. Provide a sign complying with paragraph 2.03.B, posted in a conspicuous place at each landing and within the platform enclosure stating ‘NO FREIGHT’ and include the International Symbol of Accessibility per paragraph 2.03.E.

#### 2.19 EMERGENCY EGRESS WINDOW SIGN

- A. Provide upper and lower emergency egress windows as follows:
1. Lower Sign: Signs shall be mounted on the wall centered with the emergency egress window and with the bottom edge located between 6 and 8 inches from the floor.
  2. Upper Signs: Signs shall be mounted on the wall within 4 inches of the window frame with the lower edge between 60 inches and 72 inches above ground surface or finish floor.
- B. Text: Text shall state “EMERGENCY EGRESS WINDOW”.
- C. Sign shall comply with the following requirements:
1. Sign Size: Four inches by six inches.
  2. Color: Subsurface white text, red background.
  3. Character Height: one inch.

## 2.20 FIRE SPRINKLER RISER ROOM SIGN

- A. Locate one sign at each fire sprinkler riser room door as indicated in drawings.
- B. Text: Sign to read “Fire Sprinkler Riser Inside”, white characters, 1 inch high on red background.
- C. Sign Requirements:
  - 1. Raised Characters and Proportions: Refer to paragraph 2.03.B.
  - 2. Braille: Refer to paragraph 2.03.C.
  - 3. Mounting Location and Height: Mounted on the door, refer to paragraph 2.03.F.

## 2.21 OWNER FURNISHED / CONTRACTOR INSTALLED SIGNS

- A. Locate at the main entry and at pedestrian and vehicular entrances to the school site.
  - 1. Welcome to Our School Sign: Sign size is 24 inches by 36 inches.
  - 2. Safe School Zone Sign: Sign size is 18 inches by 24 inches.

## 2.23 EVACUATION PLANS

- A. 1/8 inch thick acrylic sign consisting of a floor plan depicting the building layout. The words “EVACUATION PLAN” shall be included at the top of the plan in minimum 3/4 inch high characters. Interior spaces shall be indicated by shading and corridor shall be prominent and displayed in white. Sign shall provide emergency procedures information and instructions to be followed in the event of an emergency, and shall be printed with a minimum of 3/16-inch high non-decorative lettering providing a sharp contrast to the background. Emergency procedures information shall include, but not be limited to the following:
  - 1. Viewer location symbol, “YOU ARE HERE” in the plan. Plan shall be oriented in each sign as required to correspond with the users view.
  - 2. Location of exits with arrows leading to them.
  - 3. Location of fire extinguishers.
  - 4. Fire department emergency telephone number 911.
- B. Mount signs so that bottom edge is no more than 48 inches from the finish floor, and within close proximity to the building, stair or elevator entrance. The reader must be able to approach the sign without encountering any obstacle.
- C. Evacuation Plans Requirements:
  - 1. Finish and Contrast: Refer to paragraph 2.03.B.
  - 2. Character Height and Proportions: Refer to paragraph 2.03.B.

## 2.24 SCHOOL NAME AND ADDRESS SIGN

- A. Sign, indicating school name and address, shall be furnished with cast aluminum letters as manufactured by Andco Industries Corp., or equal.
- B. Style: Helvetica Medium, Futura 444, Ribbon 555, 556 or 557 as selected.
- C. Material: 0.064 inch aluminum construction, unless indicated otherwise.
- D. Letter Size: School name shall be 10 inches high and address shall be 4 inches high, unless indicated otherwise.

- E. Letter Copy and Design: As indicated on Drawings.
- F. Finish: Finish shall be type H anodic clear or black, as selected by ARCHITECT.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means installer accepts condition of existing surfaces.

#### 3.02 METHODS OF INSTALLATION

- A. Interior Identification Signs and Interior Directional Signs:
  1. Fasten to wall with four tamper-proof round-head screws, one at each corner of sign. Furnish plastic anchors.
  2. When concealed installation is specified, install backplate to wall as above. Fasten sign to backplate with very high-bond double-faced tape.
  3. For installation on glass, fasten sign to glass with very high bond double faced tape. On opposite side of glass, anchor matching backplate to glass with very high-bond double-faced tape.
- B. Geometric Signs: Geometric toilet room signs shall be fastened to doors with three tamper-proof oval-head counter-sunk screws.
- C. Exterior Post Mounted Directional Signs: Size of required footing shall be as indicated on the drawings. Fasten sign with tamperproof stainless steel bolts.
- D. Exterior Wall Mounted Identification Signs and Directional Signs:
  1. Aluminum signs: Fasten to wall with 4 tamper-proof round-head screws, one at each corner of sign. Furnish plastic anchors.
    - a. Cement Plaster, Brick, or Masonry: Provide plastic anchors. For signs greater than 640 square inches use Leadwood Screw Anchors, concrete fasteners 1WSA 10112, or equal.
    - b. Chain Link Fence: Fasten with 9 gage hog rings, King Hughes Fasteners 5150DG50, or equal, with 11/16 inch opening at each corner of sign.
    - c. Wrought Iron Fence: Install at each corner with 3/16 inch stainless steel rivets.
  2. Acrylic signs: Install backplate to wall as indicated above. Fasten sign to backplate with high-bond double-faced tape and silicone.
- E. Exterior Building Sign:
  1. Each letter shall be furnished with a minimum of three cast mounting lugs on backside, drilled and tapped to receive installation bolts.
  2. Letters shall be installed according to manufacturer's method PMC-1. Letters shall be installed  $\frac{3}{4}$  inch away from wall surface, by an aluminum sleeve spacer.

#### 3.03 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off Project site.

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3.04 PROTECTION

- A. Protect Work of this section until Substantial Completion.

END OF SECTION

## SECTION 31 1000

### SITE CLEARING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

###### A. Section Includes:

1. Removal of vegetation, grass, grass roots, shrubs, tree stumps, trees, upturned stumps, weed growth, tree roots, brush, masonry, concrete, rubbish, debris and other materials.
2. Removal of concrete and bituminous surfaces.
3. Removal of existing fences and gates.

###### B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 31 2200 - Grading.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2316 - Excavation and Fill for Pavement.
5. Section 31 2323 - Excavation and Fill for Utilities.
6. Section 31 2326 - Base Course.
7. Section 32 3113 - Chain Link Fences and Gates.

##### 1.02 SUBMITTALS

- A. Shop Drawings: Submit site plan indicating extent of site clearing.

##### 1.03 QUALITY ASSURANCE

- A. Comply with Standard Specifications for Public Works Construction, current edition, as a minimum requirement.

#### PART 2 - PRODUCTS - NOT USED

#### PART 3 - EXECUTION

##### 3.01 TREE AND STUMP REMOVAL



- A. Remove trees and stumps indicated or required to be removed. Remove trees, together with bulk of roots, to a minimum depth of 4 feet below required grade, and within a radius of approximately 7 feet beyond perimeter of trunk at grade.
- B. Fill and compact excavation from tree and stump removal. Fill in 6 inch layers, each compacted to 90 percent of maximum density in accordance with ASTM D1557.
  - 1. Back filling shall not commence until the excavation is inspected and tested.

### 3.02 CONCRETE AND BITUMINOUS SURFACING REMOVAL

- A. Break up and completely remove existing concrete surfacing, curbs, gutters, walks and bituminous surfacing to indicate limits. Cutting shall be performed to a neat and even line with proper tools or a concrete cutting saw. Minimum depth of cut shall be 1 1/2-inch, unless otherwise indicated. Remove concrete broken beyond the indicated limits to the nearest joint or score line and replace with new concrete to match existing.

### 3.03 FENCING

- A. Existing fences scheduled to remain may be removed to facilitate the Work, provided they are installed to their original condition in accordance with requirements of Section 32 3113 - Chain Link Fences and Gates.
- B. Fencing indicated to be removed and not reinstalled shall be completely removed, including footings. Fill and compact excavations.
- C. Install chain link fencing indicated to be relocated or reset in accordance with applicable requirements specified under Section 32 3113 - Chain Link Fences and Gates.

### 3.04 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

## SECTION 31 2200

### GRADING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

###### A. Section Includes:

1. General exterior grading, cutting and filling, including grading for building area, paving, planting areas, banks and hillsides.

###### B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 31 1000 - Site Clearing.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2316 - Excavation and Fill for Pavement.
5. Section 31 2323 - Excavation and Fill for Utilities.
6. Section 31 2326 - Base Course.

##### 1.02 PROJECT REQUIREMENTS

###### A. General:

1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.
4. Before grading, contact Underground Service Alert of Southern California (USASC) for information on public buried utilities and pipelines. Retain the services of an underground utility locator for on-site utilities.

#### PART 2 - PRODUCTS

##### 2.01 MATERIALS

- ###### A. Materials shall conform to requirements specified in this and related sections.

#### PART 3 - EXECUTION

### 3.01 PREPARATION

- A. Protect and maintain installed stakes until their removal is required for the Work. Provide replacement grade or location stakes lost or disturbed.
- B. Install grade stakes and compare to indicated grades. If discrepancies are found between existing grades and grades indicated on Drawings, do not proceed until discrepancies are resolved.

### 3.02 ROUGH AND FINE GRADING

- A. Rough grade area sufficiently high to require cutting by fine grading:
  - 1. Grade area for bituminous surfacing and other paving to the indicated grades, equal to the section of the indicated base and pavement.
  - 2. Slope banks to required finish grades as cut progresses or leave cuts full and finish grade by mechanical equipment to provide grades and soil densities indicated on the Drawings.
  - 3. Rough grade, fill and compact banks beyond indicated finish grades. Finish grade banks and slopes to indicated grades and specified soil densities.
  - 4. Grade Only Areas: In areas not indicated to receive pavement, rough grade to approximate finish grades and then scarify, moisten and roll to obtain required density and indicated finish grades.
  - 5. Tolerances: Finish grades shall be within a tolerance of 0.05 inch per foot above or below grades indicated. Provide an average grade as indicated.
- B. Base or Subgrade:
  - 1. After subgrade has been constructed to approximate required grades, scarify to a depth of at least 6 inches:
    - a. After scarifying, process loosened material to a finely divided condition and adjust moisture content to optimum condition by addition of water, addition and blending of dry suitable material, or by drying of existing material.
    - b. Subgrade material shall be compacted by tamping, sheepfoot rollers or pneumatic tire rollers. Required relative compaction shall be 90 percent minimum for the top 6 inches below subgrade.
    - c. Install base course in accordance with Section 31 2326 - Base Course.
  - 2. Tolerance of completed grades of base or subgrade shall not vary more than 0.03 inch per foot from grades indicated. Provide an average grade as indicated.

### 3.03 SHORING

- A. Provide shoring as necessary to properly and safely support earth sides of excavations, and existing curbs, sidewalks, gutter, drives and stairs, against movement and collapse.
- B. Design and Calculations: Provide in accordance with requirement of Cal OHSA.
- C. Remove shoring upon completion of the Work of this section or when no longer needed unless required otherwise by authorities having jurisdiction.

3.04 EXCESS MATERIAL DISPOSAL

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.05 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

## SECTION 31 2313

### EXCAVATION AND FILL

#### PART 1 - GENERAL

##### 1.01 SUMMARY

###### A. Section Includes:

1. Excavating, filling, backfilling, and compacting for Project site pavement, planting areas, buildings, and other structures.
2. Trenches for utility lines such as water, gas, irrigation, storm drain and sewer lines, concrete-encased conduits, manholes, vaults, valve boxes, catch basins, underground tanks, thrust blocks, yard boxes, pull boxes, and other utility appurtenances.

###### B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 31 1000 - Site Clearing.
3. Section 31 2200 - Grading.
4. Section 31 2326 - Base Course.
5. Section 32 1313 - Site Concrete Work.
6. Section 32 3113 - Chain Link Fences and Gates.
7. Section 33 4000 - Storm Drainage Utilities.

##### 1.02 PROJECT REQUIREMENTS

###### A. Import and Export of Earth Materials:

1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.

##### 1.03 SUBMITTALS

- ###### A. Shoring calculations as required in Article 3.03 of this Section.

##### 1.04 QUALITY ASSURANCE

- ###### A. Comply with the Standard Specifications for Public Works Construction, current edition, except as modified herein.
- ###### B. Sampling, testing, and certification of imported and exported soils shall be performed in accordance with Section 01 4524, Environmental Import/Export Materials Testing.

1.05 TESTING

- A. Owner will retain a Geotechnical Engineer as an Owner Consultant who will provide observations, tests, inspections and approvals identified in the Contract Documents as being responsibility of Owner.
- B. Imported Soils: The Geotechnical Engineer will obtain initial product Sample for testing in accordance Article 3.05 of this Section.

1.06 PROJECT CONDITIONS

- A. Information on Drawings or in soil investigation report does not constitute a guarantee of accuracy or uniformity of soil conditions over the Project site.

PART 2 - PRODUCTS

2.01 FILL AND BACKFILL MATERIALS

- A. Fill and backfill material shall be a granular material previously removed from excavation or imported fill material, free of clods and stones larger than 3 inches, (2½ inches for utility trenches) foreign materials, vegetable growths, sod, expansive soils, rubbish and debris. Material shall conform to these specified requirements and related sections.
- B. Fill material exhibiting a wide variation in consistency and moisture content shall be blended and aerated to stabilize and upgrade the material.
- C. Bedding material from trench bottom to one foot above the pipe:
  - 1. Sand, gravel, crushed aggregate or native free-draining granular material providing a sand equivalent of at least 30 or a coefficient of permeability greater than 1.4 inches per hour.
  - 2. Sand complying with the Specifications for cement concrete aggregates.
- D. Brick rubble and broken concrete originating from the Project site shall be legally disposed of off the Project site No such material shall be imported from outside the Project site.
- E. Permeable Backfill:
  - 1. Provide permeable backfill material behind retaining structures consisting of gravel, crushed gravel, crushed rock, natural sands, manufactured sand, or combinations of these materials conforming to the following gradations:

<u>Sieve Size:</u>	<u>Percentage Passing:</u>
3/4 inch (19mm)	100
3/8 inch (10mm)	80 to 100
No. 100	0 to 8
No. 200	0 to 3

- 2. Those portions of fill material passing a No. 4 sieve shall provide a sand equivalent of at least 60.

3. Provided backing for weep-holes shall consist of two cubic feet of aggregate in burlap sacks, securely tied. Aggregate shall conform to requirements for No. 3 concrete aggregate as specified in subsection 200-1.4 of the Standard Specifications for Public Works Construction.
  4. Permeable Backfill Alternate Materials: Instead of the materials specified for retaining structures backfill, a drainage matting system Miradrain by Mirafi, Inc., American Wick Drain, JDR Enterprises, or equal, may be provided if reviewed and approved by the Architect.
- F. Cement-sand slurry shall be provided with one sack of cement per cubic yard of the mixture.

## 2.02 BASE MATERIALS

- A. Concrete Slabs on Grade: Provide "Crushed Aggregate Base" as specified in Standard Specifications for Public Works Construction, Section 200 - Rock Materials, with 3/4 inch maximum size aggregates. Provide 3 inch thick base, unless noted otherwise.
- B. Bituminous Surfacing: Provide as indicated on Drawings and specified in Section 31 2326 Base Course.

## PART 3 - EXECUTION

### 3.01 GENERAL

- A. Before initiating intrusive activities, contact Underground Service Alert of Southern California (USA or Dig Alert) to obtain a Dig Alert ticket for location information on buried public and USA member utilities and pipelines at least 48-hours prior to beginning work. A copy of the Dig Alert ticket shall be forwarded to the Owner. For on-site utilities, retain a state-licensed third party underground utility locating service.
- B. Where the Work includes a building extension or addition on an occupied Project site, perform Work in such a manner, and at such times, as not to disrupt performance of existing utility services to existing Project site facilities. Where an interruption is necessary, obtain review from the OAR before proceeding.
- C. Remove concrete or bituminous pavement to straight lines by saw cutting.

### 3.02 PROTECTION

- A. Protect and guard excavations against danger to life, limb, and property as required by, but not limited to, OSHA regulations.
- B. Protect existing improvements including landscaping against damage. Repair or replace damaged items.
- C. Protect existing utility services and distribution systems from damage or displacement.
- D. Remove conduits or pipes not in service, exposed during Work, unless a minimum cover of two feet is provided. Remove concrete, clay or other non-metallic pipe over 8 inches in diameter, unless otherwise indicated.
- E. Shore, crib, or lag excavations and earthen banks as necessary to prevent cave in, erosion or gullyng of sides.

- F. Provide excavations free from standing water by pumping, draining, or providing protection against water intrusion. If soil becomes soft, soggy, or saturated, excavate to firm undisturbed earth and fill as required. Slope adjacent grades away from excavations to minimize entry of water.

3.03 SHORING

- A. Provide shoring as necessary to properly and safely support earth sides of excavations, and existing curbs, sidewalks, gutter, drives and stairs, against movement and collapse.
- B. Design and Calculations: Provide in accordance with requirement of governing Cal-OSHA requirements.
- C. Remove shoring upon completion of the Work of this Section or when no longer needed unless required otherwise by authorities having jurisdiction.

3.04 EXCAVATION

- A. Unclassified Excavations: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork", except as modified herein.
- B. Form sides of footings, pads, grade beams, and slab foundations, unless otherwise indicated. Provide excavations of sufficient size to permit installation and removal of forms and other required Work.
- C. Machine-drill excavation for round footings to size and depth indicated. Provide a collar or casing, or other adequate protection, to exclude dirt and debris. Protect excavations with plank covers until concrete is placed.
- D. Provide excavation bottoms level and free from loose material. Excavate to indicated or required elevations of undisturbed earth.
- E. Barricade trenches, ditches, pits, sumps, and similar Work outside the barricaded working area with chain link fence as specified in Section 01 5000 - Construction Facilities and Temporary Controls, and in accord with Cal-OSHA standards and requirements.
- F. Trenches over five feet in depth shall comply with the Construction Safety Orders of the California Division of Industrial Safety.
- G. Where indicated or required to excavate in lawn areas, protect adjoining lawn areas outside of the Work area. Replace or install removed sod upon completion of backfill by installing sod level with adjacent lawns. If installation of removed sod fails, furnish sod and install to match existing lawns.
- H. For Structures:
  - 1. Calculate excavation quantities based on elevations or depths indicated on Drawings.
  - 2. Provide 2,000 psi concrete for backfill of over-excavated areas to indicated or required elevations.



3. Special preparation of bottom of excavated planes areas: Excavate areas shown on Drawings as bottom of excavated planes (B.E.P.), by excavating and filling to indicated grades and elevations.

I. For Utilities:

1. Excavate trenches to required depth for utility lines, such as pipes, conduits, and tanks, with minimum allowance of 6 inches at the bottom and 6 inches at the sides for bedding or concrete encasement as indicated on Drawings. Grade bottom of trenches to a uniform smooth surface. Remove loose soil from the excavation before placing sand bedding or concrete encasement.
2. Do not install piping lengthwise under concrete walks without review by the ARCHITECT.
3. Do not excavate trenches parallel to footings closer than 18 inches from the face of the footing or below a plane having a downward slope of two horizontal to one vertical, from a line 9 inches above bottom of footings.

- a. Unless otherwise indicated on Drawings, depth of excavations outside buildings shall provide for a minimum coverage above top of piping, tank or conduit measured from the lowest adjoining finished grade, as follows:

Steel Pipe	24 inches below finish grade
Copper Water Tube	18 inches below finish grade
Cast-Iron, Pressure Pipe	36 inches below finished grade
Plastic Pipe (other than waste)	30 inches below finished grade
Tanks or other structure	36 inches below finished grade
Soil, sewer and storm drain	minimum 18 inches below finished grade, and as required for proper pitch and traffic load. Install polypropylene sewer pipe with at least 24 inches of coverage.
Irrigation Pipe:	Non-pressure pipe - 12 inches, pressure pipe - 24 inches.

- b. Trench width shall provide space for fitting and joining. Excavate for piping bells and fittings, bell and spigot pipe and other fittings.
4. Where portions of existing structures, walks, paving, or other improvements are removed or cut for piping or conduit installation, replace the material with equal quality, finished to match adjoining existing improvements. Repair pavement as specified in Section 32 0117 - Pavement Repair.
5. Provide a minimum clear dimension of 2 inches from sides of wall excavation to outer surfaces of buried pipes or conduits placed in the same trench or outside surfaces of containers and tanks.

3.05 IMPORT/EXPORT OF MATERIALS

- A. Unclassified Fill and Compaction: Comply with the Standard Specifications for Public Works Construction, Section 300 - Earthwork, except as modified herein. Install and compact fill in layers not to exceed 6 inches in thickness.
- B. Provide fill materials as specified in Part 2- Products. If excavated materials from the Project site are not of required quality or sufficient quantity, import additional materials as necessary.
- C. In addition to the requirements of this Section, import and/or exported materials shall comply with the requirements of Section 01 4524, Environmental Import/Export Materials Testing.
- D. Imported fill materials shall be sampled by the Geotechnical Engineer, for compliance with the requirements of Part 2 of this Section.
- E. The Geotechnical Engineer, will submit the samples to an independent DSA approved testing laboratory for testing.
- F. Initial sampling and testing shall be performed before importing material to the Project site. Identify the location of the source site in addition to the address, name of the person and entity responsible for the source site. The Geotechnical Engineer, will obtain both the initial and additional samples from the identified site and submit samples for required testing.
- G. The Geotechnical Engineer will perform additional sampling during import operations. If the total quantity of import is determined to be greater than 1000 cubic yards of material, one sample shall be obtained and submitted for testing for each 250 cubic yards of imported material. If the total quantity of import is determined to be less than 1000 yards, one sample shall be obtained and submitted for testing for each 100 cubic yards of imported material.
- H. The independent approved testing laboratory will perform the required tests and report results of tests noting if the tested material passed or failed such tests and will furnish copies to the Project Inspector, Architect, OAR, DSA, Contractor, and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of California professional engineer and the material was tested in accordance with applicable provisions of the Contract Documents, California Building Code, and the DSA. Upon completion of the Work of this Section, the independent testing laboratory and Geotechnical Engineer will submit a verified report to the DSA as required by the CBC.
- I. Bills of lading or equivalent documentation will be submitted to the Project Inspector on a daily basis.
- J. Upon completion of import operations, provide the OAR a certification statement attesting that imported material has been obtained from the identified source site.

### 3.06 INSTALLATION OF MATERIALS

- A. Pavement: Fill or backfill materials shall be installed in horizontal layers of 6 inches, unless otherwise required. Each layer shall be evenly placed and moistened or aerated as necessary. Unless otherwise reviewed by the Geotechnical Engineer, each layer of fill material shall cover the length and width of the area to be filled before the next layer of material is installed. Top surface of each layer shall be installed to an approximate level with a crown or crossfall of at least 1 in 50, but not more than 1 in

20. Provide adequate drainage at all times during installation of the Work of this Section.

B. Structures:

1. After concrete has been placed, forms removed, and concrete Work inspected, backfill excavations with earth to indicated or required grades. Backfill simultaneously on each side of walls or grade beams. Remove rubbish, debris and other waste materials from excavations before placing backfill.
2. Before placing backfill, adequately cure concrete and provide bracing, if required to stabilize structure. Protect waterproofing or damp-proofing against damage during backfilling operations, with required protection board. Remove bracing as backfill operation progresses.
3. Do not furnish or install expansive soils for retaining wall backfill.
4. Rigidly control the amount of water to be installed to provide optimum moisture content for type of fill material furnished. Do not over-saturate or compact by flooding or jetting.
5. Install wall backfill before installing railings and fences on walls.
6. Install weep hole drainage at the backside of walls so the backing completely covers the weep holes, is horizontally centered and extends at least 12 inches above the bottom of the weep opening. Provide an 8-inch square section of 1/4 inch galvanized or aluminum screen, with a minimum wire diameter of 0.03 inch, and install at the backside of each weep hole before installing the backfill material.
7. Where a reviewed drainage matting system is provided instead of permeable backfill for retaining structures, install in accordance with the manufacturer recommendations.

C. Utilities:

1. Do not install backfill until the Work of this Section has been inspected and tested. Do not furnish or install materials excavated from the Project site containing materials not permitted for backfill.
2. Backfill electrical or other excavated utility trenches located outside of barricaded installation areas within 24 hours after inspection by the IOR.
3. Install backfill in layers not exceeding 4 inches in thickness, except cement-sand slurry.
4. If materials excavated from the Project site are not permitted for trench backfill in paved areas, backfill trenches with a cement-sand slurry mix. Install backfill to an elevation of the existing undisturbed grades plus one inch.

3.07 COMPACTING

- A. Each layer of fill material shall be compacted by tamping, sheepsfoot rollers, or pneumatic-tired rollers to provide specified relative compaction. At inaccessible

locations, provide specified compaction by manually held, operated and directed compaction equipment.

- B. Install and compact sand bedding to provide a uniform bearing under the full length of piping and conduits.
- C. Unless otherwise indicated, compact each layer of fill material to a relative compaction of at least ninety percent.
- D. When fill materials, or a combination of fill materials, are encountered or provided which develop densely packed surfaces as a result of installation or compacting operations, scarify each layer of compacted fill before installing the next succeeding layer.

### 3.08 INSPECTION AND TESTING

- A. The Geotechnical Engineer will inspect and test excavations, sample material quality for testing as set required in Part 2, and observe installation and compaction of fill materials.
- B. The Geotechnical Engineer will sample imported fill materials from their designated source and submit samples to the independent approved testing laboratory before delivery to the Project site.
- C. Installation of backfill shall be observed by the Geotechnical Engineer.
- D. The Geotechnical Engineer will inspect and test excavation Work before the installation of fill and other materials.
- E. Compaction: Test compaction in accordance with ASTM D1557, Method C.
- F. The Project Inspector will inspect foundation excavations when completed and ready for forms, after forms are in place, and before first placement of concrete.

### 3.09 PROTECTION

- A. Protect the Work of this Section until Substantial Completion.

### 3.10 CLEANING

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

## SECTION 31 2316

### EXCAVATION AND FILL FOR PAVING

#### PART 1 - GENERAL

##### 1.01 SUMMARY

###### A. Section Includes:

1. Excavating, backfill, and compacting for paved areas.
2. Installation of fill materials.

###### B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 31 1000 - Site Clearing.
3. Section 31 2200 - Grading.
4. Section 31 2323 - Excavation and Fill for Utilities.
5. Section 32 2326 - Base Course.
6. Section 32 1313 - Site Concrete Work.

##### 1.02 PROJECT REQUIREMENTS

###### A. Import and Export of Earth Materials:

1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.

##### 1.03 QUALITY ASSURANCE

- A. Comply with Standard Specifications for Public Works Construction, current edition, except as modified herein.
- B. Sampling, testing, and certification of imported and/or exported soils shall be performed in accordance with Section 01 4524 - Environmental Import/Export Materials Testing.

##### 1.04 TESTING

- A. Owner will retain a Geotechnical Engineer as an Owner Consultant who will provide observations, tests, inspections and approvals identified in the Contract Documents as being responsibility of Owner.
- B. Imported Soils: The Geotechnical Engineer will obtain initial product Sample for testing in accordance Article 3.05 of this Section.

1.05 PROJECT CONDITIONS

- A. Information on Drawings or in soils report does not constitute a guarantee of accuracy or uniformity of soil conditions over the Project site.

1.06 REFERENCES

- A. CBC 2019 11B.

PART 2 - PRODUCTS

2.01 BASE MATERIALS

- A. Concrete Slabs On Grade: Provide “Crushed Aggregate Base “as specified in the Standard Specifications for Public Works Construction, Section 200: “Rock Materials,” with ¾ inch maximum size aggregates. Provide 3-inch thick base, unless noted otherwise.
- B. Bituminous Surfacing: As indicated on Drawings and specified in Section 31 2326 - Base Course.

2.02 FILL AND BACKFILL MATERIALS

- A. Fill and backfill materials shall be previously excavated materials or imported fill material, free of clods and stones larger than 3-inch, foreign materials, vegetable growths, sod, expansive soils, rubbish and debris. Material shall conform to these specified requirements and related sections.
- B. Fill material exhibiting a wide variation in consistency and moisture content shall be blended or aerated to stabilize and upgrade the material.
- C. Imported Fill Material:
  - 1. Provide suitable materials obtained from Project site excavations for earthwork and fill materials. If excavated materials are not of suitable quality or sufficient quantity, import additional materials as necessary.
  - 2. Imported fill shall be a granular material with sufficient binder to form a firm and stable unyielding subgrade and shall not have more than 60 percent of fines passing 200 mesh sieve. Material shall have a coefficient of expansion of not more than 2 percent from air dry to optimum moisture content and not more than 6 percent from air dry to saturation. Imported material shall be clean and free of rubbish, debris, and toxic or hazardous contaminants. Adobe or clay soils are not permitted.

- D. Brick rubble and broken concrete originating from the Project site shall be legally disposed of off the Project site. No such materials shall be imported from outside the Project site.
- E. Permeable Backfill:
  - 1. Provide permeable backfill material behind retaining structures consisting of gravel, crushed gravel, crushed rock, natural sands, manufactured sand, or combinations of these materials conforming to the following gradations:
 

Sieve Size:	Percentage Passing:
3/4 inch (19mm)	100
3/8 inch (10mm)	80 to 100
No. 100	0 to 8
No. 200	0 to 3
  - 2. Those portions of fill material passing a No. 4 sieve shall provide a sand equivalent of at least 60.
  - 3. Provided backing for weep holes shall consist of two cubic feet of aggregate in burlap sacks, securely tied. Aggregate shall conform to requirements for No. 3 concrete aggregate as specified in subsection 200-1.4 of the Standard Specifications for Public Works Construction.
  - 4. Permeable Backfill Alternate Materials: Instead of the materials specified for retaining structures backfill, a drainage matting system, Miradrain by Mirafi, Inc., or equal, may be provided if reviewed and approved by the Architect.

PART 3 - EXECUTION

3.01 GENERAL

- A. Before initiating intrusive activities, contact Underground Service Alert of Southern California (USA or Dig Alert) to obtain a Dig Alert ticket for location information on buried public and USA member utilities and pipelines at least 48-hours prior to beginning work. A copy of the Dig Alert ticket shall be forwarded to the Owner. For on-site utilities, retain a state-licensed third party underground utility locating service.
- B. Clear the Project site as indicated in Section 31 1000 - Site Clearing.

3.02 PROTECTION

- A. Protect and guard excavations against danger to life, limb, and property as required by, but not limited to, Cal-OSHA regulations.
- B. Protect adjacent existing improvements including landscaping against damage.

3.03 EXISTING UTILITY LINES

- A. Protect existing utility lines from damage or displacement.

- B. Remove conduits or pipes not in service, exposed during Work, unless a minimum cover of 2 feet is provided. Remove concrete, clay or other non-metallic pipe over 8 inches in diameter, unless otherwise indicated.

3.04 EXCAVATION

- A. Unclassified Excavations: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork," except as modified herein.

3.05 FILL

- A. Unclassified Fill and Compaction: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork," except as modified herein.
- B. Provide fill materials as specified in Part 2 - Products. If excavated materials from the Project site are not of required quality or sufficient quantity, import additional materials as necessary.
- C. In addition to the requirements of this Section, import and/or exported materials shall comply with the requirements of Section 01 4524 - Environmental Import/Export Materials Testing.
- D. Imported fill materials will be sampled by the Geotechnical Engineer for compliance with the requirements of Part 2 of this Section.
- E. The Geotechnical Engineer will submit samples to a DSA approved independent approved testing laboratory for testing.
- F. Initial sampling will be performed by the Geotechnical Engineer before importing material to the Project site. Identify the location of the source site in addition to the address, name of the person and/or entity responsible for the source site. The Geotechnical Engineer will obtain both the initial and additional samples from the identified site and will submit samples to the approved independent testing laboratory for testing.
- G. The Geotechnical Engineer will perform additional sampling during import operations. If the total quantity of import is determined to be greater than 1,000 cubic yards of material, one sample shall be obtained and submitted for testing for each 250 cubic yards of imported material. If the total quantity of import is determined to be less than 1,000 yards, one sample shall be obtained and submitted for testing for each 100 cubic yards of imported material.
- H. The independent approved testing laboratory will perform the required tests and report results of tests noting if the tested material passed or failed such tests and will furnish copies to the Project Inspector, Architect, OAR, DSA, Contrator, and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of California professional engineer and the material was tested in accordance with applicable provisions of the Contract Documents, CBC, and the DSA. Upon completion of the Work of this Section, the independent testing laboratory and Geotechnical Engineer shall submit a verified report to the DSA as required by CBC.



- I. Bills of lading or equivalent documentation will be submitted to the Project Inspector on a daily basis.
- J. Upon completion of import operations, provide the OAR a certification statement attesting that imported material has been obtained from the identified source site.

3.06 INSTALLATION OF MATERIALS

- A. Fill or backfill materials shall be installed in horizontal layers of 6 inches, unless otherwise required. Each layer shall be evenly placed and moistened or aerated as necessary. Unless otherwise reviewed by the Geotechnical Engineer, each layer of fill material shall cover the length and width of the area to be filled before the next layer of material is installed. Top surface of each layer shall be installed to an approximate level with a crown or crossfall of at least 1 in 50, but no more than 1 in 20. Provide adequate drainage at all times during construction of the Work of this Section.

3.07 COMPACTING

- A. Each layer of fill material shall be compacted by tamping, sheepsfoot rollers, or pneumatic-tired rollers to provide specified relative compaction. At inaccessible locations, provide specified compaction by manually held, operated and directed compaction equipment.
- B. Unless otherwise indicated, compact each layer of earth fill to a relative compaction of at least 90 percent.
- C. When fill materials, or a combination of fill materials, are encountered or provided which develop densely packed surfaces as a result of installation or compacting operations, scarify each compacted layer before installing the next succeeding layer.

3.08 INSPECTION AND TESTING

- A. The Geotechnical Engineer will inspect and test excavations, sample material quality as required in Part 2, and observe installation and compaction of fill materials.
- B. The Geotechnical Engineer will sample imported fill materials from their designated source before delivery to the Project site.
- C. Installation of backfill will be observed by the Geotechnical Engineer.
- D. The Geotechnical Engineer will inspect and test excavation Work before the installation of fill and/or other materials.
- E. Compaction: Test compaction in accordance with ASTM D1557, Method C.

3.09 PROTECTION

- A. Protect the Work of this Section until Substantial Completion.

3.10 CLEANING

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

EXCAVATION AND FILL FOR PAVING  
ARROYO HIGH SCHOOL

EXCAVATION AND FILL  
FOR PAVING  
31 2316-6

## SECTION 31 2323

### EXCAVATION AND FILL FOR UTILITIES

#### PART 1 - GENERAL

##### 1.01 SUMMARY

###### A. Section Includes:

1. Excavating, backfilling, and compacting utility trenches such as water, gas, irrigation, storm drain, sewer lines, concrete-encased conduits, and manholes, vaults, valve boxes, catch basins, underground tanks, thrust blocks, yard boxes, pull boxes and other utility appurtenances.

###### B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 31 1000 - Site Clearing.
3. Section 31 2200 - Grading.
4. Section 31 2316 - Excavation and Fill for Paving.
5. Section 32 1313 - Site Concrete Work.
6. Section 33 4000 - Storm Drainage Utilities.

##### 1.02 PROJECT REQUIREMENTS

###### A. Import and Export of Earth Materials:

1. Fees: Pay as required by authorities having jurisdiction over the area.
2. Bonds: Post as required by authorities having jurisdiction over the area.
3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.

##### 1.03 QUALITY ASSURANCE

- A. Comply with the following as a minimum requirement: Standard Specifications for Public Works construction, current edition except as modified herein.
- B. Sampling, testing, and certification of imported and/or exported soils shall be performed in accordance with Section 01 4524 - Environmental Import/Export Materials Testing.

##### 1.04 TESTING

- A. Owner will retain a Geotechnical Engineer as an Owner Consultant who will provide observations, tests, inspections and approvals identified in the Contract Documents as being responsibility of Owner.
- B. Imported Soils: The Geotechnical Engineer will obtain initial product Sample for testing in accordance Article 3.02 of this Section.

1.05 PROJECT CONDITIONS

- A. Information on Drawings or in soils report does not constitute a guarantee of accuracy or uniformity of soil conditions over the Project site.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Bedding material from trench bottom to one foot above the pipe:
  - 1. Sand, gravel, crushed aggregate or native free-draining granular material providing a sand equivalent of at least 30 or a coefficient of permeability greater than 1.4 inches per hour.
  - 2. Sand complying with the Specifications for cement concrete aggregates.
- B. Backfill Materials:
  - 1. Excavated trench material to be installed for backfilling shall be clean, free of large clods, and stones larger than 2 ½-inch in any dimension.
  - 2. Cement-sand slurry shall be provided with one sack of cement per cubic yard of the mixture.
  - 3. Imported Fill Material: Imported fill material shall be a granular material with sufficient binder to form a firm and stable unyielding subgrade and shall not have more than 60 percent of fines passing a 200 mesh sieve. Material shall provide a coefficient of expansion of not more than two percent from air dry to optimum moisture content and not more than six percent from air dry to saturation. Imported materials shall be clean and free of rubbish, debris, and toxic or hazardous contaminants. Adobe or clay soils are not permitted.

PART 3 - EXECUTION

3.01 GENERAL

- A. Before initiating intrusive activities, contact Underground Service Alert of Southern California (USA or Dig Alert) to obtain a Dig Alert ticket for location information on buried public and USA member utilities and pipelines at least 48-hours prior to beginning work. A copy of the Dig Alert ticket shall be forwarded to

the Owner. For on-site utilities, retain a state-licensed third party underground utility locating service.

- B. Barricade trenches, ditches, pits, sumps, and similar Work outside the barricaded working area with chain link fence as specified in Section 01 5000, Construction Facilities and Temporary Controls, and in accordance with Cal-OSHA standards and requirements.
- C. Saw-cut concrete or bituminous paving for trench installation.
- D. Trenches over 5 feet in depth shall conform to the Cal-OSHA.
- E. Where indicated and required to excavate in lawn areas, protect adjoining lawn areas outside of the Work area. Replace or install removed sod upon completion of backfill by installing sod level with adjacent lawns. If installation of removed sod fails, furnish sod and install to match existing lawns.
- F. Backfill over excavations to the required elevations with earth, gravel, sand, or concrete and compact as required. Provide excavations free from standing water by pumping, draining, or providing protection against water intrusion. Slope adjacent grades away from excavations to minimize entry of water.
- G. Do not install piping lengthwise under concrete walks without review by the Architect.
- H. Do not excavate trenches parallel to footings closer than 18 inches from the face of the footing or below a plane having a downward slope of two horizontal to one vertical, from a line 9 inches above bottom of footings.
  - 1. Unless otherwise indicated on Drawings, depth of excavations outside the buildings shall allow for a minimum coverage above top of pipe, tank, or conduit measured from the lowest adjoining finished grade, as follows:

Steel Pipe	24 inches below finished grade
Copper Water Tube	18 inches below finished grade
Cast-Iron Pressure Pipe	36 inches below finished grade
Plastic Pipe (other than waste)	30 inches below finished grade
Tanks or other structures	36 inches below finished grade
Soil, Sewer & Storm Drain	minimum 18 inches below finished grade, and as required for proper pitch and traffic load. (Install polypropylene sewer pipe with at least 24 inches coverage)
Irrigation Pipe:	nonpressure pipe 12 inches, pressure pipe 24 inches
  - 2. Trench width shall provide ample space for fitting and joining. Excavate for piping bells and fittings, bell and spigot pipe and other fittings.
- I. Unless indicated otherwise, excavate trenches to the required depths for utilities, such as pipes, conduit and tanks, with minimum allowances of 6 inches at the bottom and 6 inches at the sides for bedding of unprotected piping or as required for concrete encasement of conduits as indicated on Drawings. Grade bottom of

trenches to a uniform smooth surface. Remove loose soil from the excavation before installing sand bedding or concrete encasement.

- J. Provide excavations free from standing water by pumping, draining, or providing protection against water intrusion. If soil becomes soft, soggy, or saturated, excavate to firm undisturbed soil and fill as required. Slope adjacent grades away from excavations to minimize entry of water.
- K. Provide a minimum clear dimension of 2 inches from sides of wall excavation to outer surfaces of buried pipes or conduits installed in the same trench or outside surfaces of containers and tanks.
- L. Do not install backfill until required inspections and testing is completed.
- M. Backfill electrical or other excavated utility trenches located outside of barricaded installation areas within 24 hours after inspection by the Project Inspector.
- N. Install backfill materials in layers not exceeding 4 inches in thickness and compact to 90 percent of the maximum density.
- O. If materials excavated from the Project site are not permitted for trench backfill in paved areas, backfill trenches with a cement-sand slurry mix. Install backfill to an elevation of the existing undisturbed grade plus one inch.
- P. Install and compact sand bedding to provide a uniform full length bearing under piping and conduits.
- Q. Where portions of existing structures, walks, paving, or other improvements are removed or cut for piping or conduit installation, replace the material with equal quality, finished to match adjoining existing improvements. Repair pavement as specified in Section 32 0117, Pavement Repair.

### 3.02 IMPORT/EXPORT OF MATERIALS

- A. Provide fill materials as specified in Part 2, Products. If excavated materials from the Project site are not of required quality or sufficient quantity, import additional materials as necessary.
- B. In addition to the requirements of this Section, import and exported materials shall comply with the requirements of Section 01 4524, Environmental Import/Export Material Testing.
- C. Imported fill materials will be sampled by the Geotechnical Engineer for compliance with the requirements of Part 2 of this Section.
- D. The Geotechnical Engineer will perform the tests by utilizing an independent approved testing laboratory.
- E. Initial sampling will be performed by the Geotechnical Engineer before importing material to the Project site. Identify the location of the source site in addition to the address, name of the person and/or entity responsible for the source site. The Geotechnical Engineer will obtain both the initial sample and additional samples

from the identified site and shall submit all samples to the approved independent testing laboratory.

- F. The Geotechnical Engineer will perform additional sampling during import operations. If the total quantity of import is determined to be greater than 1,000 cubic yards of material, one sample shall be obtained and submitted for testing for each 250 cubic yards of imported material. If the total quantity of import is determined to be less than 1,000 yards, one sample shall be obtained and submitted for testing for each 100 cubic yards of imported material.
- G. The independent approved testing laboratory will perform the required tests and report results of all tests noting if the tested material passed or failed such tests and will furnish copies to the Project Inspector, Architect, OAR, DSA, Contractor, and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of California professional engineer and the material was tested in accordance with applicable provisions of the Contract Documents, CBC and the DSA. Upon completion of the Work of this Section, the independent testing laboratory and Geotechnical Engineer will submit a verified report to the DSA as required by CBC.
- H. Bills of lading or equivalent documentation will be submitted to the Project Inspector on a daily basis.
- I. Upon completion of import operations, provide the OAR a certification statement attesting that imported material has been obtained from the identified source site.

3.03 INSPECTION AND TESTING

- A. The Geotechnical Engineer will inspect and test excavations, sample material quality as required in Part 2, observe installation and compaction of fill materials.
- B. Compaction test shall be performed in accordance with ASTM D1557, method "C."

3.04 PROTECTION

- A. Protect the Work of this Section until Substantial Completion.

3.05 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

## SECTION 31 2326

### BASE COURSE

#### PART 1 - GENERAL

##### 1.01 SUMMARY

###### A. Section Includes:

1. Installation of base material.

###### B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 31 1000 - Site Clearing.
3. Section 31 2313 - Excavation and Fill.
4. Section 31 2316 - Excavation and Fill for Paving.
5. Section 32 1313 - Site Concrete Work.

##### 1.02 SUBMITTALS

- A. Crushed aggregate base (CAB) shall consist of native rock without naturally occurring asbestos or recycled materials. The Contractor shall submit written documentation, which identifies the source, volume, and proposed transport date of the material for review and approval by Owner's Office of Environmental Health and Safety (OEHS) prior to importing the material. A statement on company letterhead from the CAB source, stamped by either a California Professional Geologist or Engineer, which states that the subject materials are native rock, do not contain any recycled materials and that the source quarry does not mine ultramafic materials, a source of natural occurring asbestos shall be included in the submittal to OEHS. The Contractor may request variance from analytical testing required by Section 01 4524 for CAB. To be considered for a variance, the Contractor shall submit a documentation package for OEHS approval, which includes all of the aforementioned information at least 48 hours in advance of planned import.

1. Frequently used suppliers for LAUSD projects include:

- a. Hansen Aggregates.
- b. Vulcan Materials, Reliance Company.
- c. Vulcan Materials Durbin.

- C. Product Data: Submit material source, technical information and test data for base materials. Gradation and quality certifications shall be dated within 30 days of the submittal.



- D. Sample: Submit sample of proposed base course material.

1.03 QUALITY ASSURANCE

- A. Comply with the following as a minimum requirement: Standard Specifications for Public Works Construction, current edition.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Crushed Aggregate Base (CAB) materials shall conform to the requirements of the Standard Specifications for Public Works Construction: Section 200 - Rock Materials.
- B. Crushed Miscellaneous Base (CMB) or materials generated on site shall not be used as a base course material.

2.02 MATERIAL APPROVAL

- A. Base material shall be inspected by the Project Inspector for gradation and material content prior to installation. The Owner may choose to have additional tests performed by a geotechnical engineer, retained by the Owner, before installation.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install base course material in layers not exceeding 4 inches in thickness, unless required otherwise. Grade and compact to indicated levels or grades, cut and fill, water and roll until the surface is hard and true to line, grade and required section. Provide a relative compaction of at least 95 percent, unless otherwise required.
- B. Grade base course to elevations indicated on Drawings, ready to receive surfacing, in accordance with Section 31 2200 - Grading.

3.02 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.03 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 32 1313  
SITE CONCRETE WORK

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: On-site concrete work:

1. Portland cement concrete pavement, driveways, curbs, gutters and mowing strips.
2. Ramps and stairs on grade.
3. Footings for fence post, bollards, flagpoles, light standards and athletic equipment.
4. Pipe encasements, thrust blocks, and equipment pads.
5. Retaining walls, planter walls and concrete benches.
6. Skateboard deterrents.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 31 2316 - Excavation and Fill for Pavement.
3. Section 31 2326 - Base Course.
4. Section 32 3113 - Chain Link Fences and Gates.
5. Section 33 4000 - Storm Drainage Utilities.

1.02 REFERENCES

A. Structural work, such as retaining walls, planter walls, cast-in-place benches, equipment, fence and flagpole footings, and equipment pads, conform to the following Sections:

1. Section 03 1000 Concrete Forming.
2. Section 03 2000 Concrete Reinforcing.
3. Section 03 3000 Cast-in-Place Concrete.

B. Flatwork, such as walkways, driveways, ramps and steps on grade, swales, curbs, mow strips and utility related concrete, conform to:

1. Standard Specifications for Public Works Construction, The “Greenbook”, except reclaimed aggregates and processed miscellaneous base are not allowed.
- C. Imported or exported earthwork shall conform to Section 01 4524 Environmental Import / Export Materials Testing.
- D. National Ready Mixed Concrete Association (NRMCA):
  1. Checklist for the Concrete Pre-Construction Conference.
- E. All on-site concrete work shall conform to CBC 2019 11B.

### 1.03 QUALITY ASSURANCE

- A. Source Limitations for Exposed Concrete: Obtain each color, size, type, and variety of concrete material and concrete mixture from single manufacturer with resources to provide concrete of consistent quality in appearance and physical properties. Secure material required for the duration of the project as needed to ensure consistent quality in appearance.
- B. Pre-Installation Conference:
  1. Contractor shall coordinate and conduct pre-installation conference in conformance to Section 01 3119 Project Meetings.
  2. Contractor shall use the NRMCA “Checklist for the Concrete Pre-Construction Conference” as the meeting agenda.
- C. Mockup:
  1. Build 8 feet by 8 feet mockups of full-thickness sections of concrete paving using processes and techniques intended for use on permanent work, including curing procedures.
  2. Build mockups to demonstrate typical joints; surface finishes and standard of workmanship.
  3. Obtain Architect’s approval of mockup before proceeding with work of this Section.
  4. Mockup shall remain through completion of the work for use as a quality standard for finished work.
  5. Remove mockup when directed by the OAR.
- D. Field applied primers, paintings, sealers, sealants, caulking, leveling and patching compounds, crack/joint repair compounds adhesives and similar products shall be approved by the Owner’s Office of Environmental Health and Safety (OEHS).

### 1.04 SUBMITTALS

- A. Structural Work: Conform to the applicable requirements of Sections 03 1000 Concrete Forming, 03 2000 Concrete Reinforcing and 03 3000 Cast-in-Place Concrete.
- B. Flatwork: Submit mix design in conformance to the Greenbook.
- C. Shop Drawings: Submit drawings indicating the locations of concrete joints, including construction joints, expansion joints, isolation joints, and contraction joints.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Store cement and aggregate materials so to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be furnished.
- B. Packaged materials shall bear the manufacturers and brand name label and shall be stored in their original unbroken package in a weather tight place until ready for use in the work.
- C. Avoid exposure of reinforcing steel bars, wire, and wire fabric to dirt, moisture or conditions harmful to reinforcing.
- D. Reinforcing steel bars, wire, and wire fabric shall be stored on the Project site to permit easy access for examination and identification of each shipment. Material of each shipment shall be separated by size and shape.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Structural Work: Conform to the applicable requirements of the following Sections, except as otherwise specified:
  - 1. Section 03 1000 Concrete Forming.
  - 2. Section 03 2000 Concrete Reinforcing.
  - 3. Section 03 3000 Cast-in-Place Concrete.
- B. Flatwork: Conform to the applicable requirements of the Greenbook, Section 201.

2.02 SKATEBOARD DETERRENTS

- A. Manufacturer: Barrett Robinson Inc. or equal.
- B. Fabricated from 6061-T6 aluminum, clear anodized.
  - 1. Fixed Angle Series:
    - a. FR0.12: For walls with 1/8" radius edge. Dimensions: 4.875" top x 1.0" face x 2.0" wide.

- b. FA90A: For walls with 1/8" radius edge. Dimensions: 4.0" top x 2.375" face x 2.0" wide.
  - c. FA135: For chamfered edges, where the chamfer is 3/4" or more. Dimensions: 2" wide X 3-1/2" long X 1-1/8" tall.
  - d. FA902.5: For 90 degree walls with 1/2" radius edge. Dimensions: 3.75" top x 2.375" face x 2.0" wide.
2. Fixed Radius:
- a. FR.12: For 1/8" radiused edges. Dimensions: 4.875" top x 1.0" face x 2.0" wide.
  - b. FR.05: For 1/2" radiused edges. Dimensions: 3.75" top x 1.0" face x 2.0" wide.
  - c. FR1.0: For 1" radiused edges. Dimensions: 4.375" top x 1.625" face x 2.0" wide.
3. Gorilla Series:
- a. Gorilla 012: Rounded edge. For square corners from 0" - 3/8" radius. Size: 1-1/8" wide x 8" deep x 1-1/8".
  - b. Gorilla 0135: Chamfered edge. For square corners from 0" - 3/8" radius. Size: 1-1/8" wide x 8" deep x 1-1/8".
4. Two-part epoxy adhesive shall be approved by the Owner's Office of Environmental Health and Safety (OEHS).
5. Fastening pins as recommended by skateboard deterrent manufacturer.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Verify that gradients and elevations of base are correct. Maintain subgrade clean and in a smooth, compacted condition until the concrete is placed.
- B. Maintain subgrade in a smooth, compacted condition in conformity with the required section and established grade until the concrete is placed. Earth surface shall be kept moist by frequent sprinkling up to the time of placing concrete.

### 3.02 CONSTRUCTION OF FORMS

- A. Flatwork Forming: Set forms to the indicated alignment, grade and dimensions. Hold forms rigidly in place by a minimum of 4 stakes per form placed at intervals not to exceed two feet. Use additional stakes and braces at corners, deep sections, and radius bends, as required. Use clamps, spreaders, and braces where required to ensure rigidity in the forms.

- B. Wall Formwork: Forms shall be constructed to conform to final concrete shape, lines and dimensions of members required by Drawings and Specifications. Forms shall be sufficiently tight to prevent leakage of concrete and properly braced or tied together to maintain position and shape.

### 3.03 STEEL REINFORCEMENT INSTALLATION

- A. Fabricate bars of the indicated sizes and bend and form to required shapes and lengths by methods not injurious to materials. Do not heat reinforcement for bending. Bend bars No. 6 size and larger in the shop only. Bars with unscheduled kinks or bends are not permitted.
- B. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- C. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces, and lace splices with wire.
- D. Clean reinforcement of loose rust and mill scale, earth, or bond-reducing materials.

### 3.04 PREPARATION FOR CONCRETE PLACEMENT

- A. Surfaces to receive concrete shall be free of debris, standing water, and any other deleterious substances before start of concrete placing.
- B. Do not place concrete until forms, reinforcement, pipe, conduits, outlet boxes, anchors, sleeves, bolts, and other embedded materials are securely fastened in place. Maintain a minimum of two inches clearance between said items and any part of the concrete reinforcement.
- C. Adjust pull boxes, meter boxes, valve covers and manholes to proposed finish grade prior to placement of concrete. Anchor bolts shall be accurately set and maintained in position by templates while being embedded in concrete.
- D. Clean thoroughly the surfaces of metalwork to be in contact with concrete, remove dirt, grease, loose scale and rust, grout, mortar, and other foreign substances before the concrete is placed.
- E. Moisten subbase to provide a uniform dampened condition at time concrete is placed.

### 3.05 CONCRETE PLACEMENT

- A. Place, compact, screed, float and trowel concrete as indicated in Section 03 3000 Cast-in-Place Concrete.
- B. Finish: After straightedging, when most of the water sheen has disappeared and just before the concrete hardens, finish the surface with a wood or magnesium float or darby to a smooth and uniformly fine granular or sandy texture free of waves, irregularities, or tool marks. Produce a scored surface by brooming with a fiber-bristle brush in a direction transverse to that of the traffic, followed by edging.

1. Provide medium broom finish on surfaces up to six percent slope by striating surface 1/32 to 3/64 inch deep with a soft bristle broom across concrete surface to provide a uniform fine line texture.
2. Provide heavy broom finish on surfaces over six percent by striating surface 1/16 inch to 1/8 inch deep with a stiff-bristled broom.

### 3.06 JOINTS

- A. Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated. Align curb, gutter, and sidewalk joints.
- B. Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour.
  1. Continue steel reinforcement across construction joints unless otherwise indicated on the Drawings.
  2. Provide tie bars at sides of paving strips where indicated on the Drawings
  3. Butt Joints: Use bonding agent or epoxy-bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
  5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated on the Drawings.
- D. Expansion Joints:
  1. Provide premolded joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together. Extend expansion joint fillers full-width and depth of joint, and 1/4" below finished surface where joint filler is indicated. If no joint sealer is indicated place top of premolded joint filler flush with top of concrete or curb.
  2. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- E. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints to a depth equal to at least one-fourth of the concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Remove grooving-tool marks on concrete surfaces.
  2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
  3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- F. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Remove edging-tool marks on concrete surfaces.
- G. Where concrete is to be cast against old concrete, (greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by sand-blasting, exposing the aggregate. The hardened surface shall be cleaned of latent foreign material and washed clean, prior to the application of an epoxy bonding agent.

### 3.07 STAIRS AND RAMPS

- A. Install support post sleeves into the perimeter concrete curbing during the installation process of the curbing. Sleeves shall be three-inch diameter, schedule 40 PVC with a cap solvent welded to the bottom of the sleeve. Drill a half-inch weep hole on the bottom of the cap. Sleeve and cap shall be Nibco products or approved equal. Sleeves shall be embedded into concrete a minimum of nine inches and spaced at a maximum of four feet, or as indicated on the Drawings. Fill sleeve with non-shrink grout Quickcrete #1585-01 when setting posts. Provide control joints into the concrete on both sides for each post.
- B. Finish step nosings with a safety step edger/groover with a 1/2 inch radius and four grooves spaced equally 3/4 inch on center and a bit depth between 1/4 to 3/8 inch. Paint with contrasting color.

### 3.08 CURB AND GUTTER CONCRETE PLACEMENT AND FINISHING

- A. Formed Curb and Gutter: Place concrete to the required section in a single lift. Consolidate concrete using approved mechanical vibrators. Finish curve shaped gutters with a standard curb mule or concrete slipformed curb paving equipment.
- B. Concrete Finishing: Float and finish exposed surfaces with a smooth wood float until true to grade and section and uniform in texture. Brush floated surfaces with a fine-hair brush using longitudinal strokes. Round the edges of the gutter and top of the curb with an edging tool to a radius of 1/2 inch. Immediately after removing the front curb form, rub the face of the curb with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. Brush the front curb surface, while still wet, in the same manner as the gutter and curb top. Finish the top surface of gutter to grade with a wood float.



- C. Surface and Thickness Tolerances: Finished surfaces shall not vary more than 1/4 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.09 CLEAN UP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project Site.

3.10 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

## SECTION 32 1827

### STABILIZED DECOMPOSED GRANITE

#### PART 1 - GENERAL

##### 1.01 SUMMARY

###### A. Section includes:

1. Decomposed granite over crushed aggregate base with stabilizer binder additive.

###### B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 31 2200 - Grading.
3. Section 31 2326 - Base Course.
4. Section 32 1313 - Site Concrete Work.

##### 1.02 PROJECT REQUIREMENTS

- ###### A.
- Unless otherwise indicated on the Drawings, track sub-grade soils shall be graded 10 inches below final finish grades indicated on the Drawings. A 6-inch layer of compacted crushed aggregate base shall be installed to the required finish grades. A 4-inch layer of compacted decomposed granite shall then be installed to the required finish grades.

##### 1.03 SUBMITTALS

- ###### A.
- Submit in accordance with Section 01 3300 - Submittal Procedures.
- ###### B.
- Submit 5 (five) pound sample and sieve analysis per ASTM C136 for decomposed granite.

##### 1.04 QUALITY ASSURANCE

- ###### A.
- Comply with the Standard Specifications for Public Works Construction, current edition, except as modified herein.
- ###### B.
- Provide evidence of successful experience by the installer in the Work of this section.

##### 1.05 DELIVERY, STORAGE AND HANDLING

- ###### A.
- Do not install decomposed granite during rainy conditions.

#### PART 2 - PRODUCTS

- 2.01 CRUSHED AGGREGATE BASE
- A. Base materials shall comply with Section 31 2326 - Base Course.
- 2.02 DECOMPOSED GRANITE
- A. Decomposed granite shall be 2 mil track fine available from West Coast Sand and Gravel, Gail Materials, or equal.
- 2.03 STABILIZER BINDER
- A. A non-toxic, colorless, odorless, non-staining, concentrated organic powder that binds decomposed granite together, creating a natural-appearing, firm surface.
- B. Product from Stabilizer Solutions Inc., Living Earth, TechniSoil, or approved equal.

### PART 3 - EXECUTION

- 3.01 PREPARATION OF SUBGRADE
- A. The sub-grade shall be graded to an elevation 10 inches lower than the finish grades indicated on the Drawings. After the running track and straight-aways are graded to the required elevations, they shall be compacted and/or rolled as required by Section 31 2200 - Grading. Sub-grade shall then be dragged or floated to provide a uniform surface, free from any irregularities.
- 3.02 INSTALLATION OF CRUSHED AGREGATE BASE
- A. A 6-inch layer of crushed aggregate base material shall be installed in accordance with Section 31 2326 - Base Course. Grade to indicated levels or grades, and roll until the surface is true to line and required section.
- 3.03 INSTALLATION OF DECOMPOSED GRANITE
- A. Spread decomposed granite surfacing material in 1 1/2" layers. Spread the pathway mix evenly and smoothly before compacting. A finish layer of decomposed granite shall then be spread over the entire area and straightaway to finish grades. The entire surface shall then be moistened to provide full depth moisture penetration. While the decomposed granite is still thoroughly moist, roll the material with suitable compaction equipment to provide at least 90 percent relative compaction. Surface shall be filled as required and again rolled to produce a 4-inch thick uniform plane with proper drainage and slopes. Compaction with a wacker or vibratory roller is not permitted.
- 3.04 BLENDING STABILIZER
- A. Blend 12-15 lbs of stabilizer per ton of decomposed granite or crushed aggregate screening. It is critical that stabilizer be thoroughly and uniformly mixed throughout decomposed granite or crushed aggregate screenings. Blending shall be performed at the batch plant that will supply both the aggregate and the stabilizer.

3.04 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

3.05 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

## SECTION 32 31 13 – CHAIN LINK FENCES AND GATES

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Related Documents:

1. Drawings and general provisions of the Contract, including Division 0 and Division 1 Specification Sections, apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

##### B. Section Includes:

1. Fence framework, fabric, and accessories.
2. Excavation for posts.
3. Concrete encasement for posts.
4. Manual gates and related hardware.

##### C. Related Sections:

1. Section 32 31 19 - Decorative Metal Fences and Gates.

#### 1.2 REFERENCES

##### A. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.  
Federal Specifications (FS)

##### B. FS RR-F-191/1C Fencing, Wire and Post Metal (Chain-Link Fence Fabric)

##### C. State of California - California Department of Transportation (CALTRANS):

1. Standard Specifications: Chapter 80-4 excluding Section 80-4.04

##### D. American Society for Testing and Materials (ASTM)

1. ASTM A123 / A123M Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
2. ASTM C94 / C94M Standard Specification for Ready-Mixed Concrete
3. ASTM D 412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension

4. ASTM D 792 Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
5. ASTM D 1499 Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Plastics
6. ASTM D 2240 Test Method for Rubber Property—Durometer Hardness
7. ASTM F 668 Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric

### 1.3 ACTION SUBMITTALS

- A. Submit shop drawings and product data.
  1. Include accessories, fittings, hardware, anchorages, and schedule of components.
- B. Manufacturer's installation instructions.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Fencing Fabric: 9-gauge min, 1"x1" galvanized (before weaving) diamond mesh. With knuckled edges at top and bottom of fabric. Sharp edges or burrs on fence fabric due to galvanizing will not be accepted. Polyester coating over the galvanized mesh. Vinyl or PVC coating is not acceptable. Color to match existing fence to remain.
- B. Posts and Braces: Section 80-4.01A of CALTRANS
- C. Fabric: Section 80-4.01B of CALTRANS
- D. Accessories: Section 80-4.01C of CALTRANS
- E. Gates: Section 80-4.01D of CALTRANS

### 2.2 CONCRETE MIX

- A. Concrete: ASTM C 94; type II Portland Cement; 3000 psi at 28 days; 3-inch (75 mm) slump; 3/4-inch (20 mm) maximum size aggregate.

## 2.3 COMPONENTS

- A. Line Posts: 2.375-inch (59 mm) outside diameter, Schedule 40 hot dipped galvanized steel pipe or galvanized "H" columns weighing not less than 2.7 lb./ft (13.18 kg/m<sup>2</sup>).
- B. Corner and Terminal Posts: 2.875-inch (73 mm) outside diameter, Schedule 40 hot dipped galvanized steel pipe.
- C. Gate Posts: As indicated on drawings; gateposts to be galvanized steel pipe.
- D. Top, Bottom and Brace Rail: 1.660-inch (42.16 mm) outside diameter, Schedule 40 hot dipped galvanized steel pipe.
- E. Gate Frame: As indicated on drawings.
- F. Fabric/Vinyl Coated Steel: Chain link fence fabric shall be galvanized steel wire with a continuously bonded polyester coating, with a finish size (i.e., size after coating) of 8 gauge, and shall comply with ASTM F 668. Fabric height shall be 8 feet (2.44 m), +/- 3/4 inch (20 mm), with knuckled, selvage edges on the bottom and top. Mesh shall be vertically-woven diamond mesh, with a nominal distance of 1 inch (25 mm) between parallel wires.
- G. Tension Bars: 3/16 inches by 3/4-inch (4.76 mm by 20 mm) galvanized steel flat bars.
- H. Caps: Cast steel or malleable iron, galvanized, sized to post dimension, set-screw retained.
- I. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings shall be galvanized steel.
- J. Extension Arms: Cast steel, to accommodate 3 strands of barbed wire, single arm, 12-inches (305 mm) high (measured vertically) above the top edge of the fence fabric, sloped to 45 degrees.
- K. Gate Hardware: Fork type latch with gravity drop; center gate stop and drop rod; three 180 degree gate hinges per leaf.

## 2.4 FINISHES

- A. Galvanized Surfaces: Galvanize surfaces in accordance with ASTM A 123, with a coating of at least 1.20 oz/sq. ft.
- B. Accessories and Components: Same finish as fabric.

## 2.5 POLYESTER COATING

- A. The polyester coating shall conform to ASTM G53.
- B. Colors shall be stabilized and shall have a light fastness to withstand a minimum Weather-O-Meter exposure of at least 1500 hours without deterioration when tested in accordance with ASTM D 1499.
- C. Cracking peeling and UV resistance shall be Fair in accordance with ASTM G53.
- D. Hardness shall be A90 +/-5 in accordance with ASTM D 2240.
- E. Tensile strength shall be between 2600 and 3000 psi (17.94 MPa and 20.7 MPa) in accordance with ASTM D 412.
- F. Polyester coating shall be exposure-resistant to dilute solutions of most common mineral acids, sea water, salts, and alkali.
- G. Polyester coating shall be continuously bonded to the wire under 5000 psi (34.5 MPa) pressure before the wire is woven into fabric.
- H. Polyester shall be mold resistant.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install framework, fabric, accessories, and gates in accordance with section 80-4.02 of CALTRANS.
- B. Install security fence of fabric height as indicated on Drawings.
- C. Space line posts at intervals not exceeding 8 feet.
- D. Set gate and posts plumb, in concrete footings with top of footing 1 inch (25 mm) above finish grade. Slope top of concrete for water runoff. Footings for line end and corner posts are to be 8 inches (203) diameter by 3 feet (0.91 m) deep below finish grade and for gates are to be 12 inches (305 mm) diameter by 3 feet 6 inches (1.07 m) deep below finish grade, unless shown on drawings.
- E. Provide top rail through line-post tops and splice with 7-inch (178 mm) long rail sleeves.
- F. Brace each gate and corner post back to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail, one bay from end and gate posts.



- G. Install center and bottom brace rail on corner and gate leaves.
- H. Stretch fabric between terminal posts or at intervals of 100 feet (30,5 m) maximum, whichever is less.
- I. Position bottom of fabric to no more than 2 inches (50 mm) above concrete or asphalt grade and touching dirt finish grade.
- J. Fasten fabric to top rail, line posts, braces, and bottom tension wire with 11-AWG galvanized wire ties 24 inches (610 mm) maximum on centers.
- K. Attach fabric to end, corner, and gateposts with tension bars and tension bar clips.
- L. Install bottom rail supported at each line and terminal post in such a manner that a continuous brace between posts is formed.
- M. Install gates with fabric overhang to match fence. Install three hinges per leaf, latch, catches, drop bolt, foot bolts and sockets.

### 3.2 GROUNDING

- A. 40 feet (13 m) on either side of overhead high voltage electrical transmission lines the fence is to be grounded as shown on the Drawings.

### 3.3 CONSTRUCTION WASTE MANAGEMENT

- A. Conform with Division 01 Section “Construction Waste Management.”
- B. Before concrete pours, designate locations or uses for excess concrete and a location for clean out water from concrete trucks. Designated locations shall meet environmental standards and conform with Section 7-1.01 of CALTRANS.

END OF SECTION 32 31 13

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SECTION 33 4000  
STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes storm drainage piping; sub-surface drains; metal covers, grates and frames; catch basins; box culverts; manholes, and BMPs.
  - 1. Best Management Practices (BMPs):
    - a. Catch Basin Inserts.
    - b. Proprietary Infiltration BMPs
  - 2. Closed-circuit television inspection of storm drain lines.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements.
- B. Section 01 3593 - Off-site Improvement Procedures.
- C. Section 01 7417 – BMP Implementation Plan.
- D. Section 31 2313 - Excavation and Fill.
- E. Section 31 2323 - Excavation and Fill for Utilities.
- F. Section 32 1313 - Site Concrete Work.

1.03 DEFINITIONS

- A. AASHTO: American Association of State Highway and Transportation Officials.
- B. ASME: American Society of Mechanical Engineers.
- C. ASTM: American Society for Testing and Materials.
- D. BMP: Stormwater Best Management Practice.
- E. CBC: California Building Code.
- F. CCTV: Closed-Circuit Television.
- G. DWV: Drain, Waste, and Vent.

- H. FILT: Filter BMP.
- I. GS: Gravity Separator.
- J. HDPE: High Density Polyethylene.
- K. IAPMO: International Association of Plumbing and Mechanical Officials.
- L. IOR: Inspector of Record.
- M. NPS: Nominal Pipe Size.
- N. OAR: Owner's Authorized Representative.
- O. PE: Polyethylene.
- P. Post Construction BMP: Devices installed by the Contractor for storm water management to be left on site after construction completion.
- Q. PP: Polypropylene.
- R. PVC: Poly Vinyl Chloride.
- S. SDR: Standard Dimensions Ratio.
- T. OWNER: El Monte Union High School District
- U. SWPPP: Storm Water Pollution Prevention Plan.

1.04 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO):
  1. ASHTO M 252: Geotextile Specification for Highway Applications.
  2. AASHTO M 294: Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter.
  3. AASHTO M 330: Standard Specification for Polypropylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter.
- B. American Society for Testing and Materials International (ASTM):
  1. ASTM A888: Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
  2. ASTM C14: Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe.
  3. ASTM C443: Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.

4. ASTM C564: Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
5. ASTM C76: Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
6. ASTM C857: Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
7. ASTM C858: Standard Specification for Underground Precast Concrete Utility Structures.
8. ASTM C891: Standard Practice for Installation of Underground Precast Concrete Utility Structures.
9. ASTM D2564: Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
10. ASTM D2665: Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
11. ASTM D2855: Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.
12. ASTM D3034: Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
13. ASTM D3212: Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
14. ASTM D448: Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
15. ASTM F1866: Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Schedule 40 Drainage and DWV Fabricated Fittings.
16. ASTM F2306: Standard Specification for 12 to 60 in. [300 to 1500 mm] Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications.
17. ASTM F2418: Standard Specification for Polypropylene Corrugated Wall Stormwater Collection Chambers.
18. ASTM F2764: Standard Specification for 6 to 60 in. [150 to 1500 mm] Polypropylene (PP) Corrugated Double and Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications.
19. ASTM F2787: Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers.

20. ASTM F2881: Standard Specification for 12 to 60 in. [300 to 1500 mm] Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications.
  21. ASTM F2922: Standard Specification for Polyethylene Corrugated Wall Stormwater Collection Chambers.
  22. ASTM F477: Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
  23. ASTM F656: Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
  24. ASTM F794: Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
- C. Cast Iron Soil Pipe Institute (CISPI):
1. CISPI 301: Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
  2. CISPI 310: Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
- D. The International Association of Plumbing and Mechanical Officials (IAPMO):
1. IAPMO IS 6: Hubless Cast Iron Sanitary and Rainwater Systems - Installation Standards.
- E. Standard Specifications for Public Works Constructions (Greenbook):
1. Section 202: Masonry Materials.
  2. Section 206: Miscellaneous Metal Items.
  3. Section 207: Pipe.
  4. Section 208: Pipe Joint Types and Materials.
  5. Section 210: Paint and Protective Coatings.
  6. Section 306: Underground Conduit Construction.

## 1.05 SUBMITTALS

- A. Shop Drawings: Submit site plan denoting locations of lines, valves, and appurtenances.
- B. Product Data: Manufacturer's catalog data for all required materials. Include technical data for accessories, information concerning gaskets, joints and couplings.

- C. Certificates: Certificates attesting that tests set forth in referenced publication have been performed and the results required by design have been met.
- D. Closeout Documents: At Substantial Completion submit to the OAR two CD's and one hard copy of the documents indicated in paragraphs 1 through 5 below:
  - 1. Maintenance Log: Provide Microsoft Excel Spreadsheet including the following information:
    - a. Maintenance log and upkeep records of the installed Post Construction BMPs. Include the following headers as a minimum: "Date of Service", "Location of BMP", "Type of Maintenance or Service", "Notes", "Next Scheduled Preventive Maintenance Due", and "Inspector Signature".
    - b. Maintenance Requirements: Include the following headers as a minimum: "BMP Description", "Location of BMP and Map Grid Location" and "Type of Maintenance or Service Needed", i.e.; weekly, monthly, quarterly, etcetera. "Stock No.", "Manufacturer Contact Information", along with "Frequency" namely: weekly, monthly, quarterly, etcetera and "Special Instructions".
  - 2. Maintenance Manuals: Provide Maintenance Manual for storm drainage BMP components installed along with requirements, replacement or maintenance schedule and plans with the location of each BMP component. This manual shall include product information cut sheet, shop drawings, vendor information for each component and warranty.
  - 3. Record drawings: 'As-Built' site plan(s) showing Post Construction BMP. Provide a copy of marked record set with red pencil identifying any variations from design documents.
  - 4. Training Documentation:
    - a. Owner attendees sign off training sheet.
    - b. Two DVD's of materials covered in the training and components installed.
  - 5. Post-Construction BMP Maintenance Plan: Submit complete Plan per Attachment "A", edit per As-Built conditions and provide missing information.
  - 6. Records of Closed-Circuit Television Inspection: At Substantial Completion submit to the OAR three DVD's of Closed-circuit television inspections performed. Include the following information:
    - a. Electronic Media Recordings: Visual and audio record of the entire length of pipe. For existing laterals identify problem areas, such as roots, cracks, fractures, broken pipe, and other unusual conditions found.
    - b. Digital Photographs of the pipe condition, connections, points of interest and defects found. Indicate distance of defects to a point of

reference such as face of building or mainline. Provide the Digital Photographs after fixing the defective pipes.

- c. Inspection Log: Provide written report including:
  - 1) Date and time of inspection.
  - 2) Name of School, Project, Contractor, and operator name.
  - 3) Location, material and size of pipe.
  - 4) Description of defects found and attempts to fix them.

#### 1.06 QUALITY ASSURANCE

- A. Comply with the following as a minimum requirement: Standard Specifications for Public Works Construction, current edition.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic products, pipes, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle all products according to manufacturer's written rigging instructions.

#### 1.08 TRAINING OF OWNER PERSONNEL

- A. At Substantial Completion and when the storm drainage system is fully operational, knowledgeable representatives from the Contractor and manufacturer(s) of the components specified and installed at the site shall provide up to 8 hours of training. Date, time and location for the training shall be coordinated through the project OAR. Have Owner attendees sign off training sheet and provide a copy to the OAR.
- B. Training period shall cover but not be limited to the following:
  - 1. Explain the operation of storm drainage system and its design intent.
  - 2. Explain the maintenance requirements of every component of the system.
  - 3. Provide recommendations of practices to minimize or eliminate negative impact on the system.
  - 4. Provide maintenance schedule as recommended by the manufacturers for every component and review it with Owner's Maintenance and Operations staff.
  - 5. Conduct a site walk, identify every component of the system and demonstrate its operation.
  - 6. Training shall be conducted with the use of Maintenance log and Maintenance manual.



1.09 SURPLUS MATERIALS

- A. Provide enough additional materials for each component of BMP that requires replacement or service during the first year.

PART 2 – MATERIALS AND PRODUCTS

2.01 PIPING MATERIALS

- A. General: Minimum 5 feet away from building boundaries. For piping within 5 feet from building boundaries, and interior piping refer to Division 22 plumbing sections. Provide piping system in conformance with Section 207 - Pipe and Section 208 - Pipe Joint Types and Materials of the Standard Specifications for Public Works Construction. All Soil-tight pipes shall be provided with joints that are function of opening size, channel length, and backfill particle size. A backfill material containing a high percentage of fine-graded soils requires investigation for the specific type of joint to be used to guard against soil infiltration, including the requirement for fabric-wrapped joints.
- B. Nonreinforced Concrete Pipe (CP): ASTM C14, with bell-and-spigot ends and gasketed joints with ASTM C443 rubber gaskets.
- C. Reinforced Concrete Pipe (RCP): ASTM C76, with bell-and-spigot ends and gasketed joints with ASTM C443 rubber gaskets.
- D. Cast Iron Soil Pipe (CIP):
  - 1. Hubless, service weight, ASTM A888, CISPI 301, conforming to CISPI 310 and installed in accordance to IAPMO IS 6.
  - 2. Cast iron soil coupling: Hubless, heavy-duty with neoprene gaskets, stainless steel corrugated shields, and 4 bands of stainless-steel clamps. IAPMO, ASTM C564 and CISPI 310.
  - 3. Approved manufacturers: American Foundry, Mission Rubber Company, Tyler, or equal.
- E. Corrugated, Dual Wall, High Density Polyethylene Drainage Pipe (HDPE):
  - 1. Corrugated PE Drainage Pipe and Fittings NPS 4 to NPS 10: AASHTO M 252, Type S (double-wall) with smooth waterway for coupling joints.
  - 2. Corrugated PE Pipe and Fittings NPS 12 to NPS 60: AASHTO M 294 or ASTM F2306, Type S (double-wall) with smooth waterway for coupling joints.
  - 3. Approved manufacturer: ADS, Hancor, JM Eagle, or equal.
- F. Corrugated, Dual or Triple Wall, Polypropylene Pipe (PP):

1. Corrugated PP Drainage Pipe and Fittings NPS 12 to NPS 60: ASTM F2764, ASTM F2881, or AASHTO M 330, Type S (double-wall) or Type D (triple-wall), for respective diameters. Provide coupling joints with smooth waterway.
  2. Approved manufacturers: ADS, Prinsco, or equal.
- G. PVC (Poly Vinyl Chloride) Schedule 40 DWV Pipe:
1. Conform to ASTM D2665, ASTM F794, and ASTM F1866.
  2. Installer of PVC Schedule 40 DWV piping system shall carry ASTM D2855 and ASME B31.3 qualification. Installer shall provide proof of these qualifications to IOR prior to commencing work.
  3. Containers for solvent and primer shall be clearly marked with manufacturer's data. Solvent and primer shall not be more than one year old. The safety placards must be visible.
  4. Blue or red-hot glue shall not be used.
  5. Approved manufacturers and products:
    - a. Pipe: Charlotte pipe and foundry, Harvel Plastics Inc., JM Eagle, Spears Manufacturing Company, or equal.
    - b. Primer: Weld-On P-70 by IPS, Conforming to ASTM F656.
    - c. Cement: Weld-On 711 (gray) by IPS, Conforming to ASTM D2564.
- H. PVC (Poly Vinyl Chloride) SDR-35 Pipe, 6" through 15":
1. Conform to ASTM D3034.
  2. Gasketed Joints: Elastomeric gasket joints conforming to ASTM D3212.
  3. Gaskets: Chloroprene conforming to ASTM F477.
  4. Approved manufacturers: Charlotte pipe and foundry, Harvel Plastics Inc., JM Eagle, Spears Manufacturing Company, or equal.

## 2.02 BEDDING MATERIAL FOR PIPE

- A. General: Conform to the requirements of Section 31 2313 - Excavation and Fill or Section 31 2323 - Excavation and Fill for Utilities, as required.
- B. Approved manufacturers and products:
  1. Propex Fabrics, Inc.: Geotex 451.
  2. TenCate Geosynthetics Americas: Mirafi 140N.
  3. US Fabrics, Inc.: 120NW.

4. Equal products.

#### 2.03 PERFORATED SUBSURFACE DRAIN PIPE

- A. Shop-perforated with perforations symmetrically located within a maximum arc of 160 degrees. Perforations shall provide a total open area of at least 0.3 square inches per linear foot of pipe, with a minimum of one perforation per linear foot, except for joint areas. Perforation shall be either holes or slots. Hole diameters of 1/4 inch minimum to 3/8 inch maximum. Width of slots of 3/16 inch minimum to 5/16 inch maximum with slot length not exceeding 4 inches.
- B. Aggregate Around Perforated Pipe shall be 6 inches of gravel containing no particles finer than a 3/8-inch to 1/2-inch sieve opening size.

#### 2.04 STORMWATER TREATMENT SYSTEMS /BMPS

- A. GS-2: Catch Basin Inserts, approved manufacturers and products:

- A. 1. AbTech Industries: UUF DI-DO.
2. ADS-FlexStorm: FlexStorm Pure or Catch-it.
3. Aquashield Inc.: Aqua-Guardian.
4. Ecosense International: EcoSense International's Catch Basin Insert.
5. Oldcastle Precast Inc.: FLoGard, or GISB.
6. UltraTech International Inc.: Ultra-Drain Guard.
7. Equal products.

- B. RET-4: Drywells

1. Pipe Systems: Perforated Poly Vinyl Chloride (PVC) manifold, header, and lateral pipe complying with AASHTO M 252 for NPS 10 and smaller, AASHTO M 294 for NPS 12 to NPS 60. Include proprietary fittings, couplings, seals, and filter fabric.
2. Rock: Clean washed rock uniformly graded between 1/2" and 3/4".
3. Wrap pipe with filter fabric Mirafi 140 N or approved equal.

#### 2.05 MISCELLANEOUS MATERIALS

- A. Metal Covers, Grates, Frames and Accessories:

1. Conform to Section 206 - Miscellaneous Metal Items of the Standard Specifications for Public Works Construction.

2. Hot-dip galvanize steel parts after fabrication in accordance with Section 210 - Paint and Protective Coatings of the Standard Specifications for Public Works Construction.
3. Grates and Frames:
  - a. Vandal-proof design and construction.
  - b. ADA compliant, in conformance to CBC 11B-302.3.
  - c. Rated for vehicular traffic on areas intended for use by motor vehicles.
  - d. Hot-dip galvanized.
- B. Concrete, Mortar and Related Materials: Conform to Section 32 1313 - Site Concrete Work.
- C. Manhole Brick Mortar, Grout, and Plaster: Conform to Standard Specifications for Public Works Construction, Section 202 - Masonry Materials.
- D. Underground Concrete Structures: Shall be precast and rated for H-20 traffic loading and applicable soil loads. The materials and structural design of the devices shall be per ASTM C857 and ASTM C858.

## 2.06 NAMEPLATES

- A. Stainless steel or aluminium nameplate permanently fastened to BMP showing the following information:
  1. BMP ID number and BMP type.
  2. Next service day followed by a 1-inch by 4-inch long blank space.
  3. Manufacturer name, model number, telephone number and stock ID number.
  4. Installation or production date.
  5. 1-inch by 4-inch blank space for Owner's use.

## PART 3 – EXECUTION

### 3.01 GENERAL INSTALLATION REQUIREMENTS

- A. Contractor shall arrange for a preconstruction meeting with the manufacturer's representative to review the basic principles for proper installation of Underground BMP type products prior to any installation.
- B. Underground Concrete modules shall be installed in accordance with manufacturer's instructions and the current ASTM C891 procedures.

- 3.02 EXCAVATION, BACKFILLING AND COMPACTING
- A. Conform to the requirements of Section 31 2313 - Excavation and Fill or Section 31 2323 - Excavation and Fill for Utilities, as required.
- 3.03 INSTALLATION OF PIPE
- A. Conform to Section 306 - Underground Conduit Construction of the Standard Specifications for Public Works Construction.
- B. Non-ferrous drainpipe installed with less than 12 inches of cover to finish grade shall be provided with a 4-inch thick concrete pipe encasement.
- 3.04 DRAINAGE APPURTENANCES
- A. Catch basins, junction chambers, manholes, box culverts, outlet chambers and other drainage structures: Construct as indicated on Drawings and as specified in Section 32 1313 - Site Concrete Work, and in compliance with the Standard Specifications for Public Works Construction, Section 303 - Concrete and Masonry Construction.
- B. Ensure that Post Construction BMP have a visible identifying manufacturer tag with product identification, manufacturer contact information, date of last service and date of next service due.
- C. Provide storm drain stencil per City or County requirements as applicable.
- 3.05 STORMWATER TREATMENT SYSTEMS/BMPs
- 3.05 A. RET-4: Drywells
1. The drilled holes shall be the diameter shown on the plans. The holes shall be drilled in a manner to maintain maximum permeability of soils.
  2. The drainage pipe, drainage screen, and filter fabric sleeve shall be suspended during backfilling operations. The drainage pipe shall extend to within 2 feet of the total depth of the drywell. The rock backfill shall be placed to prevent buckling and breakage of the drainage pipe, screen, and filter fabric.
  3. The pre-cast liner shall be centered in drilled shaft and the sections carefully aligned to maximize the bearing surfaces of the liner walls.
  4. The ring and grate shall be set to the rim elevation shown on the plans or to match existing grades and shall be secured to the cone with mortar.
  5. Upon completion of each drywell, a lay of UV stabilized Mirafi® 100X fabric shall be placed over the grated inlet and banded in place. The fabric shall not be removed until after paving the landscaping operations are completed.
- 3.06 ABANDONED DRAINAGE LINES AND STRUCTURES

- A. Cap or plug existing drain lines that are cut and abandoned and remove existing drainage structures that are abandoned.

### 3.07 CLOSED-CIRCUIT TELEVISION INSPECTION

- 3.07 A. Coordinate with OAR time and date of inspection. Project Inspector shall be present during the CCTV inspection.
- B. Clean laterals by hydraulic jet.
- C. Perform internal closed-circuit television inspection of lateral from the building to the public mainline. Record drain line in its entirety with no breaks or interruptions. Move camera at a speed no greater than 30 feet per minute, stopping for a minimum of ten seconds to record pipe connections, defects, and points of interest.
- D. Maintain technical quality, sharp focus and distortion free picture. Pan, tilt, and rotate as necessary to best view and evaluate connections, defects and points of interest.
- E. Minimum Requirements for Closed-circuit Television Equipment:
  - 1. Television camera specially designed for pipe inspections, and operative in 100 percent humidity conditions.
  - 2. Camera and television monitor capable of producing minimum 470H-line resolution color video picture.
  - 3. Camera capable to inspect lines as small as three inches up to 70 feet from storm drain mainline.
  - 4. Camera lighting shall be suitable to allow clear picture of inner wall at least ten feet in front.
- F. Defective Work:
  - 1. New Lines: Defective Work found shall be repaired at Contractor's expense. Perform a new closed-circuit television inspection at no cost to Owner.
  - 2. Existing Laterals:
    - a. If roots, sludge, or sediment material or other defect not related to the Work of this project impedes inspection, withdraw camera, restart inspection from opposite end and notify OAR of defects found.
    - b. If obstruction or stoppage was caused by Work related to this project, remove obstruction at no cost to Owner. Perform a new closed-circuit television inspection at Contractor's expense.

### 3.08 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

- B. Maintain Post Construction BMP after installation and keep a maintenance log to be turned over to OAR at Substantial Completion.

3.09 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION