PROJECT MANUAL

CABRILLO COLLEGE
BUILDING 600 RENOVATION
6500 Soquel Drive
Aptos, CA 95003

Cabrillo Community College District
555 Soquel Ave, Suite 140
Santa Cruz, CA 95062

Bid Set
March 18, 2013

ARCHITECT
STV VBN
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Oakland, CA 94612
TEL: (510)763-1313  FAX: (510)465-1586

STV VBN Project No: 4015839
PROJECT MANUAL FOR:
CABRILLO COLLEGE BUILDING 600 RENOVATION
6500 Soquel Drive
Aptos, CA 95003

OWNER:

CABRILLO COMMUNITY COLLEGE DISTRICT
555 Soquel Ave, Suite 140
Santa Cruz, CA 95062

ARCHITECTS

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Karen Wiinikka  S5056

Signature Page
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G-002 Site Map
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A-101 Demolition Floor Plan
A-102 Floor Plan
A-103 Reflected Ceiling Plan
A-201 Building Section
A-401 Interior Elevations
A-403 Interior Elevations
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A-504 Ceiling Details
A-505 Details
A-601 Schedules
A-801 Furniture Plan (For Reference Only)

PLUMBING

P-001 Plumbing Legend Notes and Schedule
P-201 Plumbing Demolition Plan
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E-201 Title-24 Certificate of Compliance Forms

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END OF SECTION
1.1 SUMMARY

A. Section Includes:
   2. Work by District.
   3. Contractor's Duties.
   4. Contractor's use of site and premises.
   5. Work sequence.
   6. District occupancy.
   7. Specification conventions.

B. Related Sections:
   1. General Conditions of the Contract.
   2. Specific sections of the specifications.

1.2 CONTRACT DESCRIPTION

A. Work of the Project includes alterations to portion of existing building 600 at Cabrillo Community College, located at 6500 Soquel Drive, Aptos, CA 95003 as follows:
   1. Demolition of existing space and Construction of new chemistry/ biology lab and two lectures rooms.
      Work includes; Casework, fume hoods, safety shower/eye wash, ceilings, flooring and painting, installation of panic hardware on existing doors in room 610, and installation of mechanical, plumbing, electrical and fire alarm in the area of alteration.
   2. Additive Alternate #1: Addition of furring wall, consisting of 2 ½” metal studs, 5/8” gypsum board and batt insulation, at North exterior wall of rooms 610 and 611 and South wall of room 610.
   3. Additive Alternate # 2: Addition of Acoustical Wall panels at North, South & East walls of room 610 as shown in drawings..
   4. Additive Alternate # 3: Addition of eye wash/shower station and required utilities; addition of fume hood and required utilities, casework below, wing walls in room 610.

B. Perform Work of Contract under stipulated sum contract with District in accordance with Conditions of Contract.

C. Work of the Project includes the installation of District supplied furnishings and equipment as shown on the drawings. These include, but are not limited to:

1.3 WORK BY DISTRICT

A. District has paid for the Division of State Architect (DSA) Plan Check fee.

3/20/2013
1.4 CONTRACTOR’S DUTIES

A. Except as specifically noted, provide and pay for:
   1. Labor, materials and equipment.
   2. Tools, construction equipment and machinery.
   4. Other facilities and services necessary for proper execution and completion of the work.

B. Pay legally required sales, consumers and use taxes, GC Section 4.5.

C. Secure and pay for all fees, surcharges, taxes, licenses as necessary for proper execution of the work, including, but not limited to: Temporary utility hook-up.

D. Instruct each subcontractor to become familiar with the Conditions of the Contract and the General Requirements (Division 1).

1.5 CONTRACTOR’S USE OF SITE AND PREMISES

A. General: Provide protection of public right-of-way from materials and methods of construction. Protect existing utilities and buildings to remain from damage while engaged in new work. Repair any damage caused by construction operations.

B. Contractor will have complete access to site during construction.

C. All exits from the building shall remain clear and unobstructed throughout construction.

D. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

E. Repair all damage caused by construction operations. Take necessary precautions to protect District’s property, employees, and the public during the construction period.

F. If requested, maintain District occupied portion of the facility in a weather-tight condition throughout the construction period.

G. Working hours for performing the Work are limited to 7:00 AM to 5:00 PM unless approved in writing in advance by the District’s Project Manager.

1.6 WORK SEQUENCE

A. Construct the Work in stages and at times to accommodate District operation requirements during the construction period; coordinate construction schedule and operations with District.

B. Proposed Project Schedule: The Project Site will be available to the Contractor from approximately May 13th, 2013, until Substantial Completion is achieved. See Supplemental Conditions for Contract Time.

1.7 DISTRICT OCCUPANCY

A. The District will occupy the building during construction.

3/20/2013
1.8 SPECIFICATION CONVENTIONS

A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words “shall be” are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION
PART 1 - GENERAL

1.1 GENERAL:

A. The following additional requirements apply to this Project that is being reviewed by the Division of the State Architect (DSA).

1.2 ADDITIONAL REQUIREMENTS:

A. In addition to the duties specified in the Contract Documents, the duties of the Contractor shall be in accordance with the requirements specified in Section 4-343 of Part 1, Title 24, California Code of Regulations (CCR).

B. In addition to the duties specified in the Contract Documents, the duties of the Architect and the Architect's consultants shall be in accordance with the requirements specified in Section 4-333(a) and 4-341 of Part 1, Title 24, CCR.

C. DSA is not subject to arbitration proceedings.

D. Notify DSA at start of construction in accordance with Section 4-341 of Part 1, Title 24, CCR.

E. All addenda and change orders shall be submitted for DSA approval. Do not begin any work under an addendum or change order until DSA approval is obtained. Addenda and change orders shall be in accordance with Section 4-338 of Part 1, Title 24, CCR.

F. Do not begin work under a written order until a change order has been submitted to and approved by DSA in accordance with Section 4-338 or Part 1, Title 24, CCR. Substitutions effecting structural, fire/life/safety or access compliance shall be submitted as change orders for DSA approval. The Contractor will be responsible for the additional architectural and engineering costs associated with the review and regulatory processing of these substitutions.

G. Unless otherwise indicated or specified, perform the work in conformance with the latest edition of applicable regulatory requirements. A copy of Part 1 and Part 2 of Title 24, CCR shall be available on the Project site. The codes adopted by the City, County, State and Federal agencies shall govern minimum requirements for this Project.

H. Contractor shall submit verified reports in accordance with Sections 4-341 and 4-343(c) of Part 1, Title 24, CCR.

I. DSA may supervise construction, reconstruction, or repair in accordance with Section 4-334 of Part 1, Title 24, CCR.

J. Construction shall be observed by a full-time Project Inspector approved by DSA in accordance with Section 4-333(b) and 4-342 of Part 1, Title 24, CCR.

K. Testing requirements of the DSA approved District's Testing Laboratory shall be in accordance with Section 4-335 of Part 1, Title 24, CCR.
L. Special Inspection on masonry construction, glued laminated lumber, wood framing using timber connectors, ready-mixed concrete, gunite, prestressed concrete, high strength steel bolt installation, welding, pile driving, and mechanical and electrical work shall be as required by Section 4-333(c) of Part 1, Title 24, CCR. The costs of special inspection will be paid for by the District.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION
SECTION 01 23 00

ALTERNATES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Identification and description of Alternate work listed in order of preference at the end of this Section.

B. Related Sections:

1. Bid Proposal: Quotation of cost of each Alternate.
2. Owner-Contractor Agreement: Alternates accepted by Owner for incorporation into the Work.
3. Sections of the Specifications identified in each Alternate.

1.2 PROCEDURES

A. For bid comparisons, the Owner will determine the lowest responsible bidder stated in the information to Bidders.

B. Time of Completion and Liquidated damages shall remain as stated in the Information to Bidders regardless of whether or not the Owner selects the additive bid item or not.

C. Coordinate related work and modify surrounding work as required to complete the Work, including changes under each Alternate, when acceptance is designated in the Owner-Contractor Agreement.

D. Base bid work described under each alternate involves base bid work if the alternate bid item is not accepted.

1.3 SELECTION AND AWARD OF ALTERNATES

A. Indicate variation of bid price for alternates described below and list in bid proposal document or any supplement to it, which requests a “difference” in bid price by adding or deducting from the base bid price.

B. Notwithstanding the method used by the District to determine the lowest responsible bidder, the District retains the right to add or deduct from the contract any of the additive or deductive items included in the bid solicitation.

1.4 ADDITIVE ALTERNATE BID NO. 1:

A. Add painted furring wall at North exterior walls of rooms 610 and 611 and South wall of room 610 as indicated on the drawings. Furring wall consists of 2 ½” metal framing batt
insulation and one side of 5/8" gypsum board sheathing painted as specified in Section 09 21 16– Gypsum Board Assemblies.

B. If the alternate is not taken, the Base Bid shall include protection of existing walls to remain and paint finish.

1.5 ADDITIVE ALTERNATE BID NO. 2:

A. Add acoustic wall panels at North, South, and East walls of room 610 as indicated on the drawings. Acoustic panels consists of stretched fabric in perimeter clip rails over sound absorbing panels as specified in Section 09 77 13– Stretched Fabric Wall System.

B. If the alternate is not taken, the Base Bid shall include painting of wall finish to remain.

1.6 ADDITIVE ALTERNATE BID NO. 3:

A. Add eye wash/shower station and fume hood and base cabinet below it with surrounding wall in room 610 as specified in Section 11 53 13– Laboratory Fume Hoods. Alternate scope includes wall framing, blocking and utilities connections.

B. If the alternate is not taken, the Base Bid shall include continuation of new furred wall with paint finish on West wall of room 610.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION
SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Project coordination.
   2. Pre-construction conference.
   3. Site mobilization conference.
   4. Progress meetings.
   5. Pre-installation meetings.
   7. Submittals.
   8. Coordination drawings.
   9. Workmanship
   10. Incidental costs.
   11. Correspondence and Notices.
   12. Miscellaneous provisions.

B. Related Sections:
   1. Section 01 10 00 - Summary of Work.
   2. Section 01 33 00 – Submittal Procedures.
   3. Section 01 40 00 – Quality Control.
   4. Section 01 50 00 - Temporary Facilities and Controls.
   5. Section 01 72 00 – Preparation and Execution
   6. Section 01 74 00 - Cleaning
   7. Section 01 77 00 - Closeout Procedures.
   8. Section 01 78 39 – Project Record Documents:

1.2 PROJECT COORDINATION

A. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs. Provide coordination drawings as specified in paragraph 1.10.A herein.

D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finished elements.

3/20/2013
E. Submit a copy of site drawing and certificate signed by the Civil Engineer that the elevations and locations of the Work are in conformance with the Contract Documents.

F. Coordinate completion and cleanup of Work of separate Sections in preparation for Substantial Completion.

G. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner’s activities.

1.3 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within two days to Architect, Owner, participants, and those affected by decisions made.

C. Attendance Required: Job superintendent, major Subcontractors, suppliers, Architect, as appropriate to agenda topics for each meeting.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Special Project Procedures
   8. Maintenance of progress schedule.
   9. Corrective measures to regain projected schedules.
  10. Planned progress during succeeding work period.
  11. Coordination of projected progress.
  12. Maintenance of quality and work standards.
  13. Effect of proposed changes on progress schedule and coordination.
  14. Other business relating to Work.

1.4 PRE-INSTALLATION MEETINGS

A. When required in individual specification Section, convene a pre-installation meeting at work site prior to commencing work of the Section.

B. Require attendance of parties directly affecting, or affected by, work of the specific Section.

C. Notify Architect 7 working days in advance of meeting date.

D. Prepare agenda, preside at meeting, record minutes, and distribute copies within two days after meeting to participants, with two copies to Architect.

E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

3/20/2013
1.5 SCHEDULES

A. Submit preliminary progress schedule in accordance with Section 01330 coordinated with Project construction schedule.

B. After review, revise and resubmit schedule to comply with revised Project schedule.

C. During progress of Work, revise and resubmit with Applications for Payment.

1.6 SUBMITTALS

A. Submit preliminary shop drawings, product data and samples in accordance with Section 01 33 00 for review and compliance with Contract Documents, for field dimensions and clearances, for relation to available space, and for relation to work of separate contracts. Revise and resubmit as required.

B. Submit requests for interpretation of Contract Documents, and obtain instructions through Architect.

C. Process requests for substitutions, and change orders, through Architect.

D. Deliver closeout submittals for review and preliminary inspection reports, for transmittal to Architect.

1.7 COORDINATION DRAWINGS

A. General: Prepare coordination drawings where work performed by separate entities requires fabrication of products and materials which must interface where space provided is limited.

B. Prepare and provide coordination drawings of all building systems identifying information required for coordination of the space above ceilings prior to work proceeding in the field.
   1. Oversee preparation of coordination drawings, assign priority space and notify Architect of unresolved conflicts or interferences.
   2. Each subcontractor shall sign each drawing indicating agreement with what is shown, and intent to use the drawings to guide the work.

C. Drawings: Coordination drawings shall include but are not necessarily limited to the following:
   1. Provide at a minimum, a combined, comprehensive mechanical, plumbing and electrical systems coordination drawing(s).
   2. Include sizes of ductwork, mechanical pipe, plumbing, electrical, sprinkler systems, and ceiling systems overlaid on structural frame.
   3. Show seismic restraints where required on systems.

D. Obtain subcontractor approval signatures prior to submission to Architect.

1.8 WORKMANSHIP

A. Work shall be performed by craftsmen well experienced and competent in their particular trade.
B. Workmanship shall be thorough, finished and complete in every detail for finest quality installations as intended under these specifications.

1.9 INCIDENTAL COSTS

A. In addition to General Conditions Articles 4.1.5, Work in accordance with the Contract Documents, provide the following:
   1. Utilities: Refer to Section 01 50 00.
   2. Contractors and Subcontractors shall furnish at their own cost and expense all tools, consumable supplies, appliances, equipment, etc., necessary for execution of their work; and shall be responsible for care and guarding thereof.
   3. Contractors and Subcontractors shall be entirely responsible for professional, trade, business or other licenses required by state statute or local government.

1.10 CORRESPONDENCE AND NOTICES

A. Clearly identify correspondence, notices and submittals with project name, subject and detailed references to drawings and specifications.

B. Notify Architect five working days in advance of required inspection.

1.11 MISCELLANEOUS PROVISIONS

A. Contractor shall immediately refer to Architect any requirement shown or specified which Contractor finds or believes:
   1. Is not equal to industry standards for achieving a first quality installation as intended;
   2. Is excessive in cost or effort to effect the intended results;
   3. Is below standard for proper enforcement of the guarantees required;
   4. Or, is at variance with governing laws, regulations, codes or standards.

B. Work operations relative to any matter referred to Architect for consideration shall not proceed until receipt of appropriate instructions from Architect.

C. Inspection of Work and Materials: Prior to allowing sub-work to proceed, make a close and thorough inspection of all materials as delivered and all work in progress and promptly reject and return all defective materials. Reject defective work and replace as required by Contract Documents. Check and verify adequate performance or satisfactory results of all tests and inspections before allowing sub-work to proceed.

D. Guarantee Period: During guarantee periods, supervise investigation and correction of failures of deficiencies found or occurring in the work.

E. Shop Fabricate and pre-assemble interrelated parts where possible.

F. Closing up of walls, partitions or furred spaces, backfilling and other covering up operations shall not proceed until all enclosed or covered work and inspections have been completed. Verify before proceeding.

G. Provide holes, slots, cutouts, blocking, screeds, nailers, chases and similar preparation as the work progresses, as required to receive or pass subsequent work without damage to previously completed work.

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H. Exterior Work shall be made tight against direct or indirect entry of water into the concealed or interior spaces of the building. Seal joints or penetrations below grade or behind exterior trim and other conditions where water might enter the structure, as for exposed exterior work.

I. Structural Connections and Fasteners: Include as required for complete fabrication and installation of the work; of materials, types and sizes adequate for the purposes.
   1. Place in concealed or obscured locations where possible.
   2. Include suitable welding or brazing where required.

J. Powder Activated Fasteners: Limited to uses particularly shown, specified or approved by Architect. Operators shall be certified in accordance with California Industry Safety Orders.

K. Ferrous Work permanently exposed to exterior or below grade shall be galvanized; related accessory members and fastening non-ferrous, galvanized or made rustproof by approved methods.

L. Galvanizing, prime painting and related touch-up and repair shall comply with requirements for metal fabricating and painting in Section 09 91 00.

M. Isolation: Provide between ferrous and non-ferrous or dissimilar metal components to protect the work against electrolysis, as follows:
   1. For architectural work, provide cork fillers, asphaltic coatings, neoprene gaskets or similar separation as necessary; and use stainless steel fastenings only where interconnecting dissimilar parts.
   2. For mechanical and electrical work, provide dielectric unions or similar separation. In particular, provide isolation as necessary between exterior underground systems and interior above-grade systems where they meet dissimilar metals.

N. Prior to starting a particular type or kind of work, examine for relevant information, all contract documents and subsequent data issued to the project.

1.12 ALTERATION PROJECT PROCEDURES

A. Materials: As specified in Product Sections; match existing products and work for patching and extending work.

B. Employ skilled and experienced installer to perform alteration work.

C. Close openings in exterior surfaces to protect existing work from weather and extremes of temperatures and humidity.

D. Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring Products and finishes to original condition.

E. Refinish existing visible surfaces to remain in renovated rooms and spaces, to renewed condition for each material, with a neat transition to adjacent finishes.

F. Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
G. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to Architect for review.

H. Where a change of plane of 1/4" or more occurs, submit recommendation for providing a smooth transition to Architect for review.

I. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections,

J. Finish surfaces as specified in individual product sections.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Administrative and procedural requirements for submittals required for performance of the Work, including the following:
1. Submittal procedures.
2. Construction progress schedules.
3. Submittal schedule.
4. Proposed products list.
5. Product data.
7. Samples.
8. Architect’s Action.
9. Design data.
10. Test reports.
11. Certificates.
12. Manufacturer’s instructions.
13. Manufacturer’s field reports.
14. Coordination drawings.

B. Related Sections:
1. Section 01 31 00 – Project Management and Coordination.
2. Section 01 40 00 – Quality Requirements.
3. Section 01 63 00 – Product Substitution Procedures.
4. Section 01 77 00 – Closeout Procedures.
5. Section 01 78 39 – Project record Documents.

1.2 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delays.
1. Coordinate each submittal with fabrication, purchasing, testing, dimensions, catalog numbers, delivery, other submittals and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
3. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
4. Submit minimum of 5 hard copies, unless otherwise agreed upon in writing, of each submittal, or one electronic copy for distribution. If electronic submittals are submitted they must be well organized into a single pdf file per specification section with tables of contents with corresponding book marked sections tabs in the electronic file.

B. Transmit each submittal to Architect with acceptable transmittal form.
C. Submittal Preparation:
1. Prepare a separate cover sheet or title block for each submittal.
2. Identify Project, Contractor, subcontractor and supplier, manufacturer; pertinent drawing and detail number, and specification section number, appropriate to submittal.
3. Sequentially number each submittal. Preferably, use Section number as part of the Submittal number. Identification number shall appear on each item of a submittal. Mark revised submittals with original number and sequential alphabetic suffix, or approved alternative.
4. Provide applicable standards, such as ASTM numbers or Federal Specification references.
5. Provide a space approximately 4 by 5 inches on the cover sheet to record both the Contractor’s review and approval and the Architect/Engineer’s action.
6. When more than one submittal is being transmitted simultaneously, use a separate transmittal for each submittal item. NOTE: Identify the priority desired for the return of each submittal.
7. Identify any deviations or variations included in the submittal that deviates from the requirements of the Contract Documents in a separate letter and explain the reason therefore. Attach Request for Substitution Form when submitted product has not been specified in the Contract Documents.
8. Submittals involving Substitution Requests shall be delivered to the Architect at least 20 calendar days prior to the date required for fabrication or installation of the item.
9. Where color selections are involved, multiple submittals will be required to allow for coordination of colors.
10. Submittals shall include all information requested by each Specification Section; incomplete submittals will be returned with “No Action Taken”.

D. Apply Contractor’s Approval stamp, signed or initialed certifying that Contractor has reviewed, approved, verified products required, taken field dimensions, evaluated adjacent construction Work, and coordinated information in accordance with requirements of the Work and Contract Documents.

E. Allow 10 calendar days for initial review and action by Architect/Engineer of each submittal, excluding delivery time to and from Contractor.

F. When Submittal has been revised for resubmission, clearly identify changes made since previous submission.

G. After review, reproduce duplicate copies of reviewed submittals and for record documents purposes described in Section 01 78 39 and distribute to parties involved. Instruct parties to promptly report inability to comply with requirements.

H. Do not use submittals without an appropriate final stamp indicating action taken.

I. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial Bar-Chart construction schedule within 15 days after date established in Notice to Proceed for coordination with Owner’s requirements. After review, resubmit required revised data within 10 days.

B. Provide a Critical Path Method (CPM) Schedule within 30 days after date established in the Notice to Proceed, but no later than the first Application for payment.
1. The schedule shall show the sequence, duration in calendar days, the time of completion, and the activities required to complete the performance of the Work.
   a. Use same breakdown of units of the Work as indicated in the “Schedule of Values”.
   b. Secure time commitments for performing critical elements of the Work from parties involved.

2. The work activities making up the schedule shall be of sufficient detail to assure that adequate planning has been done for proper coordination and execution of the Work.
   c. Work activities shall provide an appropriate basis for monitoring and evaluating the progress of the Work.
   d. Work activities shall be identified by the section numbers in the Table of Contents of this Project Manual.

3. Illustrate order and interdependence of activities and sequence of Work; how start of given activity depends on completion of preceding activities, and how completion of each activity may restrain start of subsequent activities including critical path.

4. The schedule shall include a listing of each required submittal under the contract and when it is anticipated that each submittal will be submitted.

5. Provide a cost correlation line, indicating planned and actual costs. Show dollar volume of Work performed as of the dates used for preparation of payment requests.

C. Submit a revised and updated CPM Schedule, including any Change Orders, as a required exhibit with each Application for Payment.

D. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.

E. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

F. Submit computer generated network analysis diagram with each updated schedule.

G. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.

H. Indicate estimated percentage of completion for each item of Work at each submission.

I. Submit separate schedule of submittal dates for shop drawings, product data, and samples, including District furnished products and products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.

J. Indicate delivery dates for District furnished products and products identified under Allowances.

K. Revisions To Schedules:
   1. Revise schedule after each meeting, event or activity where revisions have been recognized or made.
2. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
3. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
4. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

1.4 SUBMITTAL SCHEDULE

A. Prepare a complete schedule of submittals.
   1. Submit the schedule within 10 days of the date required for the submittal of the computer generated Construction Progress Schedule.
   2. Coordinate Submittal Schedule with list of subconcats, Schedule of Values, list of products, and the Construction Progress Schedule.
   3. Prepare the following information in chronological order:
      a. Schedule date for the first submittal.
      b. Related Section number.
      c. Activity ID number from the Construction Progress Schedule.
      d. Scheduled date for purchasing and installation of each item.
      e. Submittal category (Shop Drawings, Product Data or Sample).
      f. Name of subcontractor or supplier.
      g. Scheduled date for resubmittal.
      h. Scheduled date for the Architect’s final release of approval.

B. Schedule of submittals shall indicate early submittals of long-lead time items and of items that require extensive review.

C. Distribution: Print and distribute copies of approved schedule to Architect, Owner, subcontractors, and other parties required to comply with submittal dates.

D. Updating: Revise Submittal Schedule after each meeting or activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each meeting.

1.5 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

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

C. Refer to Section 01 63 00 for requirements related to Substitutions.

1.6 PRODUCT DATA

A. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Submit number of copies Contractor requires, plus two (2) copies that Architect/Engineer will retain.

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C. Clearly mark each copy to identify applicable products, models, options, weights, clearances required, and other data. Supplement manufacturers’ standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, wiring diagrams, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute in accordance with Submittal Procedures article and for record documents described in Section 01 78 39.

1.7 SHOP DRAWINGS

A. Shop Drawings: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Submit project specific information drawn accurately to scale. Indicate deviations from Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of shop drawings.

C. Shop drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings.

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

E. Cross reference details to Contract Documents using the same designations or identifiers as on Drawings.

F. Submit in form of one reproducible transparency or one opaque reproduction.

G. Review submittal and verify the following prior to submission:
   1. Field measurements and dimensions.
   2. Field construction criteria.
   3. Identification of materials by catalogue numbers and similar data.
   4. Conformance with specification requirements.
   5. Notation of coordination requirements with adjacent materials or systems.
   6. Completeness of submittal.

1.8 SAMPLES

A. Samples: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Samples For Selection as Specified in Product Sections:
   1. Submit to Architect/Engineer for aesthetic, color, or finish selection.
   2. Submit samples of finishes from full range of manufacturers' standard colors, [in custom colors selected, textures, and patterns for Architect/Engineer selection.
   3. Where variation in color, pattern, texture or other characteristic is inherent in the material or product represented, submit at least 3 multiple units that approximate limits of the variations.
   4. Mount or display samples in a manner to facilitate review of qualities indicated. Include the following:
a. Project name.
b. Specification Section number and reference.
c. Generic description of sample.
d. Manufacturer’s name, product name and model number.
e. Compliance with recognized or specified standards.
f. Availability and delivery time.

C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing of adjacent work.

D. Submit number of samples specified in individual specification sections; Architect/Engineer will retain one sample.

E. Maintain sets of approved samples at the Project Site for quality comparisons throughout the construction phase.

F. Reviewed mock-ups which may be used in the Work are indicated in individual specification sections.

1.9 ARCHITECT’S ACTION

A. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return in a timely manner.

B. The Architect will review and stamp each submittal appropriately to indicate the action taken as follows:
   1. Mark the original or transparencies with required revisions.
   2. Stamp the original or transparencies and indicate, “No Exception Taken,” “Make Corrections Noted: Do Not Resubmit,” “Revise and Resubmit,” Revise and Resubmit Specific Item Only,” “Rejected: Do Not Resubmit,” and return submittal.
   3. The responses “Revise and Resubmit,” “Revise and Resubmit Specific Item Only,” or “Rejected: Do Not Resubmit,” shall not be construed as a valid reason for a request of an extension of time.

C. Review the returned submittal and take appropriate action as indicated.
   1. If the original or transparencies are marked “Revise and Resubmit,” or “Revise and Resubmit Specific Item Only,” make corrections and indicate them clearly with a “cloud”, then stamp and date, and resubmit in the same manner and number as the original submittal.
   2. If the original or transparencies are marked “Rejected: Do Not Resubmit,” make a new submittal and submit in the same manner and number as the original submittal.
   3. If the original or transparencies are marked “No Exception Taken,” or “Make Corrections Noted: Do Not Resubmit,” print and distribute copies as required to those parties involved.

D. Where a submittal is for information or record purposes or special processing or other activity, the Architect will return the submittal “No Action Required.” Unsolicited submittals will be returned to sender without action.

E. Resubmittals:

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1. The Architect or his consultants, or the Owner’s consultants, as applicable, may review at their discretion up to one Resubmittal and take action, as appropriate, in the same manner as for the original submittal.

2. If more than one Resubmittal is required, any associated costs as a result of additional reviews shall be an extra service of the Architect, or his consultants, and will be processed as a deductive Change Order in accordance with the Contract Document procedures.

F. Review resubmittals and take appropriate action as indicated with original submittal. Resubmit and revise until final action is obtained by Architect or his consultants, or Owner’s consultants.

1.10 DESIGN DATA

A. Where Work of this Contract requires structural design, the following submission requirements apply:
   1. Submit shop drawings, including detailed sectional drawing of each system, and calculations for preliminary review.
   2. Submit to Building Authority the required number of sets of Architect/Engineer reviewed shop drawings and calculations for plan review and approval. All submittals to the Building Authority shall be stamped by an engineer registered in the state where the project occurs.

B. Submit copy of documents approved by Building Authority for Architect/Engineer's knowledge as contract administrator or for Owner.

C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.11 TEST REPORTS

A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.12 CERTIFICATES

A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.13 MANUFACTURER’S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, to Architect/Engineer for delivery to Owner in quantities specified for Product Data.
B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.14 MANUFACTURER’S FIELD REPORTS

A. Submit reports for Architect/Engineer’s benefit as contract administrator or for Owner.

B. Submit report in duplicate within 30 days of observation to Architect/Engineer for information.

C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.15 COORDINATION DRAWINGS

A. Submit drawings for Architect/Engineer’s benefit as contract administrator or for Owner.

B. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.

C. Coordination drawings shall include the following:
   1. An enlarged combined, comprehensive mechanical and electrical systems drawing coordinated with structural framework drawings.
   2. Include ductwork, mechanical pipe, plumbing, electrical, sprinkler systems, and ceiling systems overlaid on structural frame.
   3. Criteria:
      a. Size ductwork, mechanical pipe, plumbing, electrical, and sprinkler system components as indicated on Contract Documents.
      b. Indicate size and elevation of structural members.
      c. Show seismic restraints where required for systems.

D. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

E. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner.

1.16 CONSTRUCTION PHOTOGRAPHS

A. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, acceptable to Architect/Engineer.

B. Each month: Submit 2 prints; color, matte; 8 x 10 inch size; mounted on 8-1/2 x 11 inch soft card stock, with left edge binding margin for three hole punch.

C. Take 5 interior photographs of on-going construction indicating relative progress of the Work, 5 days maximum prior to submitting. Each month take one exterior photograph of the project from the same point, or position.

D. Identify each print on the back. Identify name of Project, contract number, phase, area of view, date and time of view, name and address of photographer, and photographer’s numbered identification of exposure.
E. Deliver negatives to Owner with project record documents. Catalog and index negatives in chronological sequence; include typed table of contents.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Quality control and control of installation.
2. Tolerances.
3. References.
4. Mock-up requirements.
5. Testing and inspection services.
6. Manufacturers' field services.
7. Examination.
8. Preparation.

B. Related Sections:
1. Section 01 30 00 - Submittals: Submission of manufacturers' instructions and certificates.
2. Section 01 60 00 - Material and Equipment: Requirements for material and product quality.

C. Sections requiring Laboratory Testing:
1. Section 06 10 00 - Rough Carpentry.
2. Section 11 53 13 - Laboratory Fume Hoods

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers’ instructions, including each step in sequence.

C. When manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 TESTING AND INSPECTION SERVICES

A. Owner will employ and pay for specified services of an independent firm to perform testing and inspection. Testing agency shall be in compliance with ASTM E329 criteria.

B. The independent firm will perform tests, inspections and other services specified in individual specification sections and as required by Architect.
   1. Laboratory: Authorized to operate at Project location.
   2. Laboratory Staff: Maintain full time registered Engineer, or specialist on staff to review services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

C. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect/Engineer or Owner.

D. Reports will be submitted by independent firm to Architect, Engineer, Owner, and Contractor, in indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
   1. Notify Architect and independent firm 48 hours prior to expected time for operations requiring services.
2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

F. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

G. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect/Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

H. Agency Responsibilities:
   1. Test samples of mixes submitted by Contractor.
   3. Perform specified sampling and testing of products in accordance with specified standards.
   4. Ascertained compliance of materials and mixes with requirements of Contract Documents.
   5. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.
   6. Perform additional tests required by Architect/Engineer.
   7. Attend pre-construction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit two copies of report to Architect, Engineer, Owner, and to Contractor. When requested by Architect, provide interpretation of test results. Include the following:
   1. Date issued.
   2. Project title and number.
   3. Name of inspector.
   4. Date and time of sampling or inspection.
   5. Identification of product and specifications section.
   6. Location in Project.
   7. Type of inspection or test.
   8. Date of test.
   9. Results of tests.

J. Limits On Testing Authority:
   1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency or laboratory may not approve or accept any portion of the Work.
   3. Agency or laboratory may not assume duties of Contractor.
   4. Agency or laboratory has no authority to stop the Work.

1.6 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.
B. Submit qualifications of observer to Architect 30 days in advance of required observations. Observer subject to approval of Architect.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers’ written instructions.

D. Refer to Section 01 33 00 – Submittal Procedures, Manufacturers’ Field Reports.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION
SECTION 01 41 00

REGULATORY REQUIREMENTS AND REFERENCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. This Section sets forth certain codes and standards and relevant requirements applicable to the work required under this contract.

B. Related Sections:
   1. General Conditions of the Contract.
   2. Specific sections of the specifications.

1.2 STATUTORY AND JURISDICTIONAL REGULATIONS

A. State of California Code of Regulations (C.C.R.) and Amendments:
   2. Title 24 C.C.R., Part 2, Volume #1 and #2, 2010 CBC; 2009 IBC w/2010 California Amendments.
   10. Title 19 C.C.R.; Public Safety, State Fire Marshal Regulations.
   12. A copy of Parts 1 & 2, Title 24 shall be kept on the job at all times.

B. Standards and Guides:
   1. National Fire Protection Association (NFPA) Bulletins:
   5. Regulations and Standards of the local utility companies or districts serving the project, when applicable.
   6. Regulations of the California Regional Water Quality Control Board.
C. Construction Safety:
   1. Statutory and jurisdictional requirements as applicable to temporary work, including California Construction Safety Orders.

1.3 GENERAL STANDARDS FOR WORK AND MATERIALS

A. Trade Standards:
   1. Work or materials specified by reference to a number, symbol or title of a specific standard, such as ASTM, U.L., F.S., or other standards, shall comply with requirements thereof, except as limited to type, class, grade or modification shown or specified.
   2. Referenced standards shall have full force and effect as though printed herein and are not repeated for reason that manufacturers and contractors are assumed to be familiar with requirements governing or applicable to their work. Upon request, Architect will furnish information as to where copies may be obtained.
   3. Material or trade associations, societies, or other bodies regularly publishing standards most widely used under these documents are listed herein together with reference symbols.
   4. Individual standards are referred to under Technical Sections by reference symbol followed by designation number.

B. Publication Dates: Comply with the standards in effect on the date of approval of the Contract Documents by the governing agency.

Reference
Symbol  Association Name or Title

A.A.  Aluminum Association
AAMA  American Architectural Manufacturer’s Association
AASHTO  American Association of State Highway and Transportation Officials
ACI  American Concrete Institute
ADA  Americans with Disabilities Act
AISC  American Institute for Steel Construction
ANSI  American National Standards Institute
APA  American Plywood Association
ASHRAE  American Society of Heating, Refrigration & Air Conditioning Engineers
ASME  American Society of Mechanical Engineers
ASTM  American Society for Testing and Materials
AWPA  American Wood Preserver’s Association
AWS  American Welding Society
AWWA  American Water Works Association
CBC  California Building Code
CS  Commercial Standards, U.S. Department of Commerce
DHI  Door Hardware Institute
DIN  Deutsche (German) Industry Norm
FM  Factory Mutual Systems
F.S.  Federal Specifications
FSC  Forest Stewardship Council
GA  Gypsum Association
C. Books of Standards:
1. State of California, Business and Transportation Agency, Department of Transportation.
   b. CALIFORNIA TEST METHOD: Methods and Research Dept., Materials Manual, 2008; specific tests referred to by California number.
3. U.L. Underwriters’ Laboratories, Inc.; Building Materials List, 2010; and others regularly published; specific parts referred to by U.L. Classification Title and number.

1.5 FIRE RATED WORK OR MATERIAL

A. Applicable to materials, construction or fabrication specified or required to have limited fire hazard characteristics.

B. Materials or assemblies shall be tested and classified per applicable ASTM Test Methods; or comparable scientific testing establishing like valuations, under sponsorship of manufacturer and conducted by U.L. or other established testing agency regularly performing tests of the type required.
1. Testing standards, methods and procedures shall be subject to approval by Architect.
2. Flame spread of materials used, when installed under the conditions shown or specified, shall not exceed characteristic values specified.
3. Compliance shall be substantiated by written certificate, labeling or both as specified.

C. Wood: Refer to Division 6, Section 06 10 00 - Rough Carpentry.

D. Electrical: Refer to Division 26 - Electrical.

E. ASTM Tests not otherwise identified shall be listed under ASTM publication titled 2010 Annual Book of ASTM Standards, Section 00.01 under section of Subject Index, and under subject headings Fire Tests, and Flammability Tests.

1.6 MANUFACTURER’S STANDARDS

A. Applicable to type of items and products.

B. Instructions not otherwise shown or specified shall be those of producer, as applicable, covering:
   1. Publications of producers shall apply as particularly referred to; otherwise as regularly provided by producer; and shall include covering generalized installation publications or instructions.

1.7 CONFLICTS

A. Unless otherwise specified, specific references to codes, regulations, standards, manufacturers’ instructions, or requirements of regulatory agencies, when used to specify requirements for materials or design elements, shall mean the edition of each in effect as identified in the Contract Documents.

B. If a conflict exists between referenced regulatory requirements, or the Contract Documents, comply with the one establishing more stringent requirements, unless otherwise directed by the Architect.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION
SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   2. Temporary Utilities:
      a. Temporary electricity.
      b. Temporary lighting for construction purposes.
      c. Temporary heating.
      d. Temporary ventilation.
      e. Telephone and facsimile service.
      f. Temporary water service.
      g. Temporary sanitary facilities.
      h. Temporary Fire Protection.
   3. Construction Facilities:
      a. Field offices and sheds.
      b. Parking and traffic control.
      c. Progress cleaning and waste removal.
   4. Temporary Controls:
      a. Barriers.
      b. Enclosures and fencing.
      c. Protection of the Work.
      e. Dust control.
      f. Noise control.
      g. Pollution control.
   5. Removal of temporary utilities, facilities, and controls.

B. Related Sections:
   1. Section 01 10 00 – Summary of Work.
   2. Section 01 31 00 – Project Management and Coordination.
   3. Section 01 41 00 – Regulatory Requirements and References.
   4. Section 01 74 00 – Cleaning.

1.2 QUALITY ASSURANCE

A. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction at the time the Contract was awarded, including but not limited to Statutory and Jurisdictional Regulations specified in Section 01 41 00.

B. Comply with local, State and Federal environmental regulations.

D. Comply with NEMA, NECA and UL standards and regulations for temporary electric service.

E. Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

F. Use qualified personnel for installation of temporary facilities. Relocate and modify facilities as required to maintain access to building by District.

G. Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner.

H. Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

1.3 TEMPORARY ELECTRICITY

A. Complement existing power service capacity and characteristics as required for construction operations.

B. Provide power outlets, with branch wiring and distribution boxes located at each area as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.

C. Provide main service disconnect and over-current protection at convenient location feeder switch at source distribution equipment.

D. Permanent convenience receptacles may be utilized during construction.

E. Provide distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
   1. Provide 20 ampere duplex outlets, single phase circuits for power tools for every 1,000 sq. ft. of active work area.
   2. Provide 20 ampere, single phase branch circuits for lighting.

1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain lighting for construction operations to achieve minimum lighting level of 2 watts/sq. ft.

B. Provide and maintain 1 watt/sq. ft. lighting to exterior staging and storage areas.

C. Provide and maintain 0.25 watt/sq. ft. HID lighting to interior work areas after dark for security purposes.

D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.

E. Maintain lighting and provide routine repairs.

F. Permanent building lighting may be utilized during construction.
1.5 TEMPORARY HEATING
   A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
   B. Prior to operation of permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
   C. Maintain minimum ambient temperature of 50 degrees F. in areas where construction is in progress, unless indicated otherwise in product sections.

1.6 TEMPORARY VENTILATION
   A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases. Maintain minimum ambient temperature of 50 degrees F. in areas where construction is in progress, to protect materials and finishes from damage due to temperature and humidity, unless indicated otherwise in specifications.

1.7 TELEPHONE AND FACSIMILE SERVICE
   A. Provide, maintain, and pay for telephone service to field office at time of project mobilization.
   B. At each telephone, post a list of important telephone numbers.
   C. Provide, maintain and pay for facsimile service and dedicated telephone line to field office at time of project mobilization.

1.8 TEMPORARY WATER SERVICE
   A. Connect to existing water source for temporary water source.
   B. District will pay cost of temporary water. Exercise measures to conserve energy. Utilize District's existing water system, extend and supplement with temporary devices as needed to maintain specified conditions for construction operations.
   C. Extend branch piping with outlets located so water is available by hoses with threaded connections.

1.9 TEMPORARY SANITARY FACILITIES
   A. Provide and maintain required facilities and enclosures. Provide facilities at time of project mobilization.
   B. Comply with applicable laws and regulations.
   C. Use of existing facilities is not permitted.
1.10 TEMPORARY FIRE PROTECTION

A. During construction provide fire protection as required by California Fire Code (CFC) Article 87 and Section 8704 as enforced by local Chief (Fire Marshal).

B. Provide and maintain hand-carried, portable UL-listed, Class “A” fire extinguishers for temporary offices and similar spaces.

C. Develop and supervise an overall fire prevention and fire protection program.

D. Store combustible materials in fire-safe locations and containers.

1.11 FIELD OFFICES AND SHEDS

A. Office: Weather tight, with lighting, electrical outlets, heating, and ventilating equipment, and equipped with sturdy furniture drawing rack, and drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate eight (8) persons.

C. Locate offices and sheds in location as directed in mobilization meeting.

D. Do not use permanent facilities for field offices or for storage.

E. Construction: Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations with steps and landings at entrance doors.
   1. Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of Work; remove when no longer needed.
   2. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
   4. Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floors and bases.
   5. Lighting for Offices: 50 ft C at desk top height, exterior lighting at entrance doors.
   6. Fire Extinguishers: Appropriate type fire extinguisher at each office and each storage area.
   7. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

F. Environmental Control:
   1. Heating and Ventilating for Offices: Automatic equipment to maintain comfort conditions 68 degrees F heating.
   2. Storage Spaces: Heating and ventilation as needed to maintain products in accordance with Contract Documents; lighting for maintenance and inspection of products.

G. Storage Areas And Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01 60 00 – Product Requirements.

H. Maintenance And Cleaning:

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1. Weekly janitorial services for offices; periodic cleaning and maintenance for office and storage areas.
2. Maintain approach walks free of mud, water, and snow.

I. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore site to conform with adjacent areas.

1.12 PARKING AND TRAFFIC CONTROL

A. Provide and maintain access to fire hydrants and control valves free of obstructions.
B. Use designated existing on-site roads for construction traffic.
C. Use of designated existing driveways for construction traffic is permitted. Tracked vehicles not allowed on paved areas.
D. Use of designated areas of existing parking facilities by construction personnel is permitted.
E. Locate as approved by Owner.
F. Do not allow heavy vehicles or construction equipment in parking areas.
G. Maintenance:
   1. Maintain traffic and parking areas in sound condition free of construction material, construction equipment, products, mud, snow, and ice.
   2. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

1.14 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.
C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
D. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.
E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.15 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for District's use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for public access to existing building.

C. Provide protection for plants designated to remain. Replace damaged plants.

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

1.16 ENCLOSURES AND FENCING

A. Construction: Contractor's option, commercial grade chain link fence, painted.

B. Provide 6 feet high fence around construction site; equip with vehicular and pedestrian gates with locks.

C. Exterior Enclosures:
   1. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons.
   2. Provide access doors with self-closing hardware and locks.

1.17 PROTECTION OF THE WORK

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

1.18 SECURITY

A. Security Program:
   1. Protect existing premises and District's operations from theft, vandalism, and unauthorized entry.
   2. Initiate program in coordination with District's existing security system at project mobilization.
   3. Maintain program throughout construction period until District occupancy.

1.19 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.
1.20 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise from and noise produced by construction operations.

1.21 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.22 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 – PRODUCTS

A. Lumber Products: Comply with requirements of Section 06100 – Rough Carpentry and Section 06 20 00 – Finish Carpentry as applicable.

B. Adhesives: Do not use adhesives containing urea formaldehyde.

PART 3 – EXECUTION

Not Used.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Products.
   2. Transportation and handling.
   3. Storage and protection.
   4. Product Selection.
   5. Equipment: Electrical Characteristics and Components.
   6. Installation of Products.

B. Related Sections:
   1. Section 01 40 00 – Quality Controls: Product quality monitoring.
   2. Section 01 63 00 - Product Substitution Procedures.

1.2 PRODUCTS

A. Products: Means purchased items, products, material, machinery, components, equipment, fixtures and systems incorporation into the Work. It does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work.

B. Specific products, materials, equipment, fixtures, accessories, manufacturers and proprietary items mentioned by name, grade, or brand, in Specifications or on Drawings have been selected for their particular fitness, availability, and desirability for use appropriate to Work of this Project and are intended to establish the standard of quality.

C. Provide interchangeable components of the same manufacture for components being replaced.

D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

E. Do not use materials or products containing asbestos or other carcinogens.

1.3 TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer's instructions, using means and methods that will prevent damage, deterioration and loss, including theft.

B. All products and equipment shall be suitably packaged to facilitate handling and to protect against damage during transit and storage.

C. Prior to shipping each item of equipment shall be tagged or marked as identified on the shop drawings.
D. All products, materials and equipment shall be shipped to the Contractor's place of business or directly to the job site. The District will not accept delivery of any item for the Contractor or subcontractors.

E. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

F. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

G. Deliver products in manufacturer's sealed container or other packing system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

1.4 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible in a manner that will facilitate inspection and measurement of quantity or counting of units.

C. Provide all necessary labor and equipment required for the loading or unloading of products, materials and equipment.

D. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.

C. Store sensitive Products in weather tight, climate controlled, enclosures in an environment favorable to Product.

D. For exterior storage of fabricated Products, place on sloped supports above ground.

E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

F. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

J. Without limiting the foregoing the Contractor, his subcontractors and material suppliers shall bear the responsibility for timely delivery of materials and equipment, spare parts, special tools, and installation instructions to the Site.
1.5 PRODUCT SELECTION

A. Products Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous project experience.

B. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.
   1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

C. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.
   1. Contractor to provide submittal including all product data, shop drawings and certificates listed in the specification section and list the manufacturer(s) and specific model(s) proposed for use that meets or exceeds the referenced standards or description.

D. Products Specified by Naming One or More Manufacturers and stating “or equal”:
   1. Contractor to provide submittal including all product data, shop drawings and certificates listed in the specification section and list the manufacturer(s) and specific model(s) proposed that is one of the listed manufacturers. Or, if not one of the listed manufacturers, also include a completed and signed Substitution Request Form in Section 01 63 00.

E. Products specified by Naming One Manufacturer and stating “No Substitutions Allowed”:
   1. Contractor to provide submittal on the specified product. No substitutions will be permitted due to coordination with District standard assemblies and/or maintenance and operation requirements currently in use.

F. Products specified by Naming One Manufacturer, material or product:
   1. Is a unique or novel product application, is used as a standard of quality or is the only brand or trade name known to the Architect.
   2. Contractor to provide submittal including all product data, shop drawings and certificates listed in the specification section and list the manufacturer(s) and specific model(s) proposed that is one of the listed manufacturers. Or, if not one of the listed manufacturers, also include a completed and signed Substitution Request Form in Section 01 63 00.

G. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified. Submit documentation indicating compliance.

H. Visual Matching: Where matching of existing material is required, final judgment of whether a proposed product matches satisfactorily is Architect’s judgment.
1.6 EQUIPMENT: ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

B. Cord and Plug: Furnish minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 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 in accordance with seismic requirements of Title 24, CBC, and accurately located and aligned with other Work.

B. Clean exposed surfaces and protect as necessary to prevent damage and deterioration at time of Substantial Completion.
SECTION 01 63 00
PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Procedural Requirements
   2. Definitions
   3. Substitution Submittals
   4. Substitutions
   5. Architect's Duties

B. Related Documents:
   1. Section 01 40 00 - Quality Controls: Product quality monitoring.
   2. Section 01 60 00 – Product Requirements.

1.2 PROCEDURAL REQUIREMENTS

A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

B. Owner, and the Architect, will consider substitution requests only when specified products become unavailable due to no fault of the Contractor; or the Contractor proposes an alternate solution that benefits the project and complies with the design intent.

C. Procedural requirements governing the Contractor's selection of products and product options are included under Section 01 60 00 - Product Requirements.

D. Reference to any equipment, material, article or system or patented process, by trade, catalog number, name brand product or product manufacturer is for information only and shall not be construed as limiting competition.

E. In those cases where the Specifications designates a material, product, or service by specific brand or trade name and there is only one brand or trade name listed, the item involved is:
   1. Required to be used since it is a unique or novel product application, or
   2. Used as a standard of quality which must be satisfied without compromise, or
   3. Required for providing standard items designed to match existing items in use on this particular public improvement as determined by the Governing Board of the Owner.

E. Document each request to provide material other than specifically identified in specification section on Substitution Request Form with complete data.
1.3 DEFINITIONS

A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.

B. Products: Means new material, machinery, components, equipment, fixtures; and systems incorporated in the Work. Does not include temporary equipment and machinery used for preparation, fabrication, conveying and erection of the Work.

C. Products Specified by Naming One or More Manufacturers followed by the words, “or equal”, “or equivalent”, or “approved equal”: Submit a Request for Substitution for any manufacturer not named in accordance with the following articles, 1.4 and 1.5.

D. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for “substitutions.” The following are not considered substitutions:

1. Revisions to Contract Documents requested by the Owner.

2. Specified options of products and construction methods included in Contract Documents.

3. The Contractor’s determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBSTITUTION SUBMITTALS

A. Substitution Request Submittal: Requests for Substitution will be considered if received within 35 working days of the date established for commencement in the Notice to Proceed. Requests received beyond that date will be rejected.

1. Submit 6 copies of each request for substitution for consideration.

2. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate using the enclosed Request for Substitution Form:
   a. Product Data or manufacturer’s literature, including Drawings and descriptions of products, fabrication and installation procedures.
   b. Samples, where applicable or requested.
   c. A detailed comparison of significant qualities of the proposed Substitution with those of the Work specified. Significant qualities may include, but not be limited to, elements such as size, weight, durability, performance, visual effect, warranty, and the like.
   d. A statement indicating the substitution’s effect on the Contractor’s Construction Schedule compared to the schedule without approval of the Substitution. Indicate the effect of the proposed substitution on overall Contract Time.
   e. For construction methods: Provide detailed description of proposed method and drawings illustrating methods.
f. Name and address of similar projects on which product has been used, and dates of installation.
g. Name, address, and telephone number of manufacturer's representative or sales engineer.
h. Cost information, including a proposal of the net change, if any in the Contract Sum.

B. A request constitutes a representation that the Contractor:

1. Has investigated proposed Product and determined that it meets or exceeds in all respects the quality level of the specified Product.
2. That the item proposed as a Substitution affords comparable ease of operation, maintenance, and service.
3. Maintenance and service parts are locally available for the proposed Substitution.
4. Will provide the same warranty for the Substitution as for the specified Product.
5. Will coordinate installation and make changes that may be required for the Work to be complete in all respects with no additional cost to the Owner.
6. Waives claims for additional costs or time extension that may subsequently become apparent because of the failure of the Substitution to perform adequately.
7. Will reimburse Owner and Architect for review, or redesign services, and time associated with re-approval by authorities.
8. Will be responsible for Construction Schedule delay due to late ordering of substituted item and/or related items, materials and products.

C. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals without separate written request.

1.5 SUBSTITUTIONS

A. Conditions: The Contractor's substitution request will be received and considered by the Owner when one or more of the following conditions are satisfied, as determined by the Architect, otherwise requests will be returned without action except to record noncompliance with these requirements.

1. Revisions to Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of Contract Documents.
3. The request is timely, fully documented and properly submitted.
4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
5. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method
cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.

6. The specified product or method of construction cannot receive necessary approval by a governing authority, but the requested Substitution can receive the governing authority's approval.

7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that there is an incompatibility and that the Substitution will overcome the incompatibility.

8. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that there is a coordination incompatibility and that the proposed substitution can be coordinated.

9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed Substitution provides the required warranty.

B. The Contractor's submittal and Architect's review of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or a valid request for substitution. Such work will be rejected.

C. If a decision on the use of a proposed substitute cannot be made or obtained within the scheduled time allocated, use the product specified by name.

D. Limit each request to one proposed Substitution.

E. The burden of proof is on the proposer.

F. Acceptance of a substitution will be in the form of a Change Order.

1.6 ARCHITECT’S DUTIES

A. Review requests for substitutions with reasonable promptness.

B. Provide written decision regarding acceptance or rejection of proposed substitution.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

Request for Substitution Form follows on next page.

END OF SECTION

1/3/2013
REQUEST FOR SUBSTITUTION

A completed reproduction of this form shall accompany all requests for Substitutions. Substituted items or systems may be incorporated into the Work only after receipt of Architect’s written approval. Fill in all applicable spaces and cross out all non-applicable information bracketed [ ] or unbracketed.

[Subcontractor:] [Material Supplier:] [Manufacturer:]  Date: __________________

Requested Substitution: _________________________________________________________________
Reference: Specification Section: _______________  Drawing Reference: _________________________
Reason for Substitution: _________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

A. Resulting Change to Contract Amount:   [Add]  [Deduct}                                $ ________________

For substitutions made after construction commences the Architect will, upon receipt of Request for Substitution, fill in the following compensation information, add it to, or deduct it from, the Change Amount and submit Net Change to Contract Amount to Owner for approval.

B. Architect’s Fee for Substitution Evaluation:                                                     $ ________________

C. Architect’s Fee for Changes to Contract Documents
Due to Substitution:                                                                                          $ ________________

Net Change to Contract Amount  (A + B + C):   [Add] [Deduct}                                    $ ________________

Summary of related Work requiring coordination (if any): _______________________________________
____________________________________________________________________________________
____________________________________________________________________________________

Contractor agrees to assume responsibility for complete coordination with Work of all trades involved if Substitution Request is approved.

The following is attached to provide complete documentation of requested substitution:

1. Product Identification: ____________________________________________________________
2. Product Data: __________________________________________________________________
3. Samples: ______________________________________________________________________
4. Shop Drawings: _________________________________________________________________
5. Test Reports: __________________________________________________________________
6. Name, Phone No. and Address of similar projects: _____________________________________
7. Other: ________________________________________________________________________

Contractor’s Signature     [Subcontractor’s] [Supplier’s] [Manufacturer’s}  
                          Signature

1/3/2013
SECTION 01 72 00
PREPARATION AND EXECUTION

PART 1  GENERAL

1.1  SUMMARY

A.  Section Includes:
1.  Examination.
2.  Cutting and Patching.
3.  Protection of Adjacent Construction.
4.  Damage and Restorations.

B.  Related Sections
1.  Conditions of the Contract: Fiscal provisions, legal submittals and additional administrative requirements.
2.  Section 01 10 00 - Summary of Work.
3.  Section 01 31 00 - Project Management and Coordination.
4.  Section 01 33 00 - Submittal Procedures.
5.  Section 01 40 00 - Quality Control.
6.  Section 01 60 00 - Product Requirements.
7.  Division 23 - Basic Mechanical Requirements.
8.  Division 26 - Basic Electrical Requirements.

1.2  EXAMINATION

A.  Preparation of Substrate: Installer must examine the surface of the substrate, and/or moisture content of the substrate, and the conditions under which the Work is to be performed.

B.  Review areas for required installation tolerances, potential interference or conflict, and coordinate layout and support provisions for interfacing work.

C.  Verify that environmental conditions are appropriate and conducive for installation of Work.

D.  Notify the Contractor in writing of unsatisfactory or adverse conditions detrimental to the proper and timely completion of the Work.

E.  Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

F.  Clean the substrate of substances detrimental to the Work.

1.3  CUTTING AND PATCHING

A.  Refer to Section 01 33 00 – Submittal Procedures, for additional requirements.

B.  Employ skilled and experienced installer to perform cutting and patching.
C. Submit written request in advance of cutting or altering elements affecting:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   5. Work of District or separate contractor.

D. Written request of proposed Work is to include description of:
   1. The scope of cutting, patching, or alteration.
   2. The trades that will execute the Work.
   3. The proposed dates when cutting and patching is to be performed.
   4. Product(s) proposed to be used.
   5. Utilities that will be disrupted and the length of time of the disruption.
   6. Alternatives to cutting, patching or alteration.

E. Product Data: Submit manufacturer’s technical product data substantiating that proposed products comply with requirements of the Contract Documents.

F. Execute cutting, fitting, and patching, including excavation and fill, to complete Work, and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and non-conforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide shoring, bracing and other support as necessary to assure the structural safety of any portion of the Work that is to be cut.
   6. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

G. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.

H. Cut masonry and concrete materials using masonry saw or core drill.

I. Restore Work with new products in accordance with requirements of Contract Documents.

J. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

K. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

L. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00 - Firestopping, to full thickness of penetrated element.

M. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

N. Identify hazardous substances or conditions exposed during the Work to District for decision or remedy.

1.3 PROTECTION OF ADJACENT CONSTRUCTION
A. Protect installed Work and provide special protection where specified in individual Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at wall, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing manufacturer.

F. Prohibit traffic from landscaped areas.

1.3 DAMAGE AND RESTORATIONS

A. Damage to previously existing or newly placed facilities caused by movement of equipment or other operations, whether accidental or made necessary by reason of Contract requirements, shall be restored or replaced as specified or directed by Architect.

B. Restoration shall be equal to the structural qualities or performance capacities of the original work.
   1. Finishes shall match the appearance of, as nearly as possible, like existing adjacent work.
   2. Restorations shall be subject to approval by Architect and shall be made as necessary at no added expense to District unless otherwise particularly provided for.

C. Work not properly restored or where not capable of being restored as intended under these Specifications shall be removed and replaced as directed by Architect at no added expense to District.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION
1.2 SITE MAINTENANCE
A. Clean site; sweep paved areas, rake clean landscaped surfaces.
B. Remove waste and surplus materials, rubbish, and construction facilities from the site.
C. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
D. At reasonable intervals during progress of Work clean site and public properties, and legally dispose of waste materials, debris and rubbish.

1.3 PROGRESS CLEANING
A. Maintain premises and public properties free from accumulations of waste, debris, and rubbish, caused by construction operations.
B. Maintain project in accordance with applicable safety and insurance standards.
C. Provide on-site containers for collection of waste materials, debris and rubbish.
D. Remove waste materials, debris and rubbish from site and legally dispose of at dumping areas off District’s property.
E. Vacuum clean interior of building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for Substantial Completion or occupancy.
1.4 FINAL CLEANING

A. Execute final cleaning prior to final inspection, as required by General Conditions.

B. Employ experienced workers, professional cleaners, for final cleaning.

C. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

D. Clean interior and exterior glass and all surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces; leave project clean and ready for occupancy.

E. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.

F. Clean equipment and fixtures to a sanitary condition.

G. Replace filters of operating equipment.

H. Clean debris from roofs, gutters, downspouts, and drainage systems.

I. Maintain cleaning until project, or portion thereof, is occupied by District.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION
SECTION 01 75 00
STARTING AND ADJUSTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Starting of systems.
   2. Demonstration and instructions.
   3. Adjusting.
   4. Acceptance testing and commissioning.

B. Related Sections:
   1. Conditions of the contract: Fiscal provisions, legal submittals and additional administrative requirements.
   2. Section 01 10 00 - Summary of Work.
   3. Section 01 31 00 - Project Management and Coordination.
   4. Section 01 33 00 – Submittal Procedures.
   5. Division 23 - Basic Mechanical Requirements.
   6. Division 26 - Basic Electrical Materials and Methods.

1.2 STARTING OF SYSTEMS

A. Check, adjust, lubricate and verify control sequence of each piece of operating equipment to ensure smooth and unhindered operation.

B. Coordinate schedule of start-up of various equipment and systems. Notify Architect and District 7 days prior to start-up of each item.

C. Execute start-up under supervision of applicable manufacturer’s representative.

D. Test and balance HVAC system prior to instructing District’s personnel.

E. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

F. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

G. Verify wiring and support components for equipment are complete and tested.

H. Execute start-up under supervision of applicable manufacturer’s representative in accordance with manufacturers’ instructions.

I. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

1/3/2013
J. Submit a written report in accordance with Section 01330 that equipment or system has been properly installed and is functioning correctly.

1.3 DEMONSTRATION AND INSTRUCTIONS

A. Provide the services of Contractor’s or manufacturer’s qualified engineers or staff to train District’s operation and maintenance personnel in the operation, adjustment and maintenance of all mechanical and electrical products and systems.

B. Use the Operating and Maintenance Manuals prepared by the Contractor, the manufacturer’s literature of the actual equipment installed, and the copies of approved posted operating instruction as a basis for the training.

C. Demonstrate operation and maintenance of products and systems to District’s personnel two (2) weeks prior to date of Substantial Completion. Include a detailed review of the following items:
   1. Maintenance manuals.
   2. Spare parts and materials.
   3. Lubricants.
   4. Identification systems.
   5. Control sequences.
   6. Hazards.
   7. Cleaning.
   8. Warranties and Bonds.

D. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Review contents of manual with District's personnel in detail to explain all aspects of operation and maintenance.

F. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time at designated location.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. Required instruction time for each item of equipment and system is specified in individual sections.

1.4 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

1/3/2013
SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Substantial Completion.
   2. Final Acceptance.
   3. Eleven Month Warranty Inspection.

B. Related Sections:
   1. Conditions of the Contract: Fiscal provisions, legal submittals and additional administrative requirements.
   2. Section 01 10 00 - Summary of Work.
   3. Section 01 31 00 - Project Management and Coordination.
   4. Section 01 50 00 - Temporary Facilities and Controls.
   5. Section 01 75 00 - Starting and Adjusting.
   6. Section 01 78 39 – Project Record Documents.
   7. Division 23 - Basic Mechanical Requirements.
   8. Division 26 - Basic Electrical Materials and Methods.

1.2 SUBSTANTIAL COMPLETION

A. Obtain and submit releases, including occupancy permits, enabling District unrestricted use of the Work and access to services and utilities.

B. Complete startup testing of systems and instruction of District’s personnel.

C. Make final changeover of permanent locks and transmit keys to District.

D. Notify Architect when Work is considered ready for Substantial Completion, in accordance with Conditions of the Contract.

E. Submit to Architect a list of items (Punch List) remaining to be completed.

F. Comply with Architect’s instructions to correct items of Work listed in executed Certificates of Substantial Completion.

G. Notify Architect when Work is considered finally complete.

H. Comply with Architect’s instructions for completion of items of Work as determined by final inspection.

I. Comply with requirement of Section 01 78 39 – Project Record Documents.
1.3 FINAL ACCEPTANCE

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

B. Provide submittals to Architect required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due including lien releases.

D. Submit consent of surety to final payment.

E. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

F. Upon completion of final inspection, and District’s receipt of all closeout submittals, the Architect will prepare a certificate of final acceptance.

1.4 ELEVENTH MONTH WARRANTY INSPECTION

A. Prior to the end of the eleventh month of the warranty period, schedule an inspection of the project to include the Architect, the District.

B. Identify and document any items requiring correction under the warranty.

C. Correct all deficiencies within 30 days following the warranty inspection.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Warranties.
   2. Project record documents.
   3. Operation and maintenance data.
   4. Spare parts and maintenance materials.
   5. Maintenance contracts.
   6. Instruction of Owner's Personnel.

B. Related Sections:
   1. Conditions of the contract: Fiscal provisions, legal submittals and additional administrative requirements.
   2. Section 01 10 00 - Summary of Work.
   3. Section 01 31 00 - Project Management and Coordination.
   4. Section 01 33 00 – Submittal Procedures.
   5. Division 23 - Basic Mechanical Requirements.
   6. Division 26 - Basic Electrical Materials and Methods.

1.2 WARRANTIES

A. Refer to General Conditions, Article 13 for additional requirements.

B. Provide 2 (two) notarized copies of each.

C. Execute, assemble documents from Subcontractors, suppliers, manufacturers.

D. Provide Table of Contents and assemble in D size 3-ring binder with durable plastic cover.

E. Submit 10 (ten) days after inspection and acceptance of equipment or component parts of equipment put into service during progress of construction.

F. For items of Work delayed beyond date of Substantial Completion, provide up-dated submittal within 10 (ten) days after acceptance, listing date of acceptance as start of warranty period.

G. The length of warranty shall be for one year after date of acceptance of the work by the Owner.
   1. Extended warranties may be required in certain sections.
   2. The submitted warranty shall cover the length of time specified in the section covered by the warranty.

1.3 PROJECT RECORD DOCUMENTS

1/2/2013
A. Maintain on site, one set of the following record documents; record actual revisions to the Work:
   2. Specifications.
   3. Addenda.
   4. Change Orders and other Modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Contractor's request for clarifications (RFI'S).
   7. Field test records.
   8. Inspection certificates.
   9. Manufacturer's certificates.
  10. Manufacturer's instructions for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

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

D. Label and file Record Documents and samples in accordance with Section number listings in Table of Contents of this Project Manual.
   1. Label each document “PROJECT RECORD” in neat, large, printed letters.
   2. Maintain Record Documents in a clean, dry and legible condition. Do not use for construction purposes.
   2. Keep Record Documents, samples available for inspection by Architect.

E. Record information concurrent with construction progress.

F. Specifications: Legibly mark and record at each Product Section description of actual Products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and Modifications.

G. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as required by Owner.

H. Other documents: Maintain manufacturer's certifications, inspection certifications, field test records and as required by individual specification sections.

I. Submit Record Documents and samples to Architect.

1.4 OPERATION AND MAINTENANCE DATA

A. Submit 3 sets in final form, 15 days prior to final inspection, bound in 8-1/2 x 11-inch text pages, 3-ring binders with durable plastic covers.

B. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

1/2/2013
D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on 24-pound white paper.

E. Part 1 of Binder: Identify Owner, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.

F. Part 2 of Binder: Provide operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify and provide the following:
   1. Significant design criteria.
   2. List of equipment.
   3. Parts list for each component.
   4. Operating instructions.
   5. Maintenance instructions for equipment and systems.
   6. Maintenance instructions for finishes, including recommended cleaning methods, materials and special precautions identifying detrimental agents.

G. Part 3 of Binder: Project documents and certificates, including the following:
   1. Certificates.
   2. Photocopies of warranties and bonds.

H. Submit 3 copies of completed volumes in final form 15 days prior to final inspection.
   1. Submitted copies will be returned, with Owner's comments.
   2. Revise content of documents as required prior to final submittal.

I. Submit final volumes revised, within 10 days after final inspection.

1.5 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide spare parts, maintenance and extra materials in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

1.6 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to final inspection of acceptance, fully instruct Owner's designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and systems.

B. Operating and maintenance manual shall constitute the basis of instruction. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

PART 2 PRODUCTS

Not Used

1/2/2013
PART 3 EXECUTION

Not Used

END OF SECTION
SECTION 02 41 19
SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Selective demolition of interior and/or exterior building elements and sitework as indicated and as required to execute the work.
   2. Selective removal of architectural elements to be saved, protected and reinstalled as a part of this contract.
   3. Participation in pre-demolition walk-through with District’s Representative and Architect for identification of items to be salvaged and items to be removed for reinstallation.

B. Related Sections:
   1. Section 06 20 00 – Finish Carpentry: reinstallation of items.
   2. Section 09 21 16 – Gypsum Board Assemblies

1.2 DEFINITIONS
A. Remove: Remove and carefully dispose of items except those indicated to be reinstalled, salvaged, or to remain the District’s property.

B. Remove and Salvage: Items indicated to be removed and salvaged remain the District’s property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to District’s designated storage area. Removal shall be under direct supervision of District’s Representative.

C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated. Where noted, modify as required for relocation.

D. Remove and Replace: Remove as indicated. Replacement shall replicate or match existing as specified in individual sections or as noted on the drawings.

1.3 SUBMITTALS
A. Section 01 33 00 – Submittal Procedures: Submittal requirements.

B. Schedule: Submit detailed sequence of demolition and removal work, including dates for shutoff, capping, and continuance of utility services, for review prior to demolition commencement, for accomplishing this work.
   1. Information may be in the form of drawings, print mark-overs or field markings, and walk-through with the Architect and District as required to adequately describe the Work to be done and procedures to be followed.
   2. Submit shoring plan for review.

C. Procedures: Submit written procedures proposed for methods to be used to control dust and noise.

D. Record Drawings at Project closeout according to Section 01 78 39.
   1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1/11/2013
1.4 REGULATORY REQUIREMENTS


B. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.

C. Do not disable or disrupt building fire or life safety systems without 5 days prior written notice to the District.

D. Conform to applicable procedures when hazardous or contaminated materials are discovered.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable rules, codes, regulations, and safety orders of public authorities having jurisdiction.

1. Conform to procedures applicable when hazardous or contaminated materials are discovered. Separate hazardous materials.

1.6 PROJECT CONDITIONS

A. The buildings will be vacated by the District prior to start of Work. Prior to demolition work, the District will remove furniture, fixtures, and equipment.

B. Prohibited from use are any form explosives.

C. Protection:

1. Provide protection to existing materials such as metal, wood and plaster molding, trim castings, and millwork or other work designated to remain, to prevent damage to or marring of materials, surfaces and finishes. Such protection shall be of sufficient size and thickness to withstand impact from falling debris, rolling objects such as equipment, machinery and hand carts; and residue from flame-cuttings such as sparks or molten slag.

2. Protect floors with suitable coverings when necessary to prevent damage.

3. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.

4. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure to be demolished and adjacent facilities to remain.

5. Fire Protection: Comply with procedures in Section 01 50 00.

D. Flame Cutting:

1. Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden spaces before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.

2. Flame cutting is not permitted in areas with unprotected existing finishes. Prior to performing flame-cutting operations, protect existing materials, surfaces and finishes designated to remain with temporary coverings able to withstand flame-cutting residue such as sparks and molten slag.

1/11/2013
E. Use of Water: Use of water shall be strictly controlled to prevent its migration to other levels of work areas and subsequent damage to existing Work.

F. Traffic:
   1. Conduct demolition operations and the removal of debris to ensure minimum interference with streets, walks, and other adjacent occupied or used facilities.
   2. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.
   3. Provide debris containers suitably located.

G. Work to be demolished may contain hazardous materials. Hazmat report is available upon request. Report any hazardous material found to Engineer for decision or remedy, prior to start of work involving suspect materials.

H. Where existing unidentified utilities, structures or services are discovered, or other unsatisfactory conditions are uncovered, submit information to the Architect in writing for resolution prior to proceeding.

I. Dry Rot and Fungus: If dry rot or fungus is discovered during demolition work, notify the Engineer and stop operations at that location until directions as to how to proceed are given.

1.7 EXISTING CONDITIONS

A. The intent of the Drawings is to show existing site and building conditions with information developed from the original construction documents, field surveys, and District's records, and to generally show the amount and types of demolition and removals required to prepare existing areas for new work.

B. Contractor shall make a detailed survey of existing conditions pertaining to the work before commencing demolition.

C. Report discrepancies between drawings and actual conditions to the Architect for instructions, and do not perform any removal work where such discrepancies occur prior to receipt of the Engineer's instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Removed items become the property of the Contractor for disposal, except the following items, which shall be removed and salvaged by Contractor and turned over to the District for review:
   1. Door Hardware.
   2. Chalk / Marker Boards.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas affected by Work of this Section and verify that required protection is in place.

B. Do not commence demolition Work until unsatisfactory conditions have been corrected.

1/11/2013

SELECTIVE DEMOLITION
Section No. 02 41 19 – Page 3
3.2 PREPARATION

A. Provide protection as necessary and in accordance with applicable regulations, and ensure that protection is properly in place prior to Work commencement:
   1. For workmen, public, District’s employees, and other contractors.
   2. For existing finishes, structures, equipment, utilities, systems, and improvement to remain.
   3. Trees: Protect trees adjacent to and overhanging the Project site from damage of any kind as specified in Section 01 50 00.
   4. Retained Trees: Irrigate, aerate and maintain as required to ensure survival.

B. Lay out cutting work at jobsite and coordinate with related work for which cutting is required. Review proposed layout with Architect/Engineer prior to performing cutting operations.

C. Erect and maintain temporary measures to prevent spread of dust, odors, and noise.

D. Protect existing materials and items which are not to be demolished. Prevent movement of structure; provide bracing and shoring as required.

E. Verify samples of materials to be replicated or retained as specified in this Section.

F. Notify utility companies having service connections to the building such as water, telephone, electricity, gas, sewer and other connections. Coordinate for the removal or modification of utility systems or equipment, where indicated.

G. Contact municipal and regulatory agencies affected by and interested in the Work, including but not limited to Public Works, Water, Street, Police, Fire, and Building Inspection. Secure necessary information and permits required, and make detailed arrangements for coordination and smooth, safe prosecution of the Work.

3.3 DEMOLITION

A. Existing material to be removed shall, in general, be as indicated on the Drawings and shall include work necessary for the prosecution of the Work of this Contract.

B. Perform work in accordance with ANSI A10.6 unless otherwise specified.

C. Removed designated interior structures, appurtenances, and finishes at beginning of work to minimize hazardous working conditions and to provide comparatively clean surfaces for installation of new work.

D. Contractor shall be solely responsible for safety, adequacy and satisfactory performance of methods and means employed.
   1. Provide necessary temporary enclosures to adequately protect persons from possible injury.
   2. Provide necessary partitions, enclosed coverings, and the like for confining dust and debris to areas of the building in which demolition and alterations are being performed.
   3. Cover and protect windows and walls that are adjacent to areas to be demolished.
   4. Cover holes in roof and openings in walls temporarily to prevent water and air intrusions. Protection shall be sturdy and shall not damage existing materials to remain, such as brick, terra cotta, or trim, with nail, screw, or bolt holes.

1/11/2013
E. Perform demolition as much as possible with small tools. Demolish in small section. Removal loading and provide adequate shoring support before cutting or removing structural elements of the building.

F. Pollution Controls: Use suitable methods as necessary to limit the amount of dust and dirt rising and scattering in the air to the lowest level of air pollution practicable for the condition of Work; comply with governing regulations.
   1. Clean adjacent vehicles, structures, and improvements of dust, dirt, and debris caused by demolition operations, as directed by the District.

G. Sequence of removal shall be such that structural integrity of building is maintained at all times.

3.4 REMOVALS

A. Certain items are identified for removal by the District for reinstallation by the Contractor. Cooperate with District in scheduling removal of these items and in subsequent reinstallation.
   1. Carefully remove, wrap, and protect until reinstallation.

B. Where required by the Drawings or specified and when so directed to be salvaged and reinstalled, existing materials and fixtures, equipment, etc. shall be removed in the most careful manner possible to avoid damage; and, if damaged, such items shall be restored to conditions satisfactory to the Architect.

C. Carefully removes salvaged items to be retained by District and place in an area designated by the District for removal by District's personnel.

D. Materials to be removed and not installed shall become the property of the Contractor who shall be responsible for their timely removal from the Project site and their legal disposal.

E. Removal Procedures: Carefully remove Work to be salvaged or reinstalled and store under cover. The work includes but is not limited to the following:
   1. Walls and Partitions: Remove by cutting down and not by tumbling, throwing, or dropping.
   2. Concrete: NA
   3. Glazing: Remove portions as indicated or as required to complete new work. Provide temp closure with plywood when required.
   4. Wood Framing: Remove portions as indicated or as required to complete new work. Cut to neat straight lines at points of minimum stress, or provide supplementary supports as required. Floor and ceiling joists shall be braced to new headers as indicated.
   5. Roofing: Remove existing roofing as required for installation of new work.
   6. Woodwork: Cut or remove to a joint or panel line. Patch walls as necessary. Undamaged removed material may be reused. See Section 06 20 00 for new woodwork.
   7. Gypsum Wallboard: Cut back on straight lines to undamaged surfaces, with at least two opposite cut edges centered on supports.
   8. Linoleum and Other Soft Flooring: Completely remove flooring, edgings, and other accessories, and clean substrates of old cement or adhesive.
   9. Miscellaneous Items: Remove items not mentioned but required to be removed to execute the Work in such manner as minimizes damage to Work to remain.
3.6 CUTTING

A. Take care not to damage existing surfaces, which are to remain.

B. At the limits of demolition Work shown or specified, provide neat, orderly and clean joints, lines and edges of surfaces, whether for junctions with new materials or surfaces or whether to be left as existing. Where demolition methods or controls may not permit the intended jointure, submit conditions and alternatives to the Architect, and obtain resolution prior to commencing Work.

C. Cut or drill new openings to correct size as shown or to the most minimal dimension required. Review with Architect location of all openings and holes required for pipes, ducts, conduits, etc., not shown before cutting or drilling. Do not overcut.

3.7 PATCHING

A. Repair or replace any surfaces, equipment, or other improvements to remain which become damages as a result of demolition Work at no increase in Contract Sum.

B. Make all such repairs with materials equal in kind and quality to match existing adjacent surfaces or existing equipment or improvements intended to remain.

C. Repair entire surface of patched surfaces to nearest intersection.

D. Where repair scope is more than incidental, repairs shall comply with current codes.

3.8 ADJUSTING AND CLEANING

A. Provide cleaning during demolition as necessary and to the acceptance of the Engineer.

B. Leave all portions of demolition area in a level, safe and sanitary condition acceptable to public authorities and Engineer.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Wood blocking and nailers.
   2. Framing connectors and hardware.
B. Related Sections:
   1. Section 06 20 00 - Finish Carpentry.

1.2 REFERENCES
A. The American Plywood Association (APA):
B. American Society for Testing and Materials (ASTM):
C. American Wood Preservers Association (AWPA):
   1. C20: "Structural Lumber, Fire Retardant Treatment by Pressure Processes."
E. Fasteners and nails: comply with NFPA recommended Nailing Schedule of Manual for House Framing.
F. Lumber: Comply with American Softwood PS-20-10 lumber standard provide lumber species complying with grading rules of the following associations:
   1. Douglas Fir Western Lumber Grading Rules, published by Western Wood Products or standard Grading Rules for West Coast Lumber, No. 16.

H. Wood Treatment: American Wood Preservers Association (AWPA) standards for Wood Preservation treatment scheduled.

1.3 SUBMITTALS
A. Comply with provisions of Section 01 33 00 - Submittal Procedures.
B. Submit manufacturer’s data on metal framing connections.

1.4 QUALITY ASSURANCE
A. Comply with the following reference standards:
   1. Title 24, Part 1 and 2, California Administrative Code.
B. Adhesives: All adhesives shall meet or exceed the VOC limits of CBC
C. Grading and Inspection:

1/18/2013
1. Grade marking: All lumber shall be graded in accordance with the latest grading rules of the Lumber Manufacturer's Inspection bureau under whose jurisdiction the lumber is manufactured and sold. Each piece of lumber shall bear the grade and trademarks of a competent and reliable organization whose regular business is to establish lumber grades.


3. Certificate of Inspection: In lieu of the grade marking called for above, it will be acceptable if each shipment of lumber is accompanied by a certificate of inspection issued by a competent and reliable organization whose regular business it is to establish lumber grades.

D. Except when lower moisture content is required by grade specified at time of use, maximum moisture content of lumber shall not exceed 19 percent by weight.

1. Boards and dimension lumber 4 inches and thinner which include the designation "S-DRY" in grade stamp, will be considered to meet said moisture content requirements, if such lumber has been stored, transported or handled after grading to minimize exposure to conditions that could increase its moisture content.

2. Lumber certified as air dried to a moisture content not exceeding that specified will be considered to meet moisture content requirement, provided such lumber after being certified, has been stored, transported or handled in a manner to minimize exposure to conditions that could increase its moisture content and provided further, that each load delivered to job site is accompanied by such certification.

E. Lumber specified by grade to have moisture content below 19 percent shall be stored, transported and handled in a manner as to minimize exposure to conditions that could increase its moisture content. Moisture content at time of use shall not exceed limit established by grade specified.

F. Lumber not designated "S-DRY" or certified air dried to specified moisture content, and all lumber delivered to job site in wet condition, shall be stick-piled and stored for proper ventilation and drying, and shall only be used as released by the Architect.

G. Wood Preservative: In accordance with AWPA P5. Shop pressure-treat wood material requiring pressure impregnated preservative and deliver to site ready for installation. For Wood in Contact With Concrete: AWPA C31.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver undamaged products to site in manufacturer’s sealed containers or wrappings with legends intact. Store on site secure from weather, soil and physical damage.

B. Store lumber and timber framing off the ground, on sills, located in a well-drained area, and stacked to insure proper ventilation. Protect from moisture and the elements.

C. Store rough hardware, carpenters iron and miscellaneous items off the ground, in weatherproof sheds; protect metal items from rust.

D. Protect fire retardant materials against high humidity and moisture during storage and
1.7 JOB CONDITIONS

A. Maintain easily identifiable lines, elevations and grades for accurately laying out work.

B. Maintain a clean working area, free of debris.

C. Products shall be available at project when required for installation so as not to delay job progress. Installer for these products shall cooperate with installers performing work under other Sections involved to effect proper installation.

PART 2 PRODUCTS

2.1 MATERIALS

A. Lumber shall be Douglas Fir Larch No. 1, S4S.

B. Structural plywood shall be U.S. Product Standard PS1-07 Structural 1, CD-X, grade stamped by American Plywood Association. All plies shall be Douglas Fir and thickness as noted on the drawings.

C. Provide lumber pressure preservative treated where wood comes in contact with soil and wherever indicated on drawings.

D. Miscellaneous:
   1. Nailing Inserts: Redwood all-heart or Pressure Treated Douglas Fir, 1” thickness unless otherwise noted.
   4. Metal accessories and supplies.
      a. Provide manufactured items of shapes, sizes and dimensions required.
      b. Bolts: ASTM A307
      c. Steel: ASTM A36
      d. Fasteners and anchorage: Provide size, type, material and finish required for nails, screws, bolts, nuts, washers, and anchoring devices. Provide with aluminum, stainless steel or hot-dip galvanized finish with fasteners and anchorages to match.
      e. Provide stainless steel or hot-dip galvanized nails, screws, bolts and/or fasteners for pressure treated wood.
   5. Adhesives: Do not use adhesives containing urea formaldehyde.

PART 3 EXECUTION

3.1 ROUGH CARPENTRY

A. Nailing: Nailing for framing wall is with common wire nails. Number and size as called for on the drawings. Nails for trim work will be such as to hold material permanently with no buckling, twisting, cupping or splitting of the wood.

1/18/2013
B. Nailer, inserts, sleeves, stripping, etc.: Each trade will be responsible for providing or checking the installation of all inserts, nailers, sleeves, stripping, etc., as they may be specified and/or required for their work.

C. Rough Hardware:
   1. General: Consists of nails, screws, bolts, washers, lag screws, joint hangers tie straps, etc., and such items mentioned below and as shown on drawings.
   2. Bolts: In tension or shear shall have malleable iron or plate washers in accordance with UBC Standard.

3.2 LAYOUT OF WORK

A. Frame accurately to required lengths, lines and levels, and carefully space to provide for all finishes and conditions.

B. Provide special framing, recesses, chases, and wood blocking and backing for proper reception and installation of mechanical and electrical work under direction of such respective trades who shall assume responsibility for correct and proper location of such items. Frame members for passage of pipes and ducts to avoid cutting structural members.

C. Provide solid backing, minimum 2x4 nominal, behind all door stops, wall hung fixtures, casework, and other wall mounted items to provide secure anchorage and solid backing.

D. Provide all necessary work to properly receive installation of finish carpentry. Provide special framing, furring or construction, not indicated or specified, but required to complete work.

3.3 WORKMANSHIP

A. Discard units of material with defects that might impair quality of work, and units which are too small to fabricate work with minimum joints or optimum joint arrangement.

B. Frame and closely fit rough carpentry in a substantial manner, and install accurately to details on drawings. Framing methods not specifically covered or shown shall be installed in accordance with the requirements of the CCR Title 24.

C. Install all necessary bracing and backing rigidly and accurately for work of other trades and for all cabinets, cases and hardware.

D. Securely attach carpentry work to substrates by anchoring and fastening as required by recognized standards.

E. Install fasteners at spacings recommended by NFPA "National Design Specifications for Stress Grade Lumber and Its Fastening" for lumber and APA Form Y300 "Commercial/Industrial Construction Guide" for plywood.

F. Nail and spike in a thorough manner, using nails of required size. Pre-drill holes in existing lumber and in first piece receiving point if necessary to prevent splitting. Lumber split in securing shall be removed and replaced with new members properly pre-drilled.
1. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials.

G. Lagbolts and screws shall be installed in sub-drilled holes, and shall be screwed, not driven, into place. Any driven screws or lagbolts shall be rejected and mutilated wood members involved shall be replaced. Bore holes for shank the same diameter and depth as shank, with hole for threaded portion not larger than diameter of thread base.

H. Wood Grounds, Nailers, Blocking and Cants:
   1. Provide where required for screeding or attachment of other work.
   2. Form to shapes cut as necessary for true line and level for work to be attached.
   3. Coordinate location with other work involved.
   4. Attach to substrates to support applied loading.
   5. Where possible, anchor to formwork before concrete placement.
   6. Provide permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material involved.

3.4 CLEANUP

A. Keep premises free from accumulated waste materials, rubbish and debris resulting from this work.

B. Upon completion, remove tools, appliances, surplus materials, waste materials, rubbish, debris and accessory item used in or resulting from this work, and legally dispose of off the site.

3.5 PROTECTION

A. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.

B. In the event of damage, make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner.

END OF SECTION
SECTION 061800

GLUED LAMINATED WOOD

PART I - GENERAL

1.01 DESCRIPTION: Division 1 applies to this Section. Provide glued laminated wood members complete as indicated, specified, and required.

A. Work In This Section: Principal items include.

1. Glued laminated wood members.

B. Related Work Not In This Section:

1. Rough Carpentry.
2. Metal fabrications.
3. Installation.

1.02 QUALITY ASSURANCE:

A. Standards: Production of structural glue laminated timber under these Specifications shall be in accordance with AITC 190.1 and ASTM D3737 for Structural Glued Laminated Timber.

B. Requirements of Regulatory Agencies: Submit Shop Drawings, provide units to fit dimensions and conditions, forces, loads shall be prepared and stamped by a California registered civil or structural engineer employed and paid by Contractor.

C. Manufacturer Qualification: Provide factory-glued structural units, produced by an AITC-licensed firm, qualified to apply to AITC "Quality Inspected" mark.

D. Quality Marks: Mark members with AITC Quality Mark.

E. Inspection: Provide continuous inspection during the Glued Laminated Wood fabrication by DSA approved inspector in accordance with CBC Section 1704A.6.2.1.

1.03 SUBMITTALS: Refer to Section 01300 for procedures.

A. Shop Drawings and Calculations: Submit Shop Drawings for fabricated glued laminated wood units completely detailing construction, sizes, locations, cambers, and connections to supports. Contractor and manufacturer are responsible to
conform to Drawing requirements including the depths and spacings of glued laminated wood units. Glued laminated wood units shall span from bearing to bearing with no loads imposed on interior non-bearing partitions. Submit Shop Drawings to Architect for review.

B. **Certificates:** Submit an AITC Certificate of Conformance for each member to show conformance with PS-Current Edition and other standards. Deliver copies of all certificates to Architect and Building Official prior to erection of members.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING:

A. **Delivery and Handling:** Transport and handle the members by methods that prevent damage and defacing in accordance with AITC 111 and CBC 2303.1.3.1. Use non-marring padded slings for lifting and moving.

B. **Storage:** If members are not installed immediately upon delivery to site, store off ground on blocks of ample size to prevent crushing or indentations. Provide space for air circulation around each member. Cover top and sides with covering of moisture-resistant paper or plastic sheeting.

PART 2 - PRODUCTS

2.01 LAMINATED STRUCTURAL LUMBER: Comply with appearance requirements of American Institute of Timber Construction. Douglas Fir, Western Region, smooth sanded with wet-use adhesives. Appearance grade as selected by Architect shall have continuous full-width soffit layer.

A. **Manufacture and Quality Control:** Conform to PS-Current Edition, fabrication performed by an experienced fabricator in conformance with Standard for Fabricated Structural Timber, AITC 119.1.

B. **Lumber for Laminating:** Conforming to the structural requirements and laminating specifications of PS-Current Edition, of stress grades and combination shown that provides glued laminated members with allowable stress values in bending as indicated.

C. **Grade:** Industrial appearance grade in non-exposed applications and Architectural appearance grade where exposed to view, unless otherwise indicated.

D. **Fabrication:** Waterproof glue shall conform to CBC. Use shall conform to conditions specified in AITC Standards. All beams shall be given a uniform coat of “Woodlife”, before leaving fabricator's plant.
E. End Sealing: Conform to CBC 2303.1.3.1 and 2303.1.3.4. Apply a coat of clear penetrating sealer to the ends of members as soon as practicable after end trimming. Other sealing or wrapping is optional.

PART 3 - EXECUTION

3.01 INSTALLATION: Refer to Section 061000.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Finish carpentry items, other than shop prefabricated casework.
   2. Chair rail, and wood trim.
   3. Hardware and attachment accessories.

B. Related Sections:
   1. Section 08 11 10 - Steel Doors and Frames.
   2. Section 08 71 00 - Door Hardware.
   3. Section 09 91 00 - Painting.
   4. Section 12 35 53 - Laboratory Casework.

1.2 REFERENCES

A. American Plywood Association (APA):

B. American Wood Preservers Association (AWPA):
   1. AWPA C9 Plywood – Preservative Treatment by Pressure Treatment.
   2. AWPA C20 Structural Lumber - Fire-Retardant Treatment by Pressure Processes.
   3. AWPA C31 Lumber Used Out of Contact with the Ground and Continuously Protected From Liquid Water – Treatment by Pressure Processes.

C. American Society for Testing and Materials ASTM):

E. National Institute of Standards and Technology (NIST):

G. Woodwork Institute (WI – Formerly WIC):

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, finishes, stair details, accessories, drawn to a minimum scale of 1-1/2 inch to one foot.
   1. Shop drawings to indicate both new and existing-to-be-modified woodwork.
   2. Shop drawings shall be in conformance with WI Section, Basic requirements for Architectural Millwork Shop drawings.

1/14/2013
C. **Product Data:** Provide data on pressure treatment materials and any application instructions, fiber reinforced plastic panels, and cement board siding.

D. **Samples:** Submit two samples of plywood, wood trim, fiber reinforced panels and trim, cement board siding.

E. **Submit Material Safety Data Sheets (MSDS)** showing that particleboard meets requirements of ANSI A208.1.

### 1.4 QUALITY ASSURANCE

A. Perform finish carpentry work in accordance with WI Quality standards, Custom grade.

B. **Adhesives:** All adhesives shall meet or exceed the VOC limits of the South Coast Air Quality Management District Rule #1168, and shall be free of urea-formaldehyde resins.

C. **Sealants:** All sealants used as a filler must meet or exceed Bay Area Air Quality Management District Reg. 8, Rule 51.

D. All preservative pressure treated wood shall be free of Chromated Copper Arsenate (CCA).

E. Each piece indelibly ink stamped with quality mark of an approved third party inspection agency.

F. Quality mark shall include the following in a legible format:
   1. Logo of the overview agency.
   2. AWPA standard to which item is treated.
   3. Retention of preservative.
   4. Purpose for which product has been treated.
   5. The words “Dry” or “KDAT” when applicable.

### 1.5 DELIVERY, STORAGE AND PROTECTION

A. Section 01600 - Material and Equipment: Transport, store, handle and protect products.

B. Store indoors in ventilated areas with constant temperature of 60 to 90 degrees F. and a relative humidity of 45 to 60 percent.

### PART 2 PRODUCTS

#### 2.1 LUMBER PRODUCTS

A. **Softwood Lumber:** Conforming to requirements of NIST PS 20 and graded in accordance with the requirements of DFWLGR; maximum moisture content of 10 percent for interior work and 12 percent for exterior work; Redwood shall be certified kiln dried. Provide the following species and grades:

<table>
<thead>
<tr>
<th>Exterior Window frames</th>
<th>Species</th>
<th>Grade</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D.F.</td>
<td>Custom WI</td>
<td>Opaque</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interior Chair Rail</th>
<th>Species</th>
<th>Grade</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Red Oak</td>
<td>Custom WI</td>
<td>Transparent</td>
</tr>
</tbody>
</table>

1/14/2013
B. “Finger joint” materials are not acceptable.

2.2 SHEET MATERIALS

A. Softwood Plywood: PS 1, Graded in accordance with APA; maximum moisture content 12 percent for interior work.

<table>
<thead>
<tr>
<th>Interior Species</th>
<th>Grade</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underlayment D.F.</td>
<td>A-C Underlayment; Plugged and Sanded</td>
<td>None</td>
</tr>
<tr>
<td>Elec. Back Board</td>
<td>D.F.</td>
<td>C-D</td>
</tr>
</tbody>
</table>

2.4 ACCESSORIES

A. Nails: size and type to suit application. Use hot-dipped galvanized or stainless steel at exterior locations.

B. Bolts, Nuts, Washers, Lags, Pins and Screws: Of size and type to suit application; hot dipped galvanized finish in exterior locations, electro-plated galvanized finish in concealed locations and in exposed interior locations.

C. Adhesives: Do not use adhesives containing urea formaldehyde.

2.5 WOOD TREATMENT

A. Manufacturer:
   1. Osmose, Advance Guard, Sodium Borate preservative treatment (SBX).

B. Wood Preservatives: In accordance with AWPA P5. Shop pressure-treat wood material requiring pressure impregnated preservative and deliver to site ready for installation.

C. Treated lumber shall be marked or branded with indication of treatment type. Treated nailers where cut, drilled or notched shall be treated with a preservative recommended by manufacturer, in accordance with CBC 2306.4, and approved by the Architect on all surfaces from which preservative treatment has been removed.

D. For Wood in Contact With Concrete: AWPA C31.

E. Treatment Level: Provide borate preservative treatment level recommended by manufacturer to provide following minimum protection, as indicated on wood product quality stamp.

2.6 FABRICATION

A. Shop fabrication to in accordance with WI Custom Grade.

B. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site.

2.7 FINISHES

A. Paint: Refer to Section 09 91 00 – Painting.

B. Colors: Refer to Color Schedule.

1/14/2013
PART 3 EXECUTION

3.1 EXAMINATION
A. Section 01 31 00 - Project Management and Coordination.
B. Verify that surfaces are ready to receive work of this section.
C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible; do not delay job progress, allow for trimming and fitting.
D. Ensure mechanical and electrical items affecting work are properly placed, complete, and have been inspected by applicable authorities prior to commencement of installation.
E. Inspect each piece of finish carpentry and discard damaged or defective pieces.

3.2 INSTALLATION
A. Install work in accordance with WI Custom Grade, Section 3, 6, 9, & 10.
B. Set and secure materials and components in place, plumb, level, true and straight with no distortions; shim as required, using concealed shims.
C. Scribe and cut for accurate fit to other finished work.
D. Install trim in single unjointed lengths for openings and for runs less than 10 feet.
E. Prime paint surfaces of items in contact with cementitious materials.
F. Install hardware fixtures and accessories supplied under other sections for installation. Secure work to blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.

G. Underlayment:
   1. Nail to subflooring.
   2. Space panels 1/32 inch apart at edges and ends.
   3. Fill and sand edge joints, gouges, gaps, and chipped edges of underlayment receiving resilient flooring immediately before installing flooring.

3.5 PREPARATIONS FOR FINISHING
A. Sand all work smooth and set all exposed nails and screws. Apply wood filler in all exposed nail and screw indentations and leave ready to receive the site applied finishes.
B. On items which are to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.
C. Seal and varnish concealed and semi-concealed surfaces. Brush apply only using primer consistent with finish coats specified under Section 09 91 00.

3.6 ERECTION TOLERANCES
A. Maximum Variation From True Plane: 1/16 inch at interior, 1/8 inch at exterior.
B. Maximum Offset From True Alignment with Abutting Materials: 1/32 inch at interior, 1/8 inch at exterior.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide firestopping as required to maintain effective barrier against spread of flame, smoke and gases, and to retain integrity of time-rated construction as indicated and at following types of locations.

1. Provide at fire rated system perimeters, and at duct, conduit, piping penetrations through time-rated construction, and as required by applicable codes.

2. Coordinate requirements for firestopping with work involving penetrations through fire rated assemblies.

   a. Review Project and Contract Documents to ascertain extent of penetrations in fire rated assemblies and methods included in other sections for maintaining fire ratings.

1.2 SYSTEM DESCRIPTION

A. Design Requirements: Provide materials tested in accordance with following standards, unless otherwise specified.

1. American Society for Testing and Materials (ASTM) Publications:

   c. ASTM E814, Fire Tests of Through-Penetration Fire Stops.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's literature including data for materials and prefabricated devices, including descriptions sufficient to identify materials and devices on job.

   1. Submit Underwriter's Laboratory approval numbers for required fire ratings; approval of other laboratories contingent upon acceptance of applicable authorities.

B. Shop Drawings: Submit manufacturer's installation details.

C. Manufacturer’s Instructions: Maintain copy of manufacturer’s installation instructions and recommendations at each work area.

D. Certificates of Compliance: Submit certificates, accompanied by classifications, indicating material or combination of materials used meets requirements specified for flame spread and fire resistance.

   1. Certificates to be by nationally recognized testing authority or otherwise satisfactory to authorities.

12/19/12
1.4 QUALITY ASSURANCE
   
   A. Regulatory Requirements: Comply with California Building Code, Chapter 7 requirements for firestopping, including both F Ratings and T Ratings as applicable.

1.5 DELIVERY, STORAGE, AND HANDLING
   
   A. Deliver materials in their original unopened packages and store in location providing protection from damage and exposure to elements.
   
   B. Damaged or deteriorated materials shall be removed from site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
   
   A. 3M Fire Protection Products Div./3M Fire Barrier Products.
   
   B. Specified Technologies, Inc. (STI)/SpecSeal and Pensil Firestopping.
   
   C. Hilti, Corp./Hilti Firestop Systems.
   
   D. W.R. Grace & Co./Flamesafe Products.

2.2 MATERIALS
   
   A. General: Choose products and methods meeting applicable codes and Specification requirements for each firestopping application, subject to Architect's acceptance.
   
      
      1. Penetration Test: Furnish materials passing ASTM E814 for penetration fire stopping indicating maintenance of time-rated adjacent assemblies.
         
         a. Additional Tests: Where required by applicable authorities, provide materials passing ASTM E119 time-temperature fire conditions for fire ratings indicated for assemblies.
      
      2. Flame Spread: ASTM E84 flame spread rating of 25 or less.
      
      3. Smoke Density: ASTM E84 smoke density rating of 450 or less.
   
   C. Firestopping: Maintain fire rating of assembly in which firestopping is installed, such as floor, partition, or wall, in accordance with ASTM E119 tests.
   
   D. Comply with California Green Building Standards Code A5.504.8.1: Provide materials with volatile organic compound emissions less than 250 Grams per liter to reduce indoor air contaminants.

PART 3 - EXECUTION

3.1 EXAMINATION
   
   A. Examine surfaces and conditions receiving or affecting the work. Do not proceed until unsuitable conditions are corrected.

12/19/12
3.2 INSTALLATION
   A. Install firestopping in accordance with manufacturer's recommendations and installation instructions.
   B. Completely fill void space with firestopping materials regardless of geometric configuration, subject to tolerances established by firestopping manufacturer.
   C. Apply firestopping materials at penetrations of pipes, conduits, and ducts prior to application of insulation.
      1. Remove insulation already in place at penetration prior to application of firestopping materials.
         a. Insulation which meets requirements for fire ratings are excepted from this requirement.

3.3 FIELD QUALITY CONTROL
   A. Inspection: Keep area of work available for inspection by Architect and applicable authorities before and after application of firestopping.

3.4 REPAIR AND CLEAN-UP
   A. Repair damage caused by work of this section; clean exposed surfaces soiled by work and leave work ready to receive following work.
   B. On completion of work, remove debris, excess materials, and equipment from site.

END OF SECTION 07 84 00
SECTION 07 90 00

JOINT SEALERS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Preparing substrate surfaces.
   2. Installation of sealant and joint backing.

B. Related Sections:
   1. Section 06 20 00 - Finish Carpentry.
   2. Section 07 84 00 – Firestopping.

1.2 REFERENCE STANDARDS

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

B. Federal Specifications (FS):
   1. FS PPP-T-42C - Tapes, Packaging/Masking Paper.

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures: Submittal requirements.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitation and color available.

C. Samples: Submit two samples 3 inches in length illustrating sealant color for selection.

D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, perimeter conditions requiring special attention.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Comply with CBC which limits VOC content of paints and coatings used in buildings.

1.5 QUALIFICATION

A. Manufacturer: Company specializing in manufacturing the product specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing the work of this section with minimum three years documented experience approved by manufacturer.

1.6 COORDINATION

A. Section 01 31 00 - Project Management and Coordination.

1/4/2013
B. Coordinate the work with all sections referencing this section.

1.7 WARRANTY

A. Section 01 78 39 – Warranty and Guarantees: Project Record Documents.

B. Warranty: Include coverage for installed sealants and accessories which fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure, for a period of five years after acceptance of building by the Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Pecora Corporation; Sika; Vulkem; or approved equal.

2.2 JOINT SEALANTS MATERIALS

A. Exterior Sealant: Polyurethane, ASTM C920, Type M, Grade NS, Class 25, Use NT, two component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, paintable, color as selected by Architect, Sikaflex 2c, NS/SL or approved equal.

1. Properties:
   b. Service Temperature Range: -40 to 80 degrees F.
   c. Shore A Hardness: 20 to 35.

2. Location:
   a. Metal Fabrications.
   b. Wood trim and fascias.
   c. Flashing and Sheet Metal termination.
   d. Roof hatches.
   e. Exterior Door Frames.
   f. Exterior Window Frames.
   g. Plastering.
   h. Fixed Metal Wall Louvers.
   i. All other exterior locations.

B. Interior Sealant: Polyurethane, ASTM C920, Type S, Grade NS, Class 25, Use NT, one component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, color as selected by Architect.

1. Elongation Capability: 25 percent.
2. Service Temperature Range: -40 to 80 degrees F.
4. Location:
   a. Wood trim.
   b. Metal fabrications.
   d. Casework.
   e. Interior Windows.
   f. Interior Door Frames.
   g. Access Door Frames.
   h. Gypsum Board terminations.
   j. Resilient Flooring.
I. All other interior locations not listed below.

C. Interior Sealant: Silicone, ASTM C920, Type S, Grade NS, Class 25, Use NT, one component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, color as selected by Architect.
   1. Elongation Capability: 25 percent.
   2. Service Temperature Range: -40 to 80 degrees F.
   4. Location:
      a. Toilet and Bath Accessories.
      b. Toilet Compartment Pilasters.
      c. Access Door Frames in Toilet Rooms.
      d. Plumbing Fixtures.
      e. All other interior wet areas.

D. Horizontal Joint Sealant: Polyurethane, ASTM C920, Type S, Grade P, Class 25, Use T, M, and O, one component, chemical curing, non-staining, non-bleeding, self-leveling, color as selected by Architect.
   1. Properties:
      b. Service Temperature Range: -40 to 80 degrees F.
   2. Location:
      a. Under Thresholds.
      b. Floor Expansion Joints.

2.3 ACCESSORIES

A. Primer: Non-staining type recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive type recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Filler: ASTM D1056 and D1667 round closed cell polyethylene or foam rod; oversized 30 to 50 percent.

D. Bond Breaker: Pressure sensitive type recommended by sealant manufacturer to suit application.

E. Masking Tape: Conforming to FS PPP-T-42.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 - Project Management and Coordination.

B. Verify that substrate surfaces and joint openings are ready to receive work.

C. Verify that joint backing and release tapes are compatible with sealant.

D. Correct deficiencies prior to commencing with Work of this Section.

3.2 PREPARATION

1/4/2013
A. Remove loose materials, moisture, and foreign matter that may impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with ASTM C1193 and manufacturer's printed instructions.

D. Protect adjacent metal surfaces with masking tape.

3.3 INSTALLATION

A. Install sealant in accordance with manufacturer’s printed instructions.

B. Measure joint dimensions and size materials to achieve required width/depth ratios.

C. Use joint filler to achieve a neck dimension no greater than 1/3 of the joint width.

D. Install bond breaker where joint backing is not used.

E. Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot be applied within recommended temperature ranges.

F. Tool joints concave, free of air pockets, embedded matter, ridges and sags.

3.4 CLEANING

A. Section 01 74 00 - Cleaning: Final cleaning.

B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF FINISHED WORK

A. Section 01 72 00 – Preparation Execution: Protection of installed work.

B. Protect sealants until cured.

END OF SECTION
SECTION 08 11 10
STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Conditions of the Contract and Division 1 apply to this Section.

B. Section Includes:
   1. Non-rated and fire rated steel doors and frames.
   2. Non-rated and fire rated steel window frames.
   3. Insulated exterior steel doors.

C. Related Sections:
   1. All documents listed in Table of Contents are a Condition of this Section.

1.2 REFERENCES

A. Americans with Disabilities Act (ADA) - Accessibility Guidelines for Buildings and Facilities.

B. American National Standards Institute (ANSI):
   1. ANSI 250.8 - Standard Steel Door and Frames.

C. American Society for Testing and Materials (ASTM):
   2. ASTM A525 - Specification for Steel Sheet, Zinc Coated (Galvanized) by the Hot Dip Process.
   4. ASTM E413 - Classification for Rating Sound Insulation.

D. California Building Code (CBC), 2010 edition:
   1. NFPA 252 - Fire Tests of door Assemblies.

E. Steel Door Institute (SDI): The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.

1.3 SUBMITTALS

A. Comply with requirements of Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Indicate door and frame configuration, anchor types and spacing, location of cut-outs for hardware, glazing and louvers, reinforcement, and finish.

C. Product Data: Submit manufacturer's installation instructions.

D. Manufacturer's Certification: Certify that Products meet or exceed specified requirements.

1/4/2013
E. Samples: Submit two 6 inch x 6 inch samples of door metal and 10 inch long samples of door frames.

1.4 QUALITY ASSURANCE
A. Conform to the requirements of ANSI-250.8 and Americans with Disabilities Act (ADA) - Accessibility Guidelines for Buildings and Facilities.

1.5 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS
A. Fire rated doors and frames construction to conform to ANSI 250.8 and NFPA 80.
B. Installed door and frame assemblies to conform to NFPA 80 for fire rated class indicated on schedule.

1.7 DELIVERY, STORAGE, AND PROTECTION
A. Section 01 60 00 – Product Requirements: Transport, handle store, and protect products.
B. Accept doors and frames on site in manufacturer's packaging. Inspect for damage.

1.8 FIELD MEASUREMENTS
A. Verify that field measurements are as indicated on approved shop drawings.

1.9 COORDINATION
A. Section 01 30 00 - Project Management and Coordination.
B. Coordinate the work with frame opening construction, door and hardware installation.

1.10 WARRANTY
A. Section 01 77 00 - Closeout Procedures: Warranties.
B. Provide five year warranty against defects in manufacture and materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS
A. Amweld Building Products.
B. Curries Company.
C. Steelcraft Manufacturing Company.
D. Or equal.

1/4/2013
2.2 DOORS AND FRAMES

A. Material: Steel sheet in accordance with ANSI A250.

B. Insulated Exterior Flush Doors: ANSI 250.8, Level 4 Maximum Duty, Model 1, 14 gage thick metal.


C. Exterior Door Frames: 12 gage thick material, 2-inch core with 1 ½” flashing fin.

D. Interior Door and Window Frames: 14 gage thick material, core thickness to suit model and grade of doors.

2.3 DOOR CORES

A. Core: ANSI A151.1, vertical channels at flush doors.

B. Insulation: Foamed-in-place polyurethane, chemically bonded to interior face; minimum density of foam 1.8 pcf with an overall rating of R-15.

2.4 ACCESSORIES

A. Louvers: Stationary metal louvers, formed, 18 gage, weatherproof with insect screen.

B. Rubber Silencers: Resilient rubber.

C. Glazing Stops: Rolled steel channel shape, butted corners, prepared for countersink style tamperproof screws.

2.5 PROTECTIVE COATINGS

A. Primer: Manufacturer’s standard primer.

2.6 FABRICATION

A. Fabricate frames and doors in accordance with requirements of ANSI 250.8, and as indicated on drawings. Provide welded frames at exterior and interior doors.

B. Fabricate doors and frames with hardware reinforcement plates welded in place. Provide mortar guard boxes. Provide minimum of 12 gage reinforcement at door closers.

C. Close top edge of exterior doors with flush closure. Seal joints watertight. Provide nailing flanges as detailed at exterior doors.

D. Accurately form and cut mitered corners of welded type frames. Weld on inside surfaces. Sand welded joints to a smooth uniform finish. Use welded frames at all exterior and interior locations. Use of splice plates at corners is not acceptable.

E. Fabricate frames of pairs of doors wider than 3'-6" of 12 gage steel.

F. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
G. Prepare frame for silencers. Provide three single silencers for single doors on strike side, and two single silencers on frame head at double doors.

H. Provide jamb and floor anchors in accordance with ANSI 250.8.

I. Attach channel or angle spreaders at bottom of welded type door frames to ensure proper alignment while shipping.

J. Fill surface depressions with metallic paste filler and sand to a smooth uniform finish.

K. Touch up areas where galvanized coating has been removed due to sanding or handling.

L. Attach fire rated label to each frame and door unit scheduled to be labeled.

2.7 FINISH

A. Exterior Units: 0.60 oz./sq. ft. hot dip galvanized with factory painted finish.

B. Interior Units: Primer with factory paint finish.

C. Colors as selected by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 – Project Management and Coordination.

B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install frames in accordance with ANSI 250.8.

B. Install doors in accordance with SDI recommendations.

C. Install door louvers plumb and level.

D. Install door hardware in accordance with Section 08 71 00.

3.3 INSTALLATION TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.4 ADJUSTING

A. Adjust frames so that doors hang plumb.

B. Adjust doors with closers to specified opening pressures.

C. Adjust doors for smooth operation, proper closing speed, and balanced door movement.

END OF SECTION

1/4/2013
SECTION 08 31 13
ACCESS DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire resistive rated and non-rated access doors and frames in wall and ceiling locations.

B. Related Sections:
   1. Section 09 21 16 - Non-Load-Bearing Framing Metal Systems: Supportive constructions for openings in walls and ceilings.
   2. Section 09 91 00 - Painting: Finish painting.
   3. Division 23 - Basic Mechanical requirements: Furnishing of access doors and frames required for mechanical work.
   4. Division 26 – Basic Electrical Materials and Methods: Furnishing of access doors and frames required for electrical work.

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal requirements.

B. Shop Drawings: Indicate exact location of all access units.

C. Product Data: Submit manufacturer's descriptive technical literature of access doors and frames.

D. Manufacturer's Installation Instructions: Indicate installation requirements.

1.3 PROJECT RECORD DOCUMENTS

A. Section 01 78 39 - Project Record Documents: closeout documents.

B. Record actual location of all access units.

1.4 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated access units.

B. Provide certification of compliance from authority having jurisdiction indicating approval of fire rated units.

1.5 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.6 COORDINATION

A. Section 01 31 00 Project Management and Coordination: Coordination.

B. Coordinate requirements of the work with mechanical and electrical work.

1/4/2013
PART 2 PRODUCTS

2.1 MANUFACTURERS - WALL AND CEILING UNITS
   A. J.L. Industries, Model FD, WB, FD.
   B. Nystrom Access Doors & Hatches.
   C. Williams Bros. Corporation.
   D. Karp
   E. Or approved equal.

2.2 ACCESS UNITS - WALLS
   A. Non-Fire Rated Door and Frame Unit: Formed steel:
      1. In Gypsum Board: Style DW, as manufactured by Milcor; or equal.
      2. In Plaster: Style PW, as manufactured by Milcor; or equal.
   B. Fire-Rated Doors and Frame Unit: Formed steel, labeled:
      1. In Gypsum Board or Plaster: Fire-Rated Access Door, as manufactured by
         Milcor; or equal.

2.3 ACCESS UNITS - CEILINGS
   A. Non-Rated Door and Frame Units: Formed Steel:
      1. In Gypsum Board: Style DW, as manufactured by Milcor; or equal.
      2. In Acoustical Tile Ceilings: Style AT, as manufactured by Milcor; or equal.
   B. Fire-Rated Doors and Frames: Formed Steel, labeled:
      1. In Gypsum Board or Acoustical Tile: Fire-Rated Ceiling Access Door, as
         manufactured by Milcor, or equal.

2.4 FABRICATION - WALL AND CEILING UNITS
   A. Fabricate frames from 16 gage steel.
   B. Fabricate door panels of 14 gage steel.
   C. Weld, fill and grind joints to assure flush and square unit.
   D. Hardware:
      1. Hinge: 175 degree steel piano hinges with removable hinge.
      2. Lock: Screw driver slot for quarter turn cam lock. Provide cylinder locks at
         exterior access door locations.

2.5 FINISHES
   A. Base Metal Protection: Steel, galvanized at exterior or wet interior spaces, primed in
      factory. Stainless steel in Toilets and bathrooms.
PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate conditions under provisions of Section 01 31 00.
B. Verify that rough openings for door and frame are correctly sized and located.

3.2 INSTALLATION

A. Install in accordance with manufacturer’s instructions.
B. Set each item accurately aligned, square, plumb and level; well secured to supporting elements using fastener types appropriate for materials where used.
C. Position unit to provide convenient access to concealed work requiring access.
D. Adjust doors and locks for smooth, quiet operation.

END OF SECTION
SECTION 08 71 00
DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Hardware for interior and exterior doors.
   2. Thresholds, weatherstripping, seals and door gaskets.
   3. Removal of existing hardware scheduled to be salvaged.

B. Related Sections:
   1. Section 06 20 00 - Finish Carpentry.
   2. Section 08 11 10 - Standard Steel Doors and Frames.

1.2 REFERENCES

A. Americans with Disabilities Act (ADA) – 2010 Standards for Accessible Design.

B. American Society for Testing and Materials (ASTM):
   1. ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.

C. California Building Code (CBC), Title 24:
   1. CBC Section 715,3 and NFPA 252 - Fire Tests of Door assemblies.
   2. NFPA 80

D. Underwriters Laboratories, Inc. (UL):
   1. UL 305 - Panic Hardware.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal Requirements.

B. Shop Drawings: Indicate locations and mounting heights of each type of hardware, schedule for each door or item of equipment list hardware item number, manufacturer, manufacturer's number or symbol, and finish.
   1. Approval of the schedule does not relieve Contractor of responsibility for furnishing all necessary hardware.
   2. Submit schedule in horizontal or matrix form, SDI-111D, group type schedules are not acceptable and will be returned for re-submittal.

C. Submit manufacturer's parts lists, templates, manufacturer's installation instructions.

D. Samples: Submit one sample of hinges, locksets illustrating style and finish.

E. Product Data: Submit manufacturer's product data on each product proposed to be used on project.

1.4 PROJECT RECORD DOCUMENTS

A. Section 01 78 39 – Project Record Documents: Project record documents.

3/12/2013
B. Record actual locations of installed cylinders and their master key code.

1.5 OPERATION AND MAINTENANCE DATA
A. Section 01 77 00 - Closeout Procedures: Operation and maintenance data.
B. Maintenance Data: Include data on operating hardware, lubrication requirements, and procedures related to preventative maintenance.

1.6 QUALITY ASSURANCE
A. Perform work in accordance with the following requirements:
   1. Americans with Disabilities Act (ADA) - 2010 Standards for Accessible Design.
   2. Title 24, CBC.
B. Fire Rated Assemblies: All rated doors positive latching and self closing.
   1. “Rated” doors shall mean “Assembly”, as defined in CBC, Section 701.
   2. All 20 minute or greater, assemblies shall be provided with approved gasketing material so installed to provide a seal where door meets stop on both sides and across top in accordance with NFPA 252.

1.7 PRE-INSTALLATION MEETING
A. Section 01 33 00 - Project Management and Coordination: Pre-Installation Meeting.
B. Convene two weeks prior to commencing work of this Section.

1.8 DELIVERY, STORAGE, AND PROTECTION
A. Section 01 60 00 - Product Requirements: Transport, handle, store, and protect products.
B. Package hardware items individually, label and identify each package with door opening code to match hardware schedule.

1.9 COORDINATION
A. Section 01 30 00 - Project Management and Coordination.
B. Coordinate the work with other directly affected Sections involving manufacture or fabrication of internal reinforcement for door hardware.

1.10 WARRANTY
A. Section 01 77 00 – Closeout Procedures: Submittals: Warranties.
B. Provide one (1) year warranty for Schlage door locks, five (5) year warranty on Von Duprin exit devices, and Twenty five (25) years on LCN closers.

1.11 MAINTENANCE MATERIALS
A. Section 01 78 39 – Project Record Documents: Maintenance materials.
B. Provide special wrenches and tools applicable to each different or special hardware component.

C. Provide maintenance tools and accessories supplied by hardware manufacturer.

1.12 EXTRA MATERIALS

A. Section 01 77 00 - Closeout Procedures: Extra materials.

B. Provide two extra key lock cylinders to the District.

PART 2 PRODUCTS

2.1 MANUFACTURER’S

A. Established by reference to the catalog numbers and designations of the following manufacturers:

<table>
<thead>
<tr>
<th>Item</th>
<th>Manufacturer</th>
<th>Acceptable Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butts, hinges</td>
<td>Hager (H)</td>
<td>McKinney(MC), Stanley(S)</td>
</tr>
<tr>
<td>Locksets, latches,</td>
<td>Schlage (S)</td>
<td>No substitutions permitted.</td>
</tr>
<tr>
<td>cylinders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exit Devices</td>
<td>Von Duprin (V),</td>
<td></td>
</tr>
<tr>
<td>Closers</td>
<td>LCN</td>
<td></td>
</tr>
<tr>
<td>Silencers, Stops,</td>
<td>Glynn-Johnson(GJ)</td>
<td>Ives(I), Trimco(T).</td>
</tr>
<tr>
<td>Holders &amp; Kickplates</td>
<td>Quality (Q)</td>
<td></td>
</tr>
<tr>
<td>Thresholds &amp; Weather-</td>
<td>Pemko (P)</td>
<td>National Guard stripping.</td>
</tr>
<tr>
<td>stripping</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.2 MATERIALS

A. Finishes: All hardware, unless otherwise shown, shall be:

1. US26D, Dull Chrome
3. Closers: Sprayed to match adjacent hardware.
4. Thresholds: As noted on schedule.

B. Fastenings: Furnish necessary screws, bolts, nuts and others of suitable sizes to install hardware securely in position to withstand hard usage over long life. Supply fastenings which harmonize with hardware material and finish. Furnish required expansion shields, sex bolts, toggle bolts and other anchors as recommended by Architect. Furnish hardware to be fastened to concrete with machine screws and tampins.

C. Furnish products of one manufacturer for locks, hinges, closers and exit devices unless otherwise indicated.

D. Door hardware shall meet requirements of CBC Sections 1133B.2.1, 1133B.2.5.1 and 1003.3.1.8.

E. Panic hardware shall comply with UL-305 - Panic Hardware.

2.3 BUTTS

3/12/2013
A. All exterior out-swinging doors shall have non-ferrous butts with non-removable pins.

B. Unless otherwise specified, the size of the butts will be determined by the following table:
   1. Doors 1-3/8 inch thick to have 3-1/2 inch.
   2. Doors 1-3/8 inch thick and up to 41 inch wide to have 4-1/2 inch.
   3. Doors 1-3/4 inch thick, 42 inch to 48 inch wide, to have 4-1/2 inch extra heavy.
   4. Doors 2 inches thick and over 48 inches wide to have 5 inch extra heavy.

C. Provide widths sufficient to clear trim projection when door swings 180 degrees.

D. Provide 2 hinges to 60 inches high, 3 hinges to 90 inches high (except 2 hinges at doors in units), 4 hinges to 120 inches high for each door leaf.

2.4 LOCKSETS

A. Must have steel cylindrical cases, with interior parts of steel and zinc-dichromate plating to resist rusting and corrosion.
   1. Provide Schlage 6-pin cylinder; and access to cylinder without removing lever from lock set, Schlage interchangeable cylinders, for key-in-lever types.
   2. Do not supply plastic, die cast or aluminum mechanisms.
   3. Cylinders to have plugs full round (without flattened areas) of extruded brass bar material.

B. Design:
   2. No substitutions will be allowed.

C. Backset: 2-3/4 inches.

D. Strikes: Furnish standard strikes with extended lips where required to protect trim from being marred by latch bolt. Verify whether standard or ANSI cut-outs are provided in metal frames.

E. Keys and keying:
   1. Furnish Schlage construction keying with removable cylinders and keyway to match District’s standards, no substitution permitted.
   2. Keying system shall be Schlage. Provide interchangeable cores at exterior doors.
   3. Keying for each building shall be coordinated using District’s Keying Schedule.
   4. Locks shall be master keyed for each building, and site-grand mastered in addition to being grand master keyed to District standard system.
   5. Provide 3 keys for each lock set; deliver keys to District.
   6. Provide 2 key blanks for each lock set; deliver blanks to District.
   7. After punch list items have been corrected, Contractor shall remove construction key inserts.

2.5 CLOSERS

A. Furnish products of one manufacturer; full rack and pinion type with steel spring and non-gumming, non-freezing hydraulic fluid.
   1. Provide controls for regulating closing, latching speeds and back check. Spring power adjustment where specified.
   2. Supply drop plates at narrow top rail doors; and parallel-arm closers at reverse bevel doors and where doors swing full 180 degrees.
3. Set closer to minimum force needed to latch door, not to exceed maximum force allowed.

B. Furnish LCN 4110 Series, sizes as recommended by LCN Table of Sizes.

C. Pull effort on doors with closers to be a maximum of:
   1. 5 lbs. at interior doors and 5 lbs. at exterior doors.
   2. The Authority having jurisdiction may increase the maximum effort to operate fire doors to achieve positive latching, but not to exceed 15 lbs. per CBC Section 1133B.2.5.
   3. Doors shall also comply with ADA 4.13.10, closer delay time: “From an open position of 70 degrees the door will take at least 3 seconds to move to a point of 3 inches from the latch, measured to the leading edge of the door.”

2.6 DOOR STOPS

A. All material to be of solid brass or bronze or solid stainless steel.

B. Stops shall not be located more that 4 inches from adjacent wall surfaces.

2.7 THRESHOLDS

A. Aluminum extrusions, grooved pattern throughout. In single length only for each opening; ends shaped to seat jamb profiles, with mitered returns for thresholds wider than 4 inches.

B. Finish: Anodized mill finish aluminum.

C. Grout thresholds solid at exterior, locker/shower, toilet, kitchen, janitor and other wet area locations.

2.8 EXIT DEVICES

A. Touch bar design, rim and concealed rod types, Von Duprin Series 99; quiet feature, breakaway lever trim.
   1. Unlatching force shall not exceed 15# applied in the direction of travel.
   2. Panic hardware shall comply with CBC Section 1008.1.9.2 & 1008.1.10.
   3. No substitutions will be allowed.

B. Attach with thru-bolts or sex bolts, at mineral core, hollow metal, or aluminum doors.

C. Parts shall be fully replaceable, riveted construction is not acceptable.

D. Cylinder dogging on non-rated devices. Double cylinder (Classroom Security Function) at fire-rated doors.

2.9 KICK PLATES

A. 16 gage (0.050 inch thick), 10 inches high x 2 inches less than door widths at pairs of doors and 1 inch less than door width at single doors. Exception: Provide 9 inch high kick plate on 10” high smooth bottom rail at full glazed doors.

2.10 WEATHERSTRIPPING

3/12/2013
A. Extruded aluminum trim with neoprene rubber gasketing material, gasketing material tested for smoke developed per ASTM E283.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01310 - Project Management and Coordination.

B. Coordination: Coordinate the work with other directly affected Sections involving manufacturer or fabrication of internal reinforcement for door hardware.

C. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.

3.2 INSTALLATION

A. Where new hardware is indicated for an existing door, remove hardware scheduled for replacement; refer to Section 02 41 19.

B. Install all hardware in accordance with manufacturer's recommendations, using proper templates.

C. Where existing hardware is being modified, protect and refurbish existing hardware being converted.

D. Maintain the following mounting heights for doors, from finished floor to center line of hardware item:
   1. Locksets and Latchsets: 38 inches.
   2. Exit Device: 40 inches to center of touch bar.

3.3 ADJUSTING

A. Section 01 75 00 - Starting and Adjusting: Adjusting.

B. Adjust hardware for smooth operation.

3.4 PROTECTION

A. Section 01 50 00 – Temporary Facilities and Controls: Temporary protection of installed work.

B. Do not permit adjacent work to damage hardware or finish.

3.5 HARDWARE SCHEDULE

3/12/2013
A. Refer to the Door Schedule for hardware group identification:

Group 1: Existing Doors.

1  Exit device, rim cylinder dogging, Von Duprin CD99L-NL
   With cylinder dogging. Cylindar and keyway compatible
   with District standard.

Group 2: Interior, single, non-panic, non-labeled.

1-1/2 pair  Butts FBB 168 4-1/2 x 4-1/2
1  Door Closer 4041 EDA x NHO SNB
2  Kickplates 10: x 2" LDW
1  Door Stop FB 15/16R
1  Door Bottom 4301CRL x DW at Sound Doors Only

END OF SECTION
SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide gypsum board systems including gypsum board, metal stud framing, suspension system for gypsum board systems, joint treatment, acoustical accessories, and general accessories for complete installation.

B. Related Sections:
   1. Section 07 84 00 - Fire Stopping.
   2. Section 06 10 00 - Rough Carpentry wood and metal connectors.

1.2 REFERENCES

A. ASTM C754: Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board.

B. ASTM C840: Application and Finishing of Gypsum Board.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Perform gypsum board systems work in accordance with recommendations of ASTM C754 and ASTM C840 unless otherwise specified.

   1. Loads: Comply with California Building Code requirements for design of metal framing for gypsum board systems.
      a. Deflection: Maximum L/240 typical, L/360 where plaster or tile is indicated.
   2. Seismic Requirements: Comply with code requirements for seismic bracing.

B. Fire-Rated Assemblies: Listed by Underwriter's Laboratory, Gypsum Association (GA) File No's in GA-600 Fire Resistance Design Manual or other listing approved by applicable authorities.

C. Systems Responsibility: Provide products manufactured by or recommended by manufacturer of gypsum board to maintain single-source responsibility for system.

D. Openings: Obtain dimensions and locations from other trades and provide openings and enclosures for accessories, specialties, equipment, and ductwork.

1.4 SUBMITTALS

A. Product Data: Furnish manufacturer's literature for framing, insulation, gypsum board, and acoustical accessories.
B. Manufacturer’s Certification: Furnish manufacturer’s certification indicating products comply with Contract Documents and applicable codes.

1.5 QUALITY ASSURANCE

A. Comply with CBC which limits VOC content of paints and coatings used in buildings.

1.6 PROJECT CONDITIONS

A. Do not begin installation of interior gypsum board until space is enclosed, space is not exposed to other sources of water, and space is free of standing water.

B. Maintain areas to receive gypsum board at minimum 50 degree F for 48 hours prior to application and continuously after application until drying of joint compound is complete; comply with ASTM C840.

C. Immediately remove from site gypsum board for interior use exposed to water, including gypsum board with water stains, with signs of mold, and gypsum board with mildew.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. United States Gypsum Co., USG Corp.

B. Georgia-Pacific Corp.

C. National Gypsum Co.

D. Substitutions: Refer to Section 01 63 00.

2.2 MATERIALS

A. Framing Materials: Comply with ASTM C754, including cold formed metal framing and light gage metal framing; where not otherwise indicated, provide gages as recommended by manufacturer for spans and loads indicated and as required by applicable codes.


   a. Shaft Walls: Cee-T or Cee-H shaped studs.

2. Runners: Match studs.


   a. Sound Rated Assemblies: Provide resilient channels where indicated and where required to provide required sound transmission classifications.


5. Hangers: ASTM A641, Class 1 wire not less than sizes in Table No. 5 of ASTM C754 and as required by applicable codes; hanger rods, flat hangers, and angle-type hangers as required.

3/13/2013
6. Suspension System: ASTM C635, suspension system composed of main beams and cross furring members interlocking to form supporting network; recommended by gypsum board system manufacturer.

7. Fasteners and Anchorages: As recommended by gypsum board system manufacturer.

B. Gypsum Board: Comply with ASTM C840; maximum permissible lengths; ends square cut, tapered edges on boards to be finished.

1. Typical: ASTM C1396, Type X, fire rated gypsum board, unless otherwise indicated.

2. First Layer at Double Layer Applications: ASTM C1396 or ASTM C442, Type X, fire rated gypsum backing board.

3. Gypsum Core Board/Gypsum Liner Board: ASTM C442, Type X, 1" thick; mildew and mold resistant.


5. Gypsum Sheathing: Georgia Pacific/DensGlass Gold, Type X.

C. Gypsum Board Accessories: Comply with ASTM C840.

1. Provide protective coated steel corner beads and edge trim; type designed to be concealed in finished construction by tape and joint compound.

2. Corner Beads: Manufacturer’s standard metal beads.


4. Reinforcing Tape, Joint Compound, Adhesive, Water, Fasteners: Types recommended by system manufacturer and conforming to ASTM C475.

   a. Typical Joint Compound: Chemical hardening type for bedding and filling, ready-mixed or powder vinyl type for topping.

5. Control Joints: Back to back casing beads.

   a. Back control joints with 4 mil thick polyethylene air seal.

D. Batt Insulation (Thermal): ASTM C665, Type III; preformed glass fiber batts with a non reflective type vapor-retarder membrane conforming to the following:


2. Facing: Non reflective.

3. Formaldehyde free.

4. Flame/Smoke Properties: Use Type III, Class A, fire rated Flame/Smoke 25/50; or equal; at attics or furred spaces.
E. Acoustical Accessories:

1. Acoustical Insulation: Preformed mineral fiber, ASTM C665, Type I; friction fit type without integral vapor barrier; as required to meet STC ratings indicated, or of thickness indicated.

   a. Type: Paintable, non-shrinking and non-cracking where exposed, nondrying, nonskinning, nonstaining, and nonbleeding where concealed.

3. Electrical Box Pads: Provide at outlet, switch and telephone boxes in walls with acoustical insulation.
   a. Manufacturers for Non-Fire Rated Partitions:
      1) Harry A. Lowry & Associates (800.772.2521)/Lowry's Electrical Box Pads.
      2) Tremco Sheet Caulking (650.572.1656).
      3) Fire rated partition material manufacturers.
      4) Substitutions: Refer to Section 01630.

   b. Manufacturers for Fire Rated Partitions:
      1) Heavy-Duty Nelson (800.331.7325)/Fire Rated FSP Firestop Putty Pads.
      2) Specified Technologies, Inc. (800.992.1180)/Fire Putty Pads.
      3) Hilti, Corp./Hilti Box Pads.
      4) Substitutions: Refer to Section 01630.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Metal Framing Erection: Erect metal framing in accordance with ASTM C754 and manufacturer's recommendations.
   1. Install members true to lines and levels to provide surface flatness with maximum variation of 1/8" in 10'-0" in any direction.
   2. Door Opening Framing: Install double studs at door frame jambs; install runners on each side of opening at frame head height between jamb studs and adjacent studs.
   3. Install metal framing backing where required for support of fixtures, cabinets, accessories and hardware.
   4. Coordinate installation of bucks, anchors, blocking, electrical and mechanical work which is to be placed in or behind partition framing; allow items to be installed after framing is complete.

B. Ceiling Framing Installation: Erect in accordance with ASTM C754 and manufacturer's recommendations.
   1. Coordinate location of hangers with other work; provide trapeze supports and steel bracing as required to support ceiling.
2. Install ceiling furring independent of walls, columns, and above-ceiling work.

3. Space main carrying channels at maximum 48” on center, not more than 6” from perimeter walls.
   a. Lap splices minimum 12” and secure together 2” from each end of splice.

4. Place furring channels perpendicular to carrying channels at maximum 24” on center and not more than 2” from perimeter walls.

5. Lap splices minimum 8” and secure together 2” from each end of splice.

6. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing; extend bracing minimum 24” past each end of openings.

7. Laterally brace entire suspension system.

C. Gypsum Board Installation: Install in accordance with ASTM C840 and manufacturer’s recommendations.

1. Use screws when fastening gypsum board to furring and to framing.

2. Erect gypsum board with ends and edges occurring over firm bearing.
   a. Ensure joints of second layer do not occur over joints of first layer in double layer applications.

3. For fire rated systems comply with requirements for fire ratings.

4. Place control joints to be consistent with lines of building spaces and as directed by Architect.
   a. Provide where system abuts structural elements.
   b. Provide at dissimilar materials.
   c. Lengths exceeding 30'-0" in partitions.
   d. Ceiling areas exceeding 50'-0" or 2500 square feet.
   e. Wings of "L", "U" and "T" shaped ceilings.

5. Place corner beads at external corners; use longest practical lengths.

6. Place edge trim where gypsum board abuts dissimilar materials.

7. Tape, fill, and sand exposed joints, edges, corners and openings to produce surface ready to receive finishes; feather coats onto adjoining surfaces.

   a. GA Level 4 (Typical): Provide three coat finishing and sanding is required for surfaces indicated to be painted; provide flush, smooth joints and surfaces ready for applied paint finishes.
   b. GA Level 5 (at Dry Erase Coating): Provide three coat finishing with final skim coat on entire surface and sanding is required for surfaces indicated to be painted with
dry erase coating; provide flush, smooth joints and surfaces ready for applied paint finishes.

9. Remove and replace defective work.

D. Acoustical Accessories Installation:

1. Place acoustical insulation tight within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

2. Place acoustical sealant within partitions in accordance with manufacturer's recommendations; install acoustical sealant at gypsum board perimeter at:
   a. Metal Framing: One or two beads.
   b. Base layer and face layer.
   c. Penetrations of partitions.

3. Tolerance: Maximum 1/4" space between gypsum board at floor, ceiling, and penetrations.

4. Install electrical box pads with pads molded and pressed on back side of box, closing openings, in accordance with manufacturer's instructions, for complete acoustical barrier.

5. Pressurized Chambers: Install drywall assemblies airtight at air shafts, stairs, air plenums and where indicated on Drawings.
   a. Comply with requirements for HVAC system for air pressure requirements.

END OF SECTION 09 21 16
SECTION 09 51 00
SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Suspended metal grid system complete with wall trim.
   2. Acoustical ceiling panels.

B. Related Sections:
   1. Section 08 31 13 - Access Doors.
   2. Section 09 21 16 - Gypsum Board Assemblies: Acoustical sealants.
   3. Section 23 00 00 - Heating, Ventilation and Air Conditioning.
   4. Section 26 50 00 – Lighting: Lighting fixtures in ceiling system.
   5. Section 28 31 00 - Fire Alarm and Detection: Fire Alarm devices within ceiling system.

1.2 REFERENCES

A. American Society for Testing and Materials.

B. California Building Code (CBC):
   1. CBC, Chapter 25.

C. Department of State Architect (DSA);
   1. DSA IR 25-2.10 – Metal Suspension Systems for Lay-In Panel Ceilings

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal requirements.

B. Shop Drawings: Clearly indicate grid layout and all related dimensioning, junctions with other work or ceiling finishes, inter-relation and coordination of mechanical and electrical items and access panels related to ceiling system.

C. Product Data: Submit manufacturer's product data and installation instructions.

D. Samples: Submit two 4-inch x 4-inch samples of each type of ceiling tile and two 8-inch long sections of suspension grid.

1.4 EXTRA MATERIALS

A. Deliver to Owner the following extra material:
   1. Acoustical Panels 3 boxes of each type.
   2. Exposed Grid: 3-10 foot lengths of main runners and wall angles and 12 - 4 foot lengths of intermediate members.
B. Clearly identify each box with type of panel, size and location.

1.5 DELIVERY, STORAGE AND HANDLING

A. Do not deliver products until building is completely enclosed.

B. Store in protected area with a constant temperature of 55 degrees F.

1.6 ENVIRONMENTAL CONDITIONS

A. Do not install acoustical ceiling panels until building is enclosed, sufficient heat is provided, dust generating activities have terminated and all overhead mechanical work is completed, tested, and approved.

B. Permit installed wet work to dry prior to commencement of installation.

C. Install acoustical ceilings only where temperature is a minimum of 70 degrees F., humidity of 20 percent to 40 percent prior to, during and after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Armstrong 1-800-448-1405.

B. U.S.G. Interior 1-800-874-4968.

C. Or equal.

2.2 SUSPENSION SYSTEM

A. Type: Chicago Metallic, 1200 HRCmax (stab) Seismic 15/16”, Heavy Duty Seismic Ceiling Suspension System, 270 Main Runner, 1274 Stab-in Cross Tee; or approved equal; conforming to ASTM C635 and UL Design L209.

B. Accessories: Stabilizer bars, furring clips, splices, edge moldings and hold down clips and seismic compression posts as required for suspended grid system.

C. Finish: Baked enamel finish on exposed surfaces. Flame spread: 76 - 200.

D. Carrying Channels and Hangers: Black steel; size and type to suit application, seismic requirements, ceiling system flatness requirements, and to rigidly secure the complete acoustical unit ceilings with maximum deflection of 1/360.

E. Hanger Wires and Brace Wires: Size and location as specified and noted on drawings.

F. Hold Down Clips: Manufacturer's standard, use at all 24 x 48 inch acoustical panels.

2.3 ACOUSTICAL UNITS

A. Acoustical Panels - Type 1: Armstrong Clean Room Ultima, or equal

1. Size: 24 inch x 48 inch.

2. Thickness: 3/4 inch.
4. Light Reflectance: 82 percent.
5. NRC: 0.55.
6. CAC: 35.
7. Fire Hazard Classification: Class A, 0-25 flame spread rating in accordance with ASTM E1264.
8. Edge: Square.
10. Surface Finish: Smooth, DuraBrite with factory applied latex paint, as manufactured by Armstrong; or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that layout of hangers will not interfere with other work.

3.2 INSTALLATION - LAY IN GRID SUSPENSION SYSTEM

A. Comply with DSA Interpretation of Regulations IR M-3 and as herein specified.

B. Separate all ceiling hanging and bracing wires at least 6 inches from all unbraced ducts, pipes, conduits, and other above ceiling systems.
   1. It is acceptable to attach lightweight items such as single electrical conduit not exceeding 3/4 inch nominal diameter to hanger wires using connectors acceptable to Architect.

C. 12 gage minimum hanger wires may be used for up to and including 4 feet x 4 feet grid spacing along main runners.

D. Provide 12 gage hanger wires at the ends of all main and cross runners within 8-inches from the support or within 1/4 of the length of the end tee whichever is least, for the perimeter of the ceiling area. End connections for runners which are designed and detailed to resist the applied horizontal forces may be used in lieu of the 12 gage hanger wires subject to Architect's review and approval.

E. Provide trapeze or other supplementary support members at obstructions to main hanger spacing.
   1. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits or discontinuous areas.
   2. Hanger wires that are more than 1 in 6 out of plump are to have counter-sloping wires.

F. Ceiling grid members may be attached to not more than 2 adjacent walls. Ceiling grid members should be at least 1/2 inch free of other walls. If walls run diagonally to ceiling grid system runners, one end of main and cross runners should be free and a minimum of 1/2 inch clear of wall.

G. At the perimeter of the ceiling area where main or cross runners are not connected to the adjacent wall, provide interconnection between the runners at the free end to prevent lateral spreading.
   1. A metal strut or a 16 gage wire with a positive mechanical connection to the runner may be used.

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2. Where the perpendicular distance from the wall to the first parallel runner is 12 inches or less, this interlock is not required.

H. Provide sets of four 12 gage splayed bracing wires oriented 90 degrees from each other at the following spacing:
   1. Place sets of bracing wires at a spacing not more than 12 feet by 12 feet on center.
   2. Provide bracing wires at locations not more than 1/2 the spacing given in paragraph A above from each perimeter wall and at the edge of vertical ceiling offsets.
   3. Provide a compression strut, steel section with L/R ratio of 200 maximum at each set of splayed wires, attach to main runner with 1/2 inch diameter machine bolt and to structure with #12 x 4 inch long. Compression strut shall not replace hanger wire.
   4. The slope of these wires should not exceed 45 degrees from the plane of the ceiling and should be taut without causing the ceiling to lift. Splices in bracing wires are not to be permitted without special Architect's approval.

I. Fasten hanger wires with not less than 3 tight turns. Fasten bracing wires with 4 tight turns. Make all tight turns within a distance of 1-1/2 inches.
   1. Hanger or bracing wire anchors to the structure should be installed in such a manner that the direction of the wire aligns as closely as possibly with the direction of the forces acting on the wire.
   2. Note: Wire turns made by machine where both strands have been deformed or bent if wrapping can waive the 1-1/2 inch requirement, but the number of turns should be maintained, and be as tight as possible.

J. Separate all ceiling hanging and bracing wires at least 6 inches from all unbraced ducts, pipes, conduit, etc. It is acceptable to attach light-weight items, such as single electrical conduit not exceeding 3/4 inch nominal diameter, to hanger wires using connectors acceptable to Architect.

K. Where drilled-in concrete anchors or shot-in anchors are used in reinforced concrete for hanger wires, 1 out of 10 must be field tested for 200 lbs. in tension. When drilled-in concrete anchors are used for bracing wires, 1 out of 2 must be field tested for 440 lbs. in tension. Shot-in anchors in concrete not permitted for bracing wires. If any shot-in or drilled-in anchor fails, refer to CBC 1923A.3.5.

L. Attach all light fixtures to the ceiling grid runners to resist a horizontal force equal to the weight of the fixtures.

M. Flush or recessed light fixtures and air terminals or services weighing less than 56 pounds may be supported directly on the runners of a heavy duty grid system but, in addition, they must have a minimum of two 12 gage slack safety wires attached to the fixture at diagonal corners and anchored to the structure above. All 4 feet x 4 feet light fixtures must have slack safety wires at each corner.
   1. All flush or recessed light fixtures and air terminals or services weighing 56 pounds or more must be independently supported by not less than 4 taut 12 gage wires each attached to the fixture and to the structure above regardless of the type of ceiling grid system used.
   2. The 4 taut 12 gage wires including their attachment to the structure above must be capable of supporting 4 times the weight of the unit.
N. All fixtures and air terminals or services supported on intermediate duty grid systems must be independently supported by not less than 4 taut 12 gage wires each attached to the fixture or terminal and to the structure above.

O. Support surface mounted light fixtures by at least two positive devices that surround the ceiling runner and that are each supported from the structure above by a 12 gage wire. Spring clips or clamps that connect only to the runner are not acceptable. Provide additional supports when light fixtures are 8 feet or longer.

P. Support pendant mounted light fixtures directly from the structure above with hanger wires or cables passing through each pendant hanger and capable of supporting 4 times the weight of the fixture.

3.3 INSTALLATION OF ACOUSTICAL PANELS
A. Install acoustical units in accordance with manufacturer's instructions.
B. Fit units in place, free from damaged edges or other defects detrimental to appearance and function.
B. Install hold down clips at acoustical panels.
C. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

3.4 ERECTION TOLERANCES
A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

3.5 CLEANING
A. Remove excess adhesive from face of tile without damage. Permanently damaged tile shall be replaced.

END OF SECTION
SECTION 09 51 53
ADHESIVE APPLIED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Acoustical tile.
   2. Extra materials.
B. Related Sections:
   1. Section 09 21 16 - Gypsum Board Assemblies.
   2. Division 23 for registers or equipment
   3. Division 26 for Interior Lighting:

1.2 REFERENCES
A. American Society for Testing and Materials:
   2. ASTM E1264 - Classification of Acoustical Ceiling Products.

1.3 SUBMITTALS
A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
B. Shop Drawings: Clearly indicate grid layout and all related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system.
C. Product Data: Provide manufacturer's data and installation instructions.
D. Material Safety Data Sheets: Provide manufacturer's material safety data sheets (MSDS) on adhesive proposed for use on this project. Certify that adhesives shall be non-toxic, low odor and solvent free with no alcohol, glycol, ammonia, formaldehyde, or styrene-butadiene latex. Adhesives shall not have hazardous vapors nor carcinogenic materials per requirements of EPA and OSHA.

1.4 ENVIRONMENTAL CONDITIONS
A. Do not install acoustical tile until building is enclosed, sufficient heat is provided, dust generating activities have terminated and all overhead mechanical work is completed, tested and approved.
B. Permit wet work to dry prior to commencement of installation. Install acoustical ceilings only where temperature is a minimum of 70 degrees F., humidity of 25% to 55% prior to, during and after installation.

1.5 EXTRA MATERIALS
A. Deliver to District the following extra material:
   1. Acoustical Tile: 1 box of each type, or 2 percent of total quantity of each type supplied, which ever is greater.
B. Clearly identify each box with type of tile or panel, size and location installed.

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PART 2 PRODUCTS

2.1 MANUFACTURERS
A. Armstrong.
B. U.S. Gypsum.
C. Or approved equal. Submit in accordance with Section 01 63 00 – Product Substitutions Procedures.

2.2 MATERIALS
A. Recycled Content: Provide ceiling tile with treated cellulose fiber, not less than 50 percent blend of post-consumer and recovered cellulose fibers.
   1. Toxicity/IEQ: Coating-Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment consisting of manufacturer’s standard formulation with fungicide added to inhibit growth of mold and mildew and showing no mold or mildew growth when tested according to ASTM D3273.
   2. Panel-Based Antimicrobial Treatment: Provide acoustical panels treated with manufacturer’s standard antimicrobial solution that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria.

B. Acoustical Tile:
   1. Size: 12 inch x 12 inch.
   2. Thickness: 5/8 inch.
   3. Composition: Wet formed mineral fiber.
   4. Light Reflectance: 85 percent.
   5. NRC Range: 0.55.
   6. CAC Range: 35.
   7. Fire Hazard Classification: Class A, 0-25 flame spread rating, per ASTM E1264.
   8. Surface Burn Characteristics: Materials when cemented or otherwise fastened in place will not readily become detached when subject to room temperatures of 300 degree F. for 25 minutes.
   11. Surface Finish: Fine Fissured, Armstrong 741; or equal.

C. Adhesive: ASTM D1779, waterproof, gun grade, VOC compliant: less than 50 grams per liter. Product shall not contain toxic materials listed: chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene.

D. Edge Trim: Plastic, white.

E. Staples: Manufacturer’s standard recommended staples to suite application.

PART 3 EXECUTION

3.1 EXAMINATION
A. Verify that substrate conditions are ready to receive the work of this section.

3.2 INSTALLATION
A. Install system in accordance with manufacturer's instructions and as supplemented in this section.
B. Install tile in symmetrical ceiling pattern.

12/19/12
C. Adhesive:
   1. Set tile to gypsum wallboard with approved staples and adhesive sufficient to support a load of 1/2 lb. per square inch when first applied and 1-1/4 lbs. per square inch after 24 hours.
   2. Five (5) dabs of adhesive minimum for each tile.
   3. Tiles will not readily become detached when subjected to room temperature of 300 deg. F. for 25 minutes.
   4. Comply with CBC limits of VOC content of paints and coatings used in buildings.

D. Staple:
   1. Two (2) staples minimum for each tile.

E. Install acoustic units level, in uniform plane, and free from twist, warp or dents. Use fiber splines to keep tile in alignment until adhesive has set.

3.3 ERECTION TOLERANCES
   A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

3.4 CLEANING
   A. Remove excess adhesive from face of tile without damage. Permanently damaged tile shall be replaced.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Vinyl composition tile flooring.
   2. Resilient Sheet Flooring
   3. Resilient base.

B. Related Sections:
   1. Section 06 20 00 – Finish Carpentry
   2. Section 09 65 00 – Carpet Tile

1.2 REFERENCES

A. Americans with Disabilities Act (ADA) - 2010 Standards for Accessible Design.

B. American Society for Testing and Materials.
   1. ASTM E84 - Surface Burning Characteristics of Building Materials.
   2. ASTM F1066 - Specification for Vinyl Composition Floor Tile.
   3. ASTM D2047 - Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.
   4. ASTM F1861 – Standard Specifications for Resilient Wall Base
   5. ASTM F1303 – Standard Specification for Sheet Vinyl Floor Covering with Backing

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures: Submittal requirements.

B. Product Data: Provide data on specified products, describing physical and performance characteristics, sizes, patterns and colors available.

C. Samples: Submit two samples of each VCT, two 10 inch samples of base.

D. Installation Instructions: Provide manufacturer's installation instructions.

E. Material Safety Data Sheets:
   1. Provide manufacturer's material safety data sheets (MSDS) on adhesive proposed for use on this project.
   2. Certify that adhesives shall be non-toxic, low odor and solvent free with no alcohol, glycol, ammonia, formaldehyde, or styrene-butadiene latex.
   3. Adhesives shall not have hazardous vapors nor carcinogenic materials per requirements of EPA and OSHA.

1.4 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/smoke rating requirements of 25/450 in accordance with ASTM E84.

B. Resilient flooring shall have a coefficient of friction of at least 0.5 per ASTM D2047.
1.5 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in areas of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of material.

1.6 MAINTENANCE DATA AND MATERIAL

A. Include maintenance procedures, recommended maintenance materials and suggested schedule for cleaning, stripping, and re-waxing.

B. Provide one box of each color of vinyl composition tile and 10 lineal feet of base of each color required for project, for maintenance use.

C. Clearly identify each color and material.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Vinyl Composition Flooring:
   1. Mannington.
   2. Armstrong.

B. Base:
   1. Mannington Flooring Products,

C. Or equal.

2.2 FLOOR COVERING MATERIALS

A. Resilient Sheet Vinyl: RSF-1: ASTM F1303 Type 2, Grade 1, Class A, Inlaid Sheet Flooring 6 foot wide roll 0.08 inch thick, 0.055 inch thick wear layer, 5.9 pounds per square yard average weight, 500 psi static load limit,. Mannington Commercial MAGNA or equal; color as shown on drawings.

B. Vinyl Composition Tile: VCT-1: ASTM F1066, 12 x 12 inch size by 1/8 inch thick, Mannington Commercial Essentials Colorway; or equal; color as shown on drawings.

C. Accessories: Burke Flooring Products: Carpet reducers and transition strips as indicated on Drawings; color as selected by Architect.

2.3 BASE MATERIALS

A. Resilient Base: RB-1: Conforming to ASTM F1861 Type TV, Group 1, thermoplastic vinyl; top set type, 4 inch high, 1/8 inch thick, thermally formed, color as shown on drawings, and as manufactured by Mannington; or equal.

B. Accessories: Premolded external corners.
2.4 ACCESSORIES/ADHESIVES/SEALERS

A. Sub-Floor Filler: White premix latex, mix with water to produce cementitious paste.

B. Reducer Strips: Vinyl; profile as shown; color as selected by Architect.

C. Primers and Adhesives: Waterproof; of types recommended by resilient flooring manufacturer for specific material.

D. Sealer and Wax: type recommended by resilient flooring material manufacturer for material type and location.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 feet, and are ready to receive work.

B. Verify plywood sub floors are ready for installation, free of dirt, dust debris, grease, or other deleterious materials that would affect adhesive bond.

3.2 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

B. Clean floor and apply, trowel and float filler to leave smooth, flat hard surface. Prohibit traffic until filler is cured.

3.3 INSTALLATION – RESILIENT SHEET FLOORING

A. Install in accordance with manufacturer's instructions.

B. Install sheet flooring square to room walls, parallel seams to produce a Random Repeat, Reverse Sheet Seam pattern. Maximize width of roll at room or area perimeter.

C. Heat weld seems with matching solid color welding rods as recommended by flooring manufacturer.

D. Terminate flooring at centerline of door openings where adjacent flooring is dissimilar.

E. Spread only enough adhesive to permit installation of material before initial

3.4 INSTALLATION - TILE FLOORING

F. Install in accordance with manufacturer's instructions.

G. Mix tile from container to ensure shade variations are consistent.

H. Spread only enough adhesive to permit installation of material before initial set.

I. Install vinyl composition tile to square grid pattern with all joints aligned and with pattern grain alternating to produce a Quarter Turned pattern. Allow minimum 1/2 width full size tile at room or area perimeter.

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J. Terminate flooring at centerline of door openings where adjacent flooring is dissimilar.

K. Install edge strips at unprotected or exposed edges, and where flooring terminates.

3.5 INSTALLATION - BASE

A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

B. Miter internal corners. Use preformed exterior corners; standard rubber base wrapped around corners will not be accepted.

C. Install base on solid backing. Adhere tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other obstructions.

E. Install straight and level to variation of plus or minus 1/8 inch over 10 feet.

3.6 CLEAN-UP

A. Section 01 74 00 – Cleaning: Final Cleaning.

B. Remove excess adhesive from floor, base and wall surfaces without damage.

C. Clean, seal and wax floor and base surfaces in accordance with manufacturer’s recommendations.

3.7 PROTECTION

A. Section 01 50 00 – Temporary Facilities and Controls, Temporary Controls and Utilities: Protection of installed work.

B. Prohibit traffic on floor finish for 48 hours after installation.

END OF SECTION
SECTION 09 68 13
CARPET TILE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Carpet tile.
   2. Carpet edging.

B. Related Sections:
   1. Section 06 20 00 – Finish Carpentry
   2. Section 09 65 00 – Resilient Flooring.

1.2 REFERENCES

A. American Society for Testing and Materials:
   2. ASTM E84 - Surface Burning Characteristics

B. Carpet and Rug Institute:
   1. CRI 104 - Standard for Installation of Commercial Carpet.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal requirements.

B. Shop Drawings: Clearly indicate the layout of joints, direction of carpet pile, location of edge moldings, method of integrating edge strips with carpet and installation procedures.

C. Samples: Submit one carpet tile illustrating color and construction. In addition, submit one duplicate sample of each color selected.

D. Also submit two 12 inch long sample of each type of edge stripping to be used.

E. Product Data: Submit manufacturer's product data, installation instructions.

F. Manufacturer's Material Safety Data Sheets (MSDS's):
   1. Submit manufacturer's MSDS sheets and installation instructions on carpet, adhesives and accessories proposed for use on the project.
   2. Submit Certification that the carpets meet the testing criteria of the Carpet and Rug Institute Indoor Air Quality Program for total volatile organic chemicals, styrene, 4-phenylcyclohexene, and formaldehyde.
   3. Submit test data by independent testing laboratory using testing methodology prescribed by U.S. EPA Carpet Policy Dialogue with less than the following emission Factor mg/m2-hr.: TVOC=0.6; Styrene 0.4; 4-phenylcyclohexene= 0.1; formaldehyde = 0.05. Products containing volatile and semi-volatile aromatic hydrocarbons, halogenated aliphatic and aromatic hydrocarbons, mucous

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membrane irritants, central nervous system depressants, liver and kidney toxins, and compounds on the California Proposition 65 list of known carcinogens will not be acceptable.

4. Where there is a suitable alternative product, products that have any of the mentioned components shall not be used.

1.4 QUALITY ASSURANCE

A. Carpet system must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program. System components include the following:
   1. Carpet.
   2. Backing
   3. Adhesive.

B. Adhesives used in carpet system shall meet or exceed the VOC limits of the CBC.

C. Carpet System: No PVC content is allowed.

1.5 MAINTENANCE DATA

A. Section 01 77 00 - Closeout Procedures: Maintenance data.

B. Maintenance Data: Submit manufacturer's maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning and shampooing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Transport, store, handle and protect products.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/smoke rating.

B. Conform to ASTM E648 Class I.

C. Conform to ASTM E662 for density of smoke generated.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not commence with carpet installation until all painting and finishing work is complete and all ceilings and overhead work, tested, approved and completed.

B. Maintain room temperature at minimum 60 degree F for at least 24 hours prior to installation and relative humidity at approximately that at which the area is to be maintained.

C. Provide sufficient lighting during installation.
1.9 CARPET SELECTION

A. Architect or Owner reserves right to change carpet specified to different manufacturer depending on carpet availability and color selections. Contractor shall credit full amount of carpet material cost to Owner.

1.10 EXTRA MATERIALS

A. Section 01 70 00 - Closeout Procedures: Extra materials.

B. Deliver to Owner two (2) percent of each color and/or type of carpet used on project.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Tandus Flooring
B. Mannington
C. Interface
D. Mohawk
E. Shaw
F. Or approved equal.

2.2 MATERIALS – CARPET TILE

A. Tandus: ER3 Modular Backing SCS Certified, Secondary Backing 100% recycled content with Tru Bloc (Barrier System) 65 lbs/cu ft density, 0.087 inch thick. Intermediate Layer, fiberglass reinforced sealant; or equal.

B. Carpet Tile, RUNAWAY II #03164 manufactured by Tandus Flooring; or equal:
   1. Color: As indicated on Drawings.
   3. Construction: Patterned loop
   5. Pile Height: 0.117 inch.
   7. Dye Method: 50% Solution / 50% Yarn.
   8. Primary Tufting Substrate: Synthetic Non-Woven.

2.3 ACCESSORIES

A. Edge Strip: Mercer metal type.

B. Sub-Floor Filler: As recommended by Carpet manufacturer.
   1. Filler shall be non-toxic, low odor and solvent free with no alcohol, glycol, ammonia, formaldehyde or Styrene-butadiene latex.
   2. Filler shall not have hazardous vapors nor carcinogenic material per OSHA or the EPA.

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C. Adhesive: VOC compliant as recommended by Carpet manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Project Management and Coordination.

B. Verify that substrate surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft and are ready to receive work.

3.2 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to leave smooth, flat, hard surface.

C. Prohibit traffic until filler is cured.

D. Vacuum floor surface.

3.3 INSTALLATION - DIRECT GLUE DOWN

A. Apply carpet, primer and adhesive in accordance with manufacturer's instructions.

B. Verify carpet match before cutting to ensure minimal variation between dye lots.

C. Do not mix carpet from different cartons unless from same dye lot.

D. Cut carpet clean. Fit carpet tight to intersection with vertical surfaces without gaps. Make cuts straight, true, and unfrayed.

E. Install carpet in Quarter Turn pattern.

F. Fit seams straight, not crowded or peaked, free of gaps.

G. Locate change of color or pattern between rooms under door centerline.

H. Cut and fit carpet neatly around interruptions.

I. Fit carpet tight to intersection with vertical surfaces without gaps.

J. Fully adhere carpet tile to substrate.

K. Install vinyl reducers in accordance with manufacturer's instructions.

3.4 CLEANING

A. Section 01 74 00 – Cleaning: Final cleaning.

B. Remove excess adhesive from floor, base, and wall surfaces without damage.

3/12/2013
C. Clean and vacuum carpet surfaces.

3.5 PROTECTION

A. Section 01 50 00 - Temporary Facilities and Controls: Protection of installed work.

B. Prohibit traffic from carpet areas for minimum of 24 hours after installation.

END OF SECTION
SECTION 09 77 13

STRETCHED-FABRIC WALL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes site-upholstered wall systems.

B. Related Sections:

1. Section 09 21 16 – Gypsum Board Assemblies

C. References

2. ASTM C208 – Cellulosic Fiber Insulating Board.
3. ASTM C423 – Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
4. ASTM C612 – Mineral Fiber Block and Board Thermal Insulation.

D. Definitions

1. NRC: Noise Reduction coefficient.

1.2 SYSTEM DESCRIPTION

A. System shall consist of track, core materials, and fabric that are site-fabricated to permit the installation of continuous, unbroken lengths (and widths) beyond those available in pre-assembled panels. System shall allow for removal and replacement of fabric without the removal and replacement of any other components.

1.3 SUBMITTALS

A. Comply with Division 01 submittal requirements.

B. Product Data:

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for stretched-fabric systems.

1/7/2013
2. Include furnished specialties and accessories.

C. Shop Drawings: For each stretched-fabric system. Include installation and system details; details at head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate frame edge and core materials.

1. Include elevations showing panel sizes and direction of fabric weave and pattern matching.

D. Samples for Initial Selection: For each type of fabric facing from stretched-fabric system manufacturer's full range.

E. Samples for Verification: For the following products prepared on Samples of size indicated below.

1. Fabric: Full-width by approximately 36-inch- (900-mm-) long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.

2. Frame System: 12-inch- (300-mm-) square Sample(s) showing each edge profile and corner.

3. Core Material: 12-inch- (300-mm-) square Sample at corner.

4. Assembled System: Approximately 36 by 36 inches (900 by 900 mm), including joints in mockup.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For stretched-fabric systems to include in maintenance manuals. Include fabric manufacturer's written cleaning, stain-removal, restretching, and reupholstering recommendations.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of systems required for this Project.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with fabric and stretched-fabric system manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.
1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install stretched-fabric systems until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Air-Quality Limitations: Protect stretched-fabric systems from exposure to airborne odors such as tobacco smoke, and install systems under conditions free from odor contamination of ambient air.

1.8 WARRANTY

A. Special Warranty: Manufacturer and Installer agree to repair or replace components of stretched-fabric systems that fail in performance, materials, or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   b. Fabric sagging, distorting, or releasing from panel edge.
   c. Warping of core.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or comparable product by one of the following:

1. Fabricmate Systems, Inc.
2. Accutrack Systems
3. FabriTrak Systems, Inc.
4. Whisper Walls.
5. Or Equal

B. Source Limitations: Obtain stretched-fabric systems from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Requirements for Stretched-Fabric Wall Systems: Provide systems that comply with the testing and product requirements of the California Department of Health
Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Fire-Test-Response Characteristics: Provide stretched-fabric systems meeting the following requirements as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 450 or less.

2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 286.

2.3 STRETCHED-FABRIC WALL SYSTEMS

A. Stretched-Fabric Wall System Marked Alternate #2: Manufacturer's standard system consisting of facing material stretched taught over a frame and core material and secured in the frame.


2. Core: FabricMate Recore single solution substrate.
   a. Core-Face Layer: Manufacturer's standard light weight tackable, impact-resistant, semi-rigid board produced from 65% post-consumer content.
   b. Nominal Core Thickness: 1/2 inch (13 mm).

3. Core Overlay: Polyester batting.

4. Frame-Edge: Square profile.
   b. Nominal Frame Thickness: 1/2 inch (13 mm)

5. Frame Color: Black.


8. Acoustical Performance: Sound absorption 0.80 according to ASTM C 423 for Type A mounting according to ASTM E 795.

9. Nominal Overall System Thickness: 1/2 inch (13 mm).
2.4 MATERIALS

A. General:

B. Core Materials:
   1. Polyester-Fiber Board: ASTM C 612, Type standard with manufacturer; nominal density of 9.4 lb/cu. ft., unfaced, and dimensionally stable, semi-rigid board; and with maximum flame-spread and smoke-developed indexes of 15 and 200, respectively.

C. Frame-Edge Construction: Manufacturer's standard extruded plastic frame.

D. Facing Material AWP (Add Alt #2): Fabric from same dye lot; color and pattern as selected by Architect from manufacturer's full range.
   1. Manufacturer: FabricMate.
   2. Product Line/Pattern: Hytex Panel Fabric, Brilliance Fabric
   3. Color: as indicated on drawings.
   4. Fiber Content: 100 percent polyester.
   5. Width: 54 inches (1371 mm).
   8. Lining Material: Manufacturer standard fabric for each use indicated.

2.5 INSTALLATION MATERIALS

A. Installation Products, General: Concealed on back of system, recommended by stretched-fabric system manufacturer to support weight of system, fabric tension, and as follows:

B. Adhesives: As recommended by stretched-fabric system manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Fasteners: Manufacturer's standard suited to application.
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   1. Polyester-Fiber Board: ASTM C 612, Type standard with manufacturer; nominal density of 9.4 lb/cu. ft., unfaced, and dimensionally stable, semi-rigid board; and with maximum flame-spread and smoke-developed indexes of 15 and 200, respectively.

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C. Fasteners: Manufacturer's standard suited to application.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fabric, materials, substrates, areas, and conditions, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of stretched-fabric systems.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before installation, allow fabric to adjust and become stable in spaces where it will be installed in accordance with stretched-fabric system manufacturer's written instructions. Acclimatize fabric for minimum of 24 hours at ambient temperature and humidity conditions indicated for spaces when occupied for their intended use.

3.3 INSTALLATION

A. General: Install stretched-fabric systems in accordance with system manufacturer's written instructions.

1. Provide continuous perimeter frames of each profile indicated, designed to be inconspicuous when covered by fabric facing, with smooth edges, and with surface finish that will not telegraph through fabric facing.

2. Install framing around penetrations.

3. Tightly fit framing to adjacent construction and securely attach to substrate.

4. Install core material with full coverage, flush with face of stretched-fabric system frame.

5. Attach frame and core to substrate with adhesive or fasteners or both to support system and prevent deformation of components.

6. Install stretched-fabric systems vertical and plumb, unless otherwise indicated; true in plane; and with fabric square to the grain.

7. Install jointed panels with butt joints.

B. Fabric Installation: Apply fabric monolithically in continuous run over area, without joints or reveals, except where panel joints or midspan frames are indicated.


2. Fabric Sequence: Maintain sequence of fabric drops; match and level fabric pattern and grain.

3. Fabric Alignment: Install fabric with patterns or directional weaves so pattern or weave aligns with adjacent panels.
4. **Fabric Seams**: Sewn seams are not permitted.

5. **Stretch and secure fabric to frame edges and so frame and frame attachment method are concealed by fabric unless otherwise indicated.**

6. **Stretch fabric taught and square without puckers, ripples, or distortions. Acclimatize and restretch if recommended by stretched-fabric system manufacturer. Repair distortions, wrinkles, and sagging.**

3.4 **INSTALLATION TOLERANCES**

A. **Edge Straightness**: Plus or minus 1/16”.

B. **Variation from Level and Plumb**: Plus or minus 1/16”.

C. **Variation of Panel-Joint Width**: Not more than 1/16”

3.5 **CLEANING**

A. **Clip loose threads; remove pills and extraneous materials.**

B. **Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.**

END OF SECTION
SECTION 09 91 00

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Surface preparation and field application of paints and coatings on all surfaces scheduled to receive paint.

B. Related Sections:
   1. Pertinent sections of Division 01 specifying Quality Control and Testing Agency services.
   2. Section 09 21 16 – Gypsum Board Assemblies
   3. Divisions 22 “Plumbing” and 23 “Heating, Ventilating, and Air-Conditioning” for finish of piping and ductwork and their supports where exposed to view

1.2 REFERENCES

A. ASTM, International (ASTM):
   1. ASTM D16 Terminology Relating to Paint, Varnish, Lacquer, and Related Products
   2. ASTM D2486 Test Method for Scrub Resistance of Wall Paints

B. Painting and Decorating Contractors of America (PDCA):

C. The Society for Protective Coatings (SSPC)
   1. SSPC Steel Structures Painting Manual

D. California Code of Regulations (CCR):
   1. CCR Title 24 Part 2, California Building Code (CBC) including legislation requiring lower VOC’s in all paints after July 1, 2006

1.3 COLOR SCHEDULE

A. Provide paint colors as scheduled on the Drawings and selected by the Architect.

B. Prior to commencement of work, the Architect will furnish three copies of color schedule. Accent colors used for exterior and interior surfaces shall not exceed 40 percent. Color selection will include up to eight (8) different colors.

C. Where deep tone colors are scheduled, provide sufficient extra coats of paint as required to provide uniform color.

1.4 SUBMITTALS

A. Product Data: Manufacturer’s description of products and manufacturer's preparation, mixing and application instructions.

1/14/2013
B. Samples:

1. Prepare four sets of 8-1/2 x 11 inch sample “brush-outs” of each paint color and finish. Apply finishes on identical type materials to which they will be applied on job.
2. Identify each sample as to color name and mixture number, finish, formula, sheen name and gloss units in accordance with ASTM D16.

C. Product Data:

1. Manufacturer’s Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention.
2. Provide manufacturer’s material safety data sheets (MSDSs) for all products proposed for use on the project.
3. Products containing volatile and semi-volatile aromatic hydrocarbons, halogenated aliphatic and aromatic hydrocarbons, mucous membrane irritants, central nervous system depressants, and liver and kidney toxins and compounds found on the California Proposition 65 list of known carcinogens shall not be used.
4. Where there is a suitable alternative product, products which have any of the above mentioned components shall not be used.

1.5 QUALITY ASSURANCE

A. Acceptable manufacturers, materials, workmanship and all items affecting the work of this section shall be in accordance with Section 01 60 00 - Product Requirements.

B. Comply with CBC for limits on VOC content of paints and coatings used in buildings.

C. Applicator: Company specializing in performing work of this section with minimum three years documented experience, and possessing a valid Contractors State License Board C-33 Painting & Decorating license.

1.6 PRE-INSTALLATION MEETING

A. Convene at least two weeks prior to starting work of this section.

1.7 DELIVERY. STORAGE AND HANDLING

A. Deliver paint materials in sealed and labeled containers, inspect to verify acceptability.

B. Container label to include manufacturer’s name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, clean-up requirements, color designation and instructions for mixing and/or reducing.

1.8 MOCK-UP

A. Provide paint on walls, 8'-0" long by 8'-0" wide, illustrating prime coat, base coat and final paint color scheduled for interior surfaces for examination by Architect prior to application of the paint. Do not begin painting until Architect has approved mock-ups.

B. Provide door and frame assembly illustrating paint, texture and finish for application of sample paint mock-up.

1/14/2013
C. Locate where directed by Architect.
D. Mock-up may remain in place only if, and when, approved by Architect

1.9 ENVIRONMENTAL CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F. for interiors; 50 degrees F. for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish and Epoxy Finishes: 65 degrees F. for interior, unless required otherwise by manufacturer's instructions.

E. Provide adequate continuous ventilation and sufficient heating facilities to maintain temperatures above 45 degrees F. for 24 hours before, during and 48 hours after application of finishes.

F. Provide lighting level of 80 foot candles measured mid-height at substrate surface.

1.10 EXTRA MATERIALS

A. Provide one gallon of each color, sheen level, and type to District.

B. Label each container in accordance with ASTM D16 with color, type, room locations in addition to manufacturer's label.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Kelly-Moore, Dunn Edwards, Frazee; ICI Paint Stores, Benjamin Moore, or approved equal.

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<tr>
<th>MATERIAL</th>
<th>KELLY-MOORE</th>
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1/14/2013
### MATERIALS

#### INTERIOR

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#### MATERIALS

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<td>Cabot 7400</td>
<td>WPT-3</td>
<td>385 Wood Stain</td>
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B. Glass Paint; Rust-Oleum Universal paint & primer, satin sheen, color Espresso Brown, or equal. Clean glass as recommended by paint manufacturer.

C. Equivalent products of other manufacturers will only be acceptable subject to conformance with specified requirements and the following criteria:

1. Submit proposed substitution request in accordance with Division 1 – General Requirements product substitution procedures.
2. Provide independent laboratory tests conducted within the previous 12 months.
3. Provide test results of the following characteristics:
   - The resin type.
   - Solids by volume and solids by weight.
   - Identify by percent of weight both primary and reinforcing pigments.
   - Identify resins and additives by percent of weight.
   - Provide “Contrast Ratio” tests in accordance with ASTM D-2805.
   - Interior Paint: Provide “Scrub to Failure” test results in accordance with ASTM D-2486.
   - Exterior Paint: Provide “Accelerated Weathering” test results in accordance with ASTM D5031.
   - Submit manufacturer’s data and test results for each product as separate exhibits.

2.2 MATERIALS

A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.

1/14/2013
B. Paint Accessory Materials: Linseed oil, shellac, turpentine and other materials not specifically indicated but required to achieve the finishes specified of commercial quality.

C. Patching Materials: Latex filler.

D. Fastener Head Cover Material: Latex filler.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and substrate conditions are ready to receive work as instructed by product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report in writing to the Architect, any condition that may potentially affect proper application. Do not commence until all such defects have been corrected.

C. Test shop applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic "Moisture Meter" with one inch long prongs (minimum). Do not apply finishes unless the moisture content of surfaces are below the following maximums:

1. Gypsum Wallboard: 12 percent.
2. Concrete: 12 percent.
3. Fiber Cement Board: 12 percent.
4. Interior Located Wood: 15 percent.

E. Measure exterior Portland cement for pH value using litmus paper. If pH value is 8 or less, paint can be applied, if more than 8, wait until pH value is determined to be less than 8, or consult manufacturer's data sheets for recommendation.

3.2 PREPARATION OF SURFACES


B. Remove all electrical cover plates, surface hardware, fittings, escutcheons, and fastenings, prior to painting operations.

C. Store items carefully, clean and replace on completion of work.

D. Do not use solvent to clean hardware that may remove the permanent lacquer finish.

E. Prepare all surfaces, including areas to be patched, in strict accordance with paint manufacturer's published instructions for each particular substrate condition.

F. Adequately protect other surfaces from paint and damage. Make good any damage as a result of inadequate or unsuitable protection.

G. Furnish sufficient drop cloths, shields and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.

1/14/2013
H. Place cotton waste, cloths and material which may constitute a fire hazard in closed metal containers and remove daily from site.

I. Impervious Surfaces: Remove mildew, by scrubbing with a solution of tri-sodium phosphate. Rinse with clean water and allow surface to dry completely.


K. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply a coat of etching primer.

L. Shop Primed Steel Surfaces:
   1. Sand and scrape to remove all loose primer rust.
   2. Feather edges to make touch-up patches inconspicuous.
   3. Clean surfaces with solvent.

M. Interior Wood Items Scheduled to Receive Transparent Finish:
   1. Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer.
   2. Fill nail holes and cracks after sealer has dried; sand lightly between coats.

N. Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.3 APPLICATIONS

A. Apply products in accordance with manufacturer's instructions.

B. Finishes specified are intended to cover surfaces satisfactorily when applied in accordance with manufacturer's recommendations.

C. Apply each coat to uniform finish.

D. Apply each coat of paint slightly darker than the preceding coat unless otherwise approved by the Architect.

E. Sand lightly between coats to achieve required finish.

F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

G. Allow each coat of finish to dry before a following coat is applied, a minimum of 24-hours, unless directed otherwise by manufacturer.

H. Paint tops and bottoms of doors; match color of doors edges.

I. Where clear finishes are required ensure tint fillers match wood. Wood fillers well into the grain before it has set. Wipe excess from the surface.

J. Backprime exterior and interior woodwork, which is to receive a paint or enamel finish, with enamel undercoat paint.
K. Backprime interior woodwork, which is to receive a stain and/or varnish finish, with a gloss varnish. Do not thin varnish for backpriming.

L. Factory Finished and Anodized Aluminum: No paint finish required.

3.4 MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to Mechanical and Electrical sections with respect to painting and finishing requirements color coding identification banding of equipment, ducting, piping and conduit.

B. Remove grilles, covers and access panels for mechanical and electrical systems from location and paint separately.

C. Finish paint primed equipment to color selected in schedule.

D. Prime and paint insulated and bare pipes, conduits, boxes, except where items are plated or covered with a pre-finished cladding.

E. Replace identification markings on mechanical or electrical equipment when painted over or spattered.

F. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line. Paint dampers exposed immediately behind louvers, grilles.

G. Paint exposed conduit and electrical equipment occurring in finished surfaces.

H. Paint both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.

I. Color code equipment, piping, conduit and exposed ductwork in accordance with requirements indicated. All color banding and identification flow arrows, naming, numbering, etc., in accordance with ANSI requirements.

3.5 CLEANING

A. As the work proceeds and upon completion, promptly remove all paint where spilled, splashed or spattered.

B. During the progress of the work keep the premises free from any unnecessary accumulation of tools, equipment, surplus materials and debris.

C. Upon completion of work leave premises neat and clean, to the satisfaction of the Architect.

3.6 PAINTING AND FINISHING SCHEDULE

A. Exterior:

1. Galvanized and Miscellaneous Metal other than factory finished: Steel doors and frames; sheet metal flashing, trim, handrails, guard rails, roof hatches, gravity vents, metal grating, and other exposed exterior metal:
   a. First Coat: Acrylic metal primer.
   b. Second and Third Coats: Acrylic gloss enamel.

1/14/2013
B. Interior:

1. **Wood**: Wood Trim (Stain finish):
   a. First Coat: Stain to match existing wood veneers.
   b. Second Coat: Clear polyurethane varnish seal coat.
   c. Third Coat: Clear polyurethane varnish.

2. **Drywall**: Gypsum wallboard, flat finish (Ceilings):
   b. Second and Third Coat: 100% Acrylic Flat Latex.

3. **Drywall**: Gypsum wallboard eggshell finish (Walls):
   b. Second and Third Coat: 100% Acrylic Eggshell.

4. **100% Acrylic Semi-Gloss Enamel at Toilets and Janitor**:
   a. First Coat: Primer, acrylic enamel undercoat.
   b. Second and Third Coat: 100% Acrylic Semi-Gloss Enamel.

5. **Epoxy Paint**: Gypsum board walls and ceilings in Public Toilets and Break Room:
   a. First Coat: Gypsum wallboard sealer.

6. **Galvanized and Miscellaneous Metal**: Control panels, steel doors, steel door frames, handrails, exposed ducts, pipes, and other interior metals:
   a. First Coat: Metal primer.
   b. Second and Third Coat: 100% Acrylic Semi-Gloss Enamel.

END OF SECTION
PART 1  GENERAL

1.1  SECTION INCLUDES
A. This Section specifies field-applied dry-erase coatings.

1.2  RELATED SECTIONS
A. Section 09 21 16 - Gypsum Board Assemblies; gypsum board substrate.

1.3  SUBMITTALS
A. Comply with Division 1 Section: Submittals.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Maintenance Instructions: Provide precautions against cleaning materials and methods that may be detrimental to finish and performance.
D. Samples: Submit verification sample of specified color on manufacturer’s standard sample card.

1.4  QUALITY ASSURANCE
A. Fire Performance Chacteristics: Comply with fire performance characteristics indicated below. Identify components with markings from testing and inspections organization.
   1. ASTM E-84 (Fuel Contribution) – Class A, flame spread 5, smoke developed 0.
B. Manufacturer Qualifications: Minimum 3 years manufacturing dry-erase coatings.
C. Mock-ups: Prepare mock-ups for Architect's review and to establish requirements for substrate finish and final coating application, texture and color.
   1. Install dry-erase coatings mock-up in area designated by Architect.
   2. Correct areas, modify method of application/installation, or adjust finish texture as directed by Architect to comply with specified requirements.
   3. Maintain mock-ups accessible to serve as a standard of quality for this Section.
   4. Accepted mock-ups may remain in place.

1.5  DELIVERY, STORAGE, AND HANDLING
A. Deliver materials in original factory wrappings and containers, clearly labeled with manufacturer, product name, and fire hazard classification.
B. Store materials in original undamaged packages and containers inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity. Store at temperatures above 40 degrees F. Do not allow product to freeze.
1.6 PROJECT CONDITIONS

A. Maintain ambient temperature not less than 68 deg F minimum and 85 deg F maximum 72 hours prior to beginning of installation.
    1. Do not install dry-erase coatings until the space is enclosed and weatherproof.
    2. Do not install dry-erase coatings until temperature is stabilized and permanent lighting is in place.

1.7 WARRANTY

A. Warranty: Manufacturer’s limited lifetime material warranty.

PART 2 PRODUCTS

2.1 MANUFACTURER


2.2 PRODUCTS

A. Dry Erase Coating: IdeaPaint PRO, 2-part, solvent-based coating by IdeaPaint, providing a surface suitable for use of dry erase markers.
    1. Color: Manufacturer’s standard color as follows:
    2. Fire Rating (ASTM E84): Class 1 or Class A, flame spread index 5, smoke developed index 0.
    3. VOC (EPA Method 24):
        a. White. 325 g/L.
    4. Density:
    5. Opacity/Hiding Power (ASTM D2805):
        a. White. 96 percent.
    6. Sag Resistance (ASTM D4400 Method 6.5.6):
        a. White. 8.
    7. Flow and Leveling (ASTM D2801):
        a. White. 10.
    8. Crack Resistance (ASTM D522):
        a. White. 21 percent.
    9. Finish/Gloss (ASTM D523) on Dry Wall Board:
        a. White.
            1) 20 degrees: 26.6.
            2) 60 degrees: 71.0.
            3) 85 degrees: 68.0.
    10. Scrub Resistance (ASTM D2486):
        a. White. Breakthrough at 15,600 cycles.
    11. Stain Removal/Washability (ASTM D3450):
        a. White. 99.55 percent.
    12. QUV (ASTM D4587) Status after 500 hours:
        a. White Board: Brightness QUV = 91.44, DE = 2.01
15. Flammability Limit: ASTM E682, lower flammability limit 1.69 percent at 212 degrees F; upper flammability limit greater than 9.44 percent at 212 degrees F.

B. Primer: Latex, stain blocking type, non-tinted, ie: Glidden Gripper of Klitz Premium.

C. Roller Covers: 9 inch FoamPro roller by FoamPro. No substitutions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions in which dry-erase coatings will be installed.
   1. Complete finishing operations, including painting, before beginning installation of dry-erase coatings.
   2. Wall surfaces to receive dry-erase coatings shall be dry and free from dirt, grease, loose paint, and scale.
   3. Do not proceed with installations until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Remove hardware, accessories, plates and similar items to allow dry-erase coatings to be installed.
   1. Repair damaged areas by filling voids with spackle. Sand smooth repaired or textured surfaces. Scuff glossy and non-porous surfaces using medium grit sandpaper. Paint product is a high gloss coating; imperfections and visible seams will telegraph.
   2. Plaster Surface: Remove surface chalk. In new work use moisture meter to determine moisture content. Do not begin installation when moisture content is greater than five percent.
   4. Previously Painted Surface: Remove loose paint or scale. Sand surface of enamel or gloss paint and remove dust with tack cloth or denatured alcohol.

B. Prime substrate using materials recommended by manufacturerl. Follow manufacturer's application, dry time, and recoat instructions prior to proceeding.
   1. Changing color of the surface: Prime surface until the color of the existing surface does not show through.
   2. Covering stained surface: Prime surface until undesired marks and stains do not show through.

C. Ventilate area thoroughly to prevent odor from permeating to other areas in the building. Provide 100 percent outside air ventilation of application areas.

3.3 APPLICATION

A. Comply with manufacturers printed installation instructions. Mix components in strict accordance with manufacturer's instructions. Pot life is 1 hour maximum.

B. Apply dry-erase coating with specified roller only. Comply with the following:
   1. Apply heavy single coat only. Do not recoat or touch up applied coating.
   2. Paint surface by working from one end to the other.
   3. Begin by cutting in the edges of an approximately 2 foot wide section.
   4. Paint 2 foot wide section, maintaining a wet edge.

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5. Roll new section into wet edge.
6. Continuously check for skips, holes, and holidays as application progresses.
7. Remove masking tape within 1 hour of painting.

C. Coating shall cure for a minimum of 7 days after application before use.

D. Application Rate: 5 mils wet film thickness as measured with a wet film gage; maximum 50 square feet per quart or 200 square feet per gallon. Refer to packaging for specified square footage size.

3.4 CLEANING AND MAINTENANCE

A. Daily erasure and cleaning should be done with a standard dry-erase eraser or a dry cotton clot, or micro-fiber towel. Be sure to use clean erasers. For periodic and more thorough cleaning use a clean damp cloth or dry-erase cleaner or wipes.

B. If damaged, the original surface shall be deglossed by scuffing surface and priming before recoating with IdeaPaint.

3.5 PROTECTION

A. Protect installed product and finished surfaces from damage during construction.

END OF SECTION
SECTION 10 14 00
SIGNAGE

PART 1 GENERAL

1.1 SUMMARY
A. Conditions of the Contract and Division 1 apply to this Section.
B. Section Includes:
   1. Plastic signs.
   2. Installation of Identifying Devices.
C. Related sections:
   1. All documents listed in Table of Contents are a Condition of this Section.

1.2 REFERENCES
A. Americans with Disabilities Act (ADA):
   1. 2010 Standards for Accessible Design.
B. California Building Code (CBC):
   1. Title 24, CBC 2010; Sections 1114B, 1115B.6, and 1117B.5.

1.3 SUBMITTALS
A. Section 01 33 00 - Submittal Procedures: Submittal requirements.
B. Shop Drawings: Provide listing of type of signs, lettering and locations to be attached along with overall dimension of each sign.
C. Samples: Provide one full-size sample sign of type style and color specified including method of attachment.

1.4 DELIVERY, STORAGE, AND PROTECTION
A. Section 01 60 00 - Product Requirements: Transport, store, handle and protect product.
B. Package separately or in like groups of names, labeled as to names enclosed. Include installation template, hardware or adhesive specified and Installation instructions.

PART 2 PRODUCTS

2.1 MANUFACTURERS
A. Mohawk Sign Systems.
B. ASI.
C. Or equal.

3/15/2013
2.2 PLASTIC SIGNS

A. General:
   1. Braille Symbols:
      a. Contracted Grade 2 Braille shall be used wherever Braille symbols are required.
   2. All signs and identification shall match existing signs and comply with California Title 24, Section 1117B.5 - 1117B.5.10

B. Room Sign:
   1. Mohawk 200Á Series, Sand Carved (raised 1/32“); ASI; or equal; meeting requirements of ADA.
   2. 1/8 inch thick, melamine plastic laminate with contrasting core color, fire retardant, and self-extinguishing meeting requirements of U.S. Government specification LD-387A, Type NDP.
   3. Acrylic plastic back-plate with 1/2 inch radius corners;
   4. Size: As shown in drawing.
   5. Lettering: Three digit room number, 2 inch high, Medium Helvetica raised letters, Grade 2 Braille characters;
   6. Color: As shown in drawing.
   7. Location: Mount on wall 9 inches min from strike side of door jamb, 5 foot to baseline of highest tactile characters from the floor.

C. Accessible Exit Sign:
   1. Mohawk 200A Series, Sand Carved (raised 1/32-inch); ASI; or equal; to meet requirements of ADA.
   2. Melamine plastic laminate with contrasting core color, fire retardant, and self-extinguishing meeting requirements of U.S. Government specification LD-387A.
   3. Type NDP, 1/2 inch radius corners;
   4. Size: As shown in drawing.
   5. Lettering: 2 inch high, Medium Helvetica raised letters, Grade 2 Braille characters.
   6. Color as selected by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Project Management and Coordination.
B. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION

A. Install in accordance with manufacturer’s instructions.
B. Install signs after doors and surfaces are finished in locations indicated.
C. Center door mounted signs on door surface level.
D. Position wall mounted signs as indicated level.

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E. Install metal signs where indicated.

END OF SECTION
SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire extinguishers and fire extinguisher cabinets as indicated.
   2. Fire Blanket and Cabinet

B. Related Sections:
   1. Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCE STANDARDS

A. California Code of Regulations (CCR):
   1. CCR Title 24, Part 9, California Fire Code, Section 906, Portable Fire Extinguishers.
   2. CCR Title 19, Public Safety (State Fire Marshal Regulations)

B. National Fire Protection Association (NFPA):
   1. NFPA 10 Portable Fire Extinguishers.

C. Underwriters Laboratories (UL):
   1. Listing for type, rating and classification of extinguisher.

1.3 SUBMITTALS

A. Comply with requirements of Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Submit shop drawings of installation details indicating material characteristics, details of construction, connections, and relationship with adjacent materials.

C. Product Data: Submit manufacturer's product data and installation instructions for fire extinguishers, extinguisher cabinets, and installation accessories.

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain extinguishers and cabinets from one source and from a single manufacturer.

B. Provide only UL listed products with listing mark for each type, rating and classification.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products of J.L. Industries.

B. Larsen’s Manufacturing Co.

C. Potter-Roemer.

D. Or equal.

2.2 FIRE EXTINGUISHERS

A. Multi-Purpose Dry Chemical Extinguishers: Provide nominal 10-pound capacity extinguishers as indicated, rated as follows:

1. 10 Pounds: UL Rating of 4A-60B:C.

2.3 FIRE EXTINGUISHER CABINETS

A. Cabinets: Extinguisher cabinets shall be surface mounted type with rolled edge as indicated. Cabinets shall be standard manufactured type, of size required for size of extinguisher, fabricated from steel with baked enamel finish.

2. Door: Provide full-glass panel and steel frame door; with “Saf-T-Lok”, or equal.

3. Door shall require 5 pounds maximum pull force to open.

4. Door shall be furnished with standard recessed door pull.

5. Joints in cabinets shall be made watertight, and doors shall be gasketed to minimize moisture intrusion. Provide weep holes in bottom of cabinet.

2.4 FIRE BLANKET AND CABINET

A. Roller-type Fire Blanket and Cabinet: Roller-type for emergency use with enclosed blanket attached to vertical roller. Blanket to have arm loops to enable a person to wrap themselves in the blanket in one continuous motion. J.L. Industries Royal Series or equal.

1. Blanket: 62 inch x 84 inch processed wool fire blanket meeting the Flammable Fabrics Act, Flammability of Clothing Textiles, Title 16, CFR1610

2. Cabinet: Surface-mounted tub and solid metal door with red epoxy finish, or equal.

3. Door Hardware: shall be zinc plated steel door pull with roller catch.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Verify that space in fire hose cabinets is sufficient to receive indicated fire extinguishers.

B. Verify backing is in place and location is correct for proper mounting height.

3/12/2013
3.2 INSTALLATION

A. Install securely in place in accordance with the manufacturer's installation instructions and in compliance with applicable requirements of the California Fire Code and NFPA 10.

B. Install fire extinguishers and extinguisher cabinets plumb and level as indicated.

C. Install fire blanket and cabinets plumb and level as indicated.

D. Install fire extinguishers in mechanical and service areas with wall-hung brackets at locations and heights indicated and acceptable to authorities having jurisdiction.

E. Restore damaged finishes. Clean and protect work from damage.

3.3 ADJUSTMENT AND CLEANING

A. Service: Inspect, charge and tag fire extinguishers not more than ten (10) days prior to occupancy of building.

B. Upon completion, thoroughly clean exposed surfaces in accordance with manufacturer’s instructions.

END OF SECTION
SECTION 1152 00

AUDIO-VISUAL EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manually operated roll-up projection screens, and related work.
   2. Universal projector mounts, including required accessories, for owner supplied projectors.

B. Related Sections:
   1. Pertinent sections of Division 01 specifying Coordination and Quality Control.
   2. Section 06 20 00 - Finish Carpentry: Installation.

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Material List: Provide complete manufacturer’s specifications and technical data for each type of assembly.

C. Samples: Provide samples of projector screen fabric.

D. Shop Drawings: Indicate information on shop drawings as follows;
   1. Layout indicating locations.
   2. Dimensions.
   3. Installation details.
   4. Anchorage details.
   5. Manufacturer’s recommendations for accessories and mounting kits.

1.3 WARRANTY

A. Section 01 77 00 - Closeout Procedures: Warranties.

B. Warranty work under this section shall be against defective materials and workmanship, normal wear and tear and abuse expected.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Transport, store, handle and protect products.

B. Protect adjacent construction and finishes as necessary.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Da-Lite.

B. Peerless

C. Or equal.

2.2 PROJECTION SCREEN

A. Da-Lite, Model C, for manual operation, 96 inch x 96 inch, screen; or equal.
1. Screen: Flame-retardant fiberglass matte with Glas Beaded, Matte White, Video Spectra projection surface; each unit in single piece without intermediate seams or joints.
2. Case: 22 gage steel, with flat back to prevent scraping fabric; factory applied baked enamel finish on all surfaces; with mounting brackets as necessary for rigid installation.
3. Rollers: Metal, 3-inch diameter.
4. Wall Brackets: Da-Lite NO. 23; or equal; adjusts from 14.5 to 23.5 inches

2.3 UNIVERSAL PROJECTOR MOUNT

A. Peerless, PRG-UNV, Precision gear projector mount with universal adapter plate; or equal.

B. Design / Performance Criteria
   1. Tilt: Plus or minus 20 degrees.
   2. Roll: Plus or minus 10 degrees.
   3. Swivel: 360 degrees.
   4. Load Capacity: 50 lb (23 kg)

C. Operation
   1. Allow alignment of projector lens to the pivot axes
   2. Allow fine tuning of the image to the viewing screen

D. Mounting
   1. Ceiling mounted with vandal resistant fasteners

E. Finish
   1. Powder coated black finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 - Project Management and Coordination: Coordination and Meetings.
B. Verify structural support are in accordance with manufacturer’s instructions.
C. Verify adjacent general work and finish paintin completed within areas to receive screens.
D. Review details with Architect and incorporate adjustments as directed.
E. Correct any deficiencies prior to commencing work of this Section.

3.2 INSTALLATION

A. Projector Screen
   1. Install, secure, place in operation and adjust per manufacturer’s approved installation instructions.
   2. Assure that screen roller is level.

B. Projector Mount
   1. Coordinate with other trades for proper time and sequence.
   2. Install per manufacturer’s approved installation instructions.
   3. Install mount plumb and level.

C.

3.3 ADJUSTMENT

A. Section 01 75 00 - Starting and Adjusting: Adjusting.
B. Screen: Free from wrinkles, bulges, sags and other undesirable effects; and in perfect operating condition.

3.4 CLEANING

A. Section 01 74 00 - Cleaning: Final cleaning.

B. Remove unwanted debris, wrapping and protection materials.

END OF SECTION
LABORATORY FUME HOODS
SECTION 11 53 13

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Bench-top laboratory fume hoods.
   2. Water, laboratory gas, and electrical service fittings in fume hoods.
   3. Piping and wiring within fume hoods for service fittings, light fixtures, fan switches, and other electrical devices included with fume hoods.

B. Related Sections:
   1. Section 06 10 00 - Rough Carpentry: for wood blocking for anchoring fume hoods.
   2. Section 09 21 16 – Gypsum Board Assemblies: for reinforcements in metal-framed partitions for anchoring fume hoods.
   3. Section 12 35 53 - Laboratory Casework: for fume hood base cabinets, including worktops, sinks, and service fittings.
   4. Division 23 Sections for fume hood duct connections, including ducts and exhaust fans.
   5. Division 23 and 26 Sections for installing service fittings in fume hoods, including piping and wiring within fume hoods, and for other wiring in fume hoods, including connecting light fixtures, fan switches, and other electrical devices included with fume hoods.
   6. Division 23 Section "Testing, Adjusting, and Balancing for HVAC“ for field quality-control testing of fume hoods.

1.3 PERFORMANCE REQUIREMENTS

A. Containment: Provide fume hoods that comply with the following when tested according to ASHRAE 110 at a release rate of 4.0 L/min.:
   1. Average Face Velocity: 100 fpm (0.51 m/s) plus or minus 10 percent with sashes fully open.
   2. Face-Velocity Variation: Not more than 15 percent of average face velocity.
      a. Test hoods with horizontal sashes with maximum opening on one side, with maximum opening in the center, and with one opening at each side equal to half of maximum opening.
      b. Test hoods with combination sashes fully raised, with maximum opening on one side, with maximum opening in the center, and with one opening at each side equal to half of maximum opening.
4. As-Manufactured (AM) Rating As indicated in the Fume Hood Schedule.

B. Static-Pressure Loss: Not more than 1/2-inch wg (124 Pa) at 100-fpm (0.51-m/s) face velocity when measured at four locations 90 degrees apart around the exhaust duct and at least three duct diameters downstream from duct collar.

C. Structural Performance: Provide fume hood components capable of withstanding the following loads without permanent deformation, excessive deflection, or binding of cabinet drawers and doors:

D. Delegated Design: Design fume hoods, including comprehensive engineering analysis by a qualified professional engineer, using seismic performance requirements and design criteria indicated.

E. Seismic Performance: Fume hoods, including attachments to other work, shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. Design earthquake spectral response acceleration, short period (Sds) for Project is 1.0
2. Component Importance Factor is 1.5.

1.4 SUBMITTALS

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

B. Shop Drawings: For laboratory fume hoods. Include plans, elevations, sections, details, and attachments to other work.

1. Indicate details for anchoring fume hoods to permanent building construction including locations of blocking and other supports. Include calculations demonstrating that anchorages comply with seismic performance requirements.
2. Indicate locations and types of service fittings together with associated service supply connection required.
3. Indicate duct connections, electrical connections, and locations of access panels.
4. Include roughing-in information for mechanical, plumbing, and electrical connections.
5. Show adjacent walls, doors, windows, other building components, laboratory casework, and other laboratory equipment. Indicate clearances from above items.
6. Include layout of fume hoods in relation to lighting fixtures and air-conditioning registers and grilles.
7. Include coordinated dimensions for laboratory equipment specified in other Sections.

C. Samples for Verification: For fume hood exterior finishes, interior lining in manufacturer's standard sizes.

D. Delegated-Design Submittal: For fume hoods indicated to comply with seismic performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Product Test Reports: Showing compliance with specified performance requirements for as-manufactured containment and static pressure loss based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency.

F. Source quality-control reports.
G. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Source Limitations for Laboratory Fume Hoods: Obtain fume hoods from single manufacturer.

B. Product Designations: Drawings indicate sizes, types, and configurations of fume hoods by referencing designated manufacturer's catalog numbers. Other manufacturers' hoods of similar sizes, types, and configurations, and complying with the Specifications, may be considered. See Division 01 Section "Product Requirements."

C. Product Standards: Comply with SEFA 1, "Laboratory Fume Hoods - Recommended Practices. Provide fume hoods UL listed and labeled for compliance with UL 1805.

D. Safety Glass: Products complying with testing requirements in 16 CFR 1201 for Category II materials.

   1. Permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or another suitable material.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install fume hoods until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.8 COORDINATION

A. Coordinate layout and installation of framing and reinforcements for lateral support of fume hoods.

B. Coordinate installation of fume hoods with laboratory casework, fume hood exhaust ducts, and plumbing and electrical work.

1.9 EXTRA MATERIALS

A. Furnish complete touchup kit for each type and color of fume hood finish provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged fume hood finish.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Kewaunee Scientific Corporation, Supreme Air ADA Bench Fume Hood, 6 feet wide, open bypass type, or comparable product by one of the following:

1. Air Master Systems Corporation.
2. Bedcolab Ltd.
3. BMC Manufacturing.
4. Fisher Hamilton L.L.C.
5. Hanson Lab Furniture, Inc.

2.2 MATERIALS

A. Steel Sheet: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A 1008/A 1008M; matte finish; suitable for exposed applications.

B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness.

C. Glass-Fiber-Reinforced Polyester: Polyester laminate with a chemical-resistant gel coat on the exposed face, and having a flame-spread index of 25 or less per ASTM E 84.

D. Glass: Clear, laminated tempered glass complying with ASTM C 1172, Kind LT, Condition A, Type I, Class I, Quality-Q3; with two lites not less than 3.0 mm thick and with clear, polyvinyl butyral interlayer.

E. Fasteners: Provide stainless-steel fasteners where exposed to fumes.

2.3 FUME HOOD VENTILATION

A. Bypass Fume Hoods: Provide bypass fume hoods. Compensating bypass above sash opens as sash is closed. Provide sufficient bypass capacity so that face velocity with sash opening of 6 inches (150 mm) does not exceed three times the face velocity with sash fully open.

2.4 FABRICATION

A. General: Assemble fume hoods in factory to greatest extent possible. Disassemble fume hoods only as necessary for shipping and handling limitations. Fume hoods shall be capable of being partly disassembled as necessary to permit movement through a 35-by-79-inch (889-by-2007-mm) door opening.

B. Steel Exterior: Fabricate from steel sheet, not less than 0.0478 inch (1.2 mm) thick, with component parts screwed together to allow removal of end panels, front fascia, and airfoil and to allow access to plumbing lines and service fittings. Apply chemical-resistant finish to interior and exterior surfaces of component parts before assembly.
C. Ends: Fabricate with double-wall end panels without projecting corner posts or other obstructions to interfere with smooth, even airflow. Close area between double walls at front of fume hood and as needed to house sash counterbalance weights, utility lines, and remote-control valves.

D. Splay top and sides of face opening to provide an aerodynamic shape to ensure smooth, even flow of air into fume hood.

E. Interior Lining: Reinforced Phenolic Resin Lining, made from compressed molded cellulose fiber reinforced phenolic resin core with integrally cured melamine surfaces.
   1. Interior panels, not less than 1/4 inch (6.35 mm) thick, white color.
   2. Fasten panels using stainless steel screws with plastic covered heads

F. Lining Assembly: Unless otherwise indicated, assemble with stainless-steel fasteners or epoxy adhesive, concealed where possible. Seal joints by filling with chemical-resistant sealant during assembly.
   1. Fasten lining components to a rigid frame assembly fabricated from steel and to which exterior panels are attached.
   2. Punch fume hood lining side panels to receive service fittings and remote controls. Provide removable plug buttons for holes not used for indicated fittings.

G. Molded Glass-Fiber-Reinforced Polyester Lining: Molded unit consisting of end panels, back panel, preset rear baffle, and top bonded together into a single piece; reinforced to form a rigid assembly to which exterior is attached.
   1. Punch fume hood lining side panels to receive service fittings and remote controls. Provide removable plug buttons for holes not used for indicated fittings.

H. Hood Work Surface: Hood work surface shall be 1-1/4” thick molded epoxy resin made in the form of a watertight pan, not less than 3/8” deep to contain spillage with a 6” wide safety ledge across the front edge. Top shall be manufactured at the same manufacturing location as the fume hood to assure proper cutout alignment and coordinated shipping. A cup drain flush with the recessed work surface shall be provided. A cup drain mounted flush with the recessed top shall be provided.

I. Rear Baffle: Unless otherwise indicated, provide baffle, of same material as fume hood lining, at rear of hood with openings at top and bottom for airflow through hood. Secure baffle to cleats at rear of hood with stainless-steel screws. Fabricate baffle for easy removal for cleaning behind baffle.
   1. Provide a stable, non-adjustable baffle with three fixed horizontal slots to aid in distributing the flow of air into and through the hood. The baffle shall be spaced out 2 1/2” from the back liner.

J. Exhaust Plenum: Full width of fume hood and with adequate volume to provide uniform airflow from hood, of same material as hood lining, and with duct stub for exhaust connection.

K. Fume Hood Duct Collar: Provide 12” diameter stainless steel bell-mouthed duct collar located in the top of the hood plenum chamber.

L. Bypass Grilles: Provide grilles at bypass openings of bypass and restricted bypass fume hoods.
M. Sashes: Provide Vertical Rising Sash of ¼" laminated safety float glass. Sash shall have full length metal handle at the bottom and be counterbalanced to prevent tilting and binding during operation.

N. Airfoil: Unless otherwise indicated, provide airfoil at bottom of fume hood face opening with 1-inch (25-mm) space between airfoil and work top. Sash closes on top of airfoil, leaving 1-inch (25-mm) opening for air intake. Airfoil directs airflow across work top to remove heavier-than-air gases and to prevent reverse airflow.

1. Fabricate airfoil from stainless steel coated with PTFE or PVDF.

O. Light Fixtures: Provide vaporproof, two-tube, rapid-start, fluorescent light fixtures, of longest practicable length; complete with tubes at each fume hood. Shield tubes from hood interior with 1/4-inch (6.35-mm) thick laminated glass or 3-mm-thick tempered glass, sealed into hood with chemical-resistant rubber gaskets. Provide units with fluorescent tubes easily replaceable from outside of fume hood.

1. Provide fluorescent tubes with color temperature of 3500 K and minimum color-rendering index of 85.

P. Ceiling Extensions: Provide removable filler panels matching fume hood exterior to enclose space above fume hoods at front and all exposed sides of fume hoods and extending from tops of fume hoods to ceiling.

Q. Plumbing Services: Plumbing services shall consist of epoxy cup sink with remote control valves located within the end panels, controlled by extension rods projecting through the control panels of the hood, with color coded plastic handles. Interior fitting for gases and water shall be nylon panel flanges and angle serrated hose connectors, color coded. Water goosenecks shall be cast bronze with a chemical resistant metallic bronze finish. Plumbing shall be field plumbed by others at the jobsite.

R. Electrical Services: The hood superstructure shall be pre-wired and contain a UL label certifying acceptable wire gauge, connections, fixtures and wire color coding. Wiring electrical services shall consist of two duplex receptacles, a light switch, and switch for exhaust fan makeup air unit. The duplex receptacles shall be 20 Amp., 125 volt AC, and 3-wire polarized grounded with ground fault interruption. The receptacles shall be of specification grade, side wired only, to insure a positive connection. The light switch shall be 20 Amp., 125 volt AC, and 3-wire polarized grounded. Wiring shall terminate in one 6" x 6" x 4" service junction box located on the fume hood roof. Final wiring and circuit dedication shall be by others.

2.5 CHEMICAL-RESISTANT FINISH

A. General: Prepare, treat, and finish welded assemblies after welding. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.

B. Preparation: Clean steel surfaces, other than stainless steel, of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.

C. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply fume hood manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat
and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).

1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.
2. Colors for Fume Hood Finish: As selected by Architect from manufacturer's full range.

2.6 ACCESSORIES

A. Service Fittings: Comply with requirements in Division 12 Section "Laboratory Casework."
1. Provide service fittings with exposed surfaces, including fittings, escutcheons, and trim, finished with acid- and solvent-resistant powder coating complying with requirements in SEFA 7 for corrosion-resistant finishes.
2. Provide service fittings with exposed surfaces in laboratory casework manufacturer's standard metallic brown, aluminum, white, or other color as approved by Architect.

B. Airflow Indicator: Provide each fume hood with airflow indicator of one of the following type(s):
1. Indicator Type: Direct-reading aneroid (Magnehelic-type) gage that measures fume hood exhaust duct static pressure as an indication of airflow.

C. Airflow Alarm: Provide fume hoods with audible and visual alarm/readout that activates when airflow sensor reading is outside of preset range. Hood shall be set and balanced to an average face velocity of 100 fpm at 18 inch sash position. Kewaunee Air Alert 600 Face Velocity Airflow Alarm or approved equal. Alarm panel shall be prewired and factory installed in hood.
1. Provide with aneroid (Magnehelic-type) gage airflow sensor.
2. Provide with reset and test switches.
3. Provide with switch that silences audible alarm and automatically resets when airflow returns to within preset range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fume hoods.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fume hoods according to Shop Drawings and manufacturer's written instructions. Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building and adjacent laboratory casework. Securely attach access panels, but provide for easy removal and secure reattachment. Where fume hoods abut other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

1/30/2013
B. Comply with requirements in Divisions 22 and 26 Sections for installing water and laboratory gas service fittings and electrical devices.

1. Install fittings according to Shop Drawings, installation requirements in SEFA 2.3, and manufacturer’s written instructions. Set bases and flanges of sink and work top-mounted fittings in sealant recommended by manufacturer of sink or work top material. Securely anchor fittings to fume hoods unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

A. Field test installed fume hoods according to "Flow Visualization and Velocity Procedure" requirements in ASHRAE 110.

1. Test one installed fume hood, selected by Architect, for each type of hood installed, according to ASHRAE 110. If tested hood fails to meet performance requirements, field test additional hoods as directed by Architect.

2. Adjust fume hoods, hood exhaust fans, and building's HVAC system, or replace hoods and make other corrections until tested hoods perform as specified.

3. After making corrections, retest fume hoods that failed to perform as specified.

3.4 ADJUSTING AND CLEANING

A. Adjust moving parts for smooth, near silent, accurate sash operation with one hand. Adjust sashes for uniform contact of rubber bumpers. Verify that counterbalances operate without interference.

B. Clean finished surfaces, including both sides of glass; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

3.5 FUME HOOD SCHEDULE

A. Bench Top Fume Hood Type 1

1. Ventilation Type: Open Bypass, rated air flow 980 cfm at .25" sp, 100 fpm face velocity, 21" sash position, Note the hood to be certified at 18" sash position, 100 fpm face velocity, 840 cfm approx.

2. ASHRAE 110 As-Manufactured (AM) Rating: AM 0.01 (0.01 ppm).

3. ASHRAE 110 As-Installed (AI) Rating: AI 0.10 (0.10 ppm)

4. Sash Configuration:

   b. Opening Height: **27 to 30 inches (685 to 762 mm)**
   c. Water: One cold (ICW) remote-control, rigid, gooseneck, single-service faucet with vacuum breaker and removable serrated outlet.
   d. One cup sink on left-hand side.
   e. Laboratory Gas for Gas (Fuel Gas), Vacuum: One flange-type fitting with straight outlet and remote-control needle valve.
   f. Electrical: One duplex receptacle, at both end(s) of hood; one light switch on right-hand side; one switch for exhaust fan / make up air on left-hand side, mounted on exterior front face of end pilaster.

1) Provide GFCI receptacles.
SECTION 12 35 53
LABORATORY CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary
   Conditions and Division 01 Specification Sections, apply to this Section

1.2 SUMMARY

A. Section Includes:
   1. Wood laboratory casework.
   2. Filler and closure panels.
   3. Laboratory countertops.
   4. Moveable and Adjustable Tables.
   5. Instructor Bench

B. Related Sections:
   1. Section 06 10 00 – Rough Carpentry: reinstallation of items for wood blocking for
      anchoring laboratory casework.
   2. Section 09 21 16 – Gypsum Board Assemblies: for reinforcements in metal-framed
      partitions for anchoring fume hoods.
   3. Section 09 65 00 – Resilient Base for resilient base applied to metal laboratory casework.
   5. Divisions 23 and 26 Sections for installing service fittings specified in this Section,
      including connecting service utilities.

1.3 DEFINITIONS

A. MDF: Medium-density fiberboard.

B. Exposed Surfaces of Casework: Surfaces visible when doors and drawers are closed, including
   bottoms of cabinets more than 48 inches (1200 mm) above floor, and visible surfaces in open
   cabinets or behind glass doors.
   1. Ends of cabinets indicated to be installed directly against and completely concealed by
      walls or other cabinets are defined as "concealed."

C. Semiexposed Surfaces of Casework: Surfaces behind opaque doors, such as cabinet interiors,
   shelves, and dividers; interiors and sides of drawers; and interior faces of doors. Tops of
   cabinets 78 inches (1980 mm) or more above floor are defined as "semiexposed."

D. Concealed Surfaces of Casework: Include sleepers, web frames, dust panels, and other
   surfaces not usually visible after installation.

3/15/2013
E. Hardwood Plywood: A panel product composed of layers or plies of veneer, or of veneers in combination with lumber core, hardboard core, MDF core, or particleboard core, joined with adhesive and faced both front and back with hardwood veneers.

1.4 PERFORMANCE REQUIREMENTS

A. System Structural Performance: Laboratory casework and support framing system shall withstand the effects of the following gravity loads and stresses without permanent deformation, excessive deflection, or binding of drawers and doors:

1. Support Framing System: **600 lb/ft. (900 kg/m)**
2. Suspended Base Cabinets (Internal Load): **160 lb/ft. (240 kg/m)**.
3. Work Surfaces (Including Tops of Suspended Base Cabinets): **160 lb/ft. (240 kg/m)**.
4. Wall Cabinets (Upper Cabinets): **160 lb/ft. (240 kg/m)**.
5. Shelves: **40 lb/sq. ft. (200 kg/sq. m)**

1.5 SUBMITTALS

A. Data: For each type of product indicated.
B. Shop Drawings: For laboratory casework. Include plans, elevations, sections, details, and attachments to other work.

1. Indicate locations of hardware and keying of locks.
2. Indicate locations and types of service fittings.
3. Indicate locations of blocking and reinforcements required for installing laboratory casework.
4. Include details of utility spaces showing supports for conduits and piping.
C. Samples for Initial Selection: For factory-applied finishes and other materials requiring color selection.
D. Samples for Verification: For each type of cabinet finish and each type of countertop material indicated, in manufacturer's standard sizes.
E. Product Test Reports for Casework: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory casework with requirements of specified product standard.
F. Product Test Reports for Countertop Surface Material: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory countertop surface materials with requirements specified for chemical and physical resistance.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that produces casework of types indicated for this Project that has been tested for compliance with SEFA 8.
B. Source Limitations: Obtain laboratory casework from single source from single manufacturer unless otherwise indicated.
1. Obtain countertops from casework manufacturer.

C. Casework Product Standard: Comply with SEFA 8, "Laboratory Furniture - Casework, Shelving and Tables - Recommended Practices."

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Keying Conference: Conduct conference at Project site. Incorporate keying conference decisions into final keying requirements.

F. Preinstallation Conference: Conduct conference at Project site

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install laboratory casework until building is enclosed, utility roughing-in and wet work are complete and dry, and temporary HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.9 COORDINATION

A. Coordinate layout and installation of framing and reinforcements for support of laboratory casework.

B. Coordinate installation of laboratory casework with installation of fume hoods and other laboratory equipment.

1.10 EXTRA MATERIALS

A. Furnish complete touchup kit for each type and color of wood laboratory casework provided. Include scratch fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged laboratory casework finish.

1. Cabinet Mounting Clips and Related Hardware: Quantity equal to 5 percent of amount installed, but no fewer than 20 of each type.

PART 2 - PRODUCTS

2.1 WOOD CABINET & INSTRUCTOR BENCH MATERIALS

A. General:
1. Adhesives: Do not use adhesives that contain urea formaldehyde.
2. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
3. Hardwood Plywood: HPVA HP-1, either veneer core or particleboard core, unless otherwise indicated, made without urea formaldehyde.
4. MDF: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
6. Hardboard: AHA A135.4, Class 1 Tempered.
7. Edgebanding for Wood-Veneered Construction: Minimum 1/8-inch- (3-mm-) thick, solid wood of same species as face veneer.

B. Exposed Materials:

1. General: Provide materials that are selected and arranged for compatible grain and color. Do not use materials adjacent to one another that are noticeably dissimilar in color, grain, figure, or natural character markings.
2. Wood Species: Red oak Plywood: Hardwood plywood with face veneer of species indicated, selected for compatible color and grain. Grade A exposed faces at least 1/50 inch (0.5 mm) thick, and Grade J crossbands. Provide backs of same species as faces.
   a. Face Veneer Cut: Quarter sliced or Rift cut.
3. Solid Wood: Clear hardwood lumber of species indicated and selected for grain and color compatible with exposed hardwood plywood.

C. Semiexposed Materials:

1. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects, of same species as exposed solid wood.
2. Plywood: Hardwood plywood of same species as exposed plywood. Grade B faces and Grade J crossbands. Provide backs of same species as faces.
3. Provide solid wood or hardwood plywood for semiexposed surfaces unless otherwise indicated.
4. Metal for Steel Drawer Pans: Cold-rolled, carbon-steel sheet complying with ASTM A 1008/A 1008M; matte finish; suitable for exposed applications.

D. Concealed Materials:

1. Solid Wood: Any species, with no defects affecting strength or utility.
3. Particleboard.
4. MDF.
5. Hardboard.

2.2 COUNTERTOP AND TABLE TOP

A. Countertops, General: Provide units with smooth surfaces in uniform plane free of defects. Make exposed edges and corners straight and uniformly beveled. Provide front and end overhang of 1 inch (25 mm), with continuous drip groove on underside 1/2 inch (13 mm) from edge.

1. Manufacturers: Subject to compliance with requirements, provide products by available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Durcon Company (The).
   b. Epoxyn Products.
   c. Laboratory Tops, Inc.
   d. Prime industries, inc.

2. Physical Properties:
   a. Flexural Strength: Not less than 10,000 psi (70 MPa).
   b. Modulus of Elasticity: Not less than 2,000,000 psi (1400 MPa).
   c. Hardness (Rockwell M): Not less than 100.
   d. Water Absorption (24 Hours): Not more than 0.02 percent.
   e. Heat Distortion Point: Not less than 260 deg F (127 deg C).

3. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
   a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
   b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).


C. Epoxy Countertops and Table Tops

1. Countertop Fabrication: Fabricate with factory cutouts for sinks, holes for service fittings and accessories, and with butt joints assembled with epoxy adhesive and concealed metal splines.
   a. Countertop Configuration: Flat 3/4 inch (19 mm) thick, with rounded edge and corners, and with drip groove and integral coved or applied backsplash.
   b. Countertop Configuration: As indicated.

2. Table-Top Fabrication:
   a. Table-Top Configuration: Flat, 3/4 inch (19 mm) thick, with rounded edge and corners, and with drip groove at perimeter.

3. Shelf Configuration: Flat, 3/4 inch (19 mm) thick, with rounded edge and corners.

2.3 MOVABLE AND ADJUSTABLE METAL TABLES

A. Basis-of-Design Product: Subject to compliance with requirements, provide Movable Adjustable Free-standing table frames and work station work tops, Kewannee Scientific Corporation, Enterprise Workstations or comparable product by one of the following:

1. Air Master Systems Corporation.
2. Bedcolab Ltd.
3. BMC Manufacturing.
4. Fisher Hamilton L.L.C.
5. Hanson Lab Furniture.

B. Movable and Adjustable Tables: System shall be comprised of Work Surface Support Frames adjustable from 31" to 37" AFF, and a Rear Frame Support Structure, single or double sided, incorporating a vertical post and horizontal support. The vertical supports shall incorporate individual slots for adjustable shelving and accessories. The vertical support shall incorporate a chase for plumbing and wiring of services.

1. Work Surface Support Frame:
   a. The frame shall be a welded four sided assembly consisting of 11 gauge steel channel formations, front adjustable height legs, and rear attachment collars.
2. Two additional leg members shall be bolted to the rear attachment collars to provide a four leg self-supporting table frame, adjustable in height from 31" to 37" AFF including 1" work surface
3. Front and rear leg members shall be 11 gauge steel tubes, 2" outside diameter and 1.75" inner telescoping leg capable of vertical adjustment in 2" increments
4. Legs shall include non-marring, 3/8" diameter, levelers.
5. Load rating shall be 100lbs per linear foot of length to a maximum of 800lbs. With uniformly distributed load, the maximum allowable deflection shall be .125" measured at the front center rail
6. Work Surface Size:
   a. Table 1: work surface shall be 24 inches wide by 60 inches long.
   b. Table 2: work surface shall be 27 inches wide by 60 inches long.

C. WOOD CABINETS AND INSTRUCTOR BENCH

D. Basis of Design Product: Subject to compliance with requirements, provide Kewaunee Scientific Corporation; Contemporary Full Overlay – Style 5 Laboratory Cabinets or comparable product by one of the following:
1. Advanced Lab Concepts, Inc.
2. CampbellRhea.
3. CiF Furniture Ltd.
4. Collegedale Casework, LLC.
5. Diversified Woodcrafts, Inc.
6. Fisher Hamilton L.L.C.

E. Design: Full overlay with radiused edges.

1. Provide [1/8-inch (3.2-mm)] reveals between doors and drawers that are adjacent.
F. Grain Direction:
   1. Vertical on both doors and drawer fronts, with continuous vertical matching.
   2. Lengthwise on face frame members.
   3. Vertical on end panels.
   4. Side to side on bottoms and tops of units.
   5. Vertical on knee-space panels.
   6. Horizontal on aprons and table frames.

G. Veneer Matching:
   1. None required; select and arrange veneers for compatible grain and color.
   2. Provide veneers for each cabinet from a single flitch, book and running matched.
      a. Provide continuous matching of adjacent drawer fronts within each cabinet.
   3. Provide veneers for each elevation from a single flitch, book and running matched.
      a. Provide continuous matching of adjacent drawer fronts within each cabinet and end matching between drawer fronts of adjacent cabinets.
   4. Doors [48 inches (1200 mm)]: 3/4 inch (19 mm) thick, with particleboard or MDF cores, and hardwood face veneers and crossbands.

2.4 WOOD FINISH

A. Preparation: Sand lumber and plywood before assembling. Sand edges of doors, drawer fronts, and molded shapes with profile-edge sander. Sand after assembling for uniform smoothness at least equivalent to that produced by 220-grit sanding and without machine marks, cross sanding, or other surface blemishes.

B. Chemical-Resistant Finish: Apply laboratory casework manufacturer's standard three-coat, chemical-resistant, transparent finish. Sand and wipe clean between coats. Topcoat(s) may be omitted on concealed surfaces.

   1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.

2.5 HARDWARE

A. General: Provide laboratory casework manufacturer's standard ADA accessible, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.

B. Hinges: Stainless-steel, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 for doors 48 inches (1200 mm) high or less and 3 for doors more than 48 inches (1200 mm) high.

C. Hinged Door and Drawer Pulls: ADA compliant accessible stainless steel, or chrome-plated brass back-mounted pulls. Provide 2 pulls for drawers more than 24 inches (600 mm) wide.

D. Sliding Door Pulls: ADA compliant accessible stainless-steel or chrome-plated recessed flush pulls.
E. Door Catches: Dual, self-aligning, permanent magnet catches. Provide 2 catches on doors more than 48 inches (1200 mm) high.

F. Drawer Slides: Side mounted, epoxy-coated steel, self-closing; designed to prevent rebound when drawers are closed; complying with BHMA A156.9, Type B05091.
   1. Provide Grade 1 for drawers not more than 6 inches (150 mm) high and 24 inches (600 mm) wide.
   2. Provide Grade 1HD-100 for drawers more than 6 inches (150 mm) high or 24 inches (600 mm) wide.
   3. Standard Duty (Grade 1): Full-extension type, with polymer rollers.
   4. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Full extension, ball-bearing type.

G. Label Holders: Stainless steel, aluminum, or chrome-plated; sized to receive standard label cards approximately 1 by 2 inches (25 by 50 mm), attached with screws or rivets. Provide where indicated.

H. Locks for Wood Cabinets: Cam type with 5-pin tumbler, brass with chrome-plated finish; complying with BHMA A156.11, Type E07281.
   1. Provide a minimum of two keys per lock and two master keys.
   2. Provide where indicated.
   3. Keying: Key locks as directed.
   4. Master Key System: Key all locks to be operable by master key.

I. Adjustable Shelf Supports for Wood Cabinets: Powder-coated steel shelf rests complying with BHMA A156.9, Type B04013.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of laboratory casework.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CABINETS

A. Comply with installation requirements in SEFA 2.3. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical. Do not exceed the following tolerances:

1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet (1.5 mm in 3 m).
2. Variation of Bottoms of Upper Cabinets from Level: 1/8 inch in 10 feet (3 mm in 3 m).
3. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet (3 mm in 3 m).
4. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.5 mm).

3/15/2013
B. Utility-Space Framing: Secure to floor with two fasteners at each frame. Fasten to partition framing, wood blocking, or metal reinforcements in partitions and to base cabinets.

C. Base Cabinets: Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced not more than 24 inches (600 mm) o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.

   1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24 inches (600 mm) o.c. and at sides of cabinets with not less than 2 fasteners per side.

D. Wall Cabinets: Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 24 inches (600 mm) o.c.

E. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.

F. Adjust laboratory casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF COUNTERTOPS

A. Comply with installation requirements in SEFA 2.3. Abut top and edge surfaces in one true plane with flush hairline joints and with internal supports placed to prevent deflection. Locate joints only where shown on Shop Drawings.

B. Field Jointing: Where possible, make in same manner as shop-made joints using dowels, splines, fasteners, adhesives, and sealants recommended by manufacturer. Prepare edges in shop for field-made joints.

   1. Use concealed clamping devices for field-made joints in plastic-laminate countertops. Locate clamping devices within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer’s written instructions to exert a uniform heavy pressure at joints.

C. Fastening:

   1. Secure countertops, except for epoxy countertops, to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.

   2. Secure epoxy countertops to cabinets with epoxy cement, applied at each corner and along perimeter edges at not more than 48 inches (1200 mm) o.c.

   3. Where necessary to penetrate countertops with fasteners, countersink heads approximately 1/8 inch (3 mm) and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.

D. Provide required holes and cutouts for service fittings.

E. Seal unfinished edges and cutouts in plastic-laminate countertops with heavy coat of polyurethane varnish.

F. Provide scribe moldings for closures at junctures of countertop, curb, and splash with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent
laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.

G. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.4 INSTALLATION OF LABORATORY ACCESSORIES

A. Install accessories according to Shop Drawings, installation requirements in SEFA 2.3, and manufacturer's written instructions.

B. Securely fasten adjustable shelving supports, stainless-steel shelves, and pegboards to partition framing, wood blocking, or reinforcements in partitions.

C. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight, closely fitted to other work where indicated.

D. Securely fasten pegboards to partition framing, wood blocking, or reinforcements in partitions.

3.5 INSTALLATION OF SERVICE FITTINGS

A. Comply with requirements in Divisions 22 and 26 Sections for installing water and laboratory gas service fittings and electrical devices.

B. Install fittings according to Shop Drawings, installation requirements in SEFA 2.3, and manufacturer's written instructions. Set bases and flanges of sink- and countertop-mounted fittings in sealant recommended by manufacturer of sink or countertop material. Securely anchor fittings to laboratory casework unless otherwise indicated.

3.6 CLEANING AND PROTECTING

A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

B. Protect countertop surfaces during construction with 6-mil (0.15-mm) plastic or other suitable water-resistant covering. Tape to underside of countertop at a minimum of 48 inches (1200 mm) o.c.

END OF SECTION 12 35 53
SECTION 22 00 00
PLUMBING

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

1. Scope: Provide all materials, labor and equipment for complete and operational plumbing systems including all piping, fittings, hangers, sleeves and sealing, insulation, fixtures, and water heaters.

B. RELATED WORK

1. Section 23 05 00: Basic Mechanical Requirements
2. Section 23 30 00: Heating, Ventilating and Air Conditioning

1.2 SUBMITTALS –

A. Reference Section 23 05 00 and General Conditions for required format.

B. Submit as the minimum the following:

1. Pipe and fittings for all systems, pipe insulation
2. Valves and gas cocks
3. Hangers and supports
4. Plumbing fixtures
5. Cleaning and chlorination procedure and certified test reports of final test samples
6. Water heaters

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Domestic Hot and Cold Water, Industrial Hot and Cold Water, Lab Vacuum:

1. Copper Type L, ASTM B88, w/ wrought copper fittings, lead free sweat joints.
2. Pipes 2” and larger shall be brazed using 15% silver content solder.

B. Sanitary Waste and Vents:
1. Cast iron no-hub pipe and fittings with no-hub joints.

2. Slope all waste piping at ¼" per foot or greater.

3. Slope all vent piping back to waste line.

4. Cleanouts:
   a. Provide cleanouts where shown and where required by code or for good access for cleaning.
   b. Cleanouts shall be furnished with brass countersunk plugs for sanitary waste lines and matching plugs or removable caps or plugs for other piping in accordance with manufacturer's recommendations for the particular pipe material.
   c. Tee handle wrench shall be furnished to suit plugs.
   d. Stainless steel cover shall be provided in walls.

C. Relief Valve Drain: Copper Type L, ASTM B88, w/ wrought copper fittings, lead free sweat joints.

D. Natural Gas:
   1. Black steel pipe conforming to ASTM A53, seamless, grade B, threaded connections for sizes 2" and smaller.
   2. Use Teflon based pipe joint compound. Do not use Teflon tape.
   3. Fittings: Malleable steel, threaded conforming to ASME B16.3.

E. Deionized Water:
   1. Schedule 80 PVC pipe and fittings with solvent weld joints.
   2. Provide galvanized sheet metal V-trough for support of pipe to prevent sagging. Use V-shaped hanger to match trough.

2.2 PIPE SUPPORTS:

A. All component model numbers noted are Cooper B-line. Substitutions are allowed in accordance with provisions in specifications for acceptance of substitutions.

B. All piping shall be seismically braced in where required by and in accordance with SMACNA Seismic Restraint Guidelines, latest edition. Braces shall be in the lateral and axial directions. Slack cable braces shall be used for hangers required to move as part of thermal expansion provisions and shall not interfere with that movement.
C. All insulated piping shall be supported with the use of calcium silicate insulated pipe supports to prevent collapse of insulation except that pipes \( \frac{3}{4} \)" and smaller may use adjustable clevis hanger with galvanized sheet metal shield (B-3151 or equal).

D. All supports shall be manufactured of steel components. Use of plumbers tape, metal strap, plastic hangers or other types is not allowed.

E. All copper pipe shall be isolated from steel hangers and supports using factory Vibra-Cushion strip or plastic coated hangers. Field wrapping of pipe with tape is not acceptable.

F. Adjustable Steel Swivel Ring: Figure B-3170 or equal.

G. Adjustable Steel Swivel J-hanger: Figure B-3690 or equal.

H. Adjustable Steel Clevis Hangers: Figure B-3100, B-3104 or equal.

I. Pipe Clamps: Figure B-200 Tubing/Pipe Clamp, Figure B-2000 Series clip-in pipe clamps

J. Strut: B-11, B-22, and B-52, 12 gauge. Size as required for piping load and span.

K. Structural steel tubes and shapes as specified on details, fully hot-dipped galvanized after cutting and welding. Required field welds and cuts shall be coated with cold galvanizing compound.

2.3 PIPE INSULATION

A. Insulate all recirculated domestic hot water and hot water return piping.

B. Insulation: Owens Corning preformed fiberglass pipe insulation w/ all-service jacket conforming to ASTM C547, thermal conductivity 0.23 Btu-in/hr-sqft-°F at 75°F. Thickness as follows:

1. Domestic Hot Water Supply and Return: 1" thickness

C. Provide white PVC one-piece pre-formed fitting covers at all fittings (tees, elbows, etc.)

2.4 VALVES

A. Domestic and Industrial Hot and Cold water, Vacuum,: Full port bronze ball valves, chrome plated bronze ball, Nibco or equal

B. Natural Gas: Nibco Butterball or equal, UL listed for natural gas service. Alternate: Nordstrom Figure 142, 2-bolt cover iron plug valve.

2.5 FIXTURES

A. Laboratory Gas/Vacuum Valves: Deck mounted, single ball valve, 3/8" NPT
threaded inlet, certified for natural gas service, full flow serrated nozzle. Chicago Faucet Mechanical Faucet Model 980-909AGVCP

B. See plumbing fixture schedule on drawings for basis of design fixtures specifications

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. General:

1. Where galvanically dissimilar pipe materials interconnect, appropriate manufactured adapters or flanged connections with suitable gaskets shall be provided.

2. Piping shall be protected from damage and contamination during transport and construction. Exposed ends of piping shall be kept sealed prior to and during erection and at the end of each working day.

3. Copper tubing and piping shall be cut with dedicated wheel cutter. Cut ends shall be square to form proper seating in socket fittings. All cut ends shall be reamed and deburred. All piping needs to be flushed in compliance with current plumbing code.

4. Water System Piping: Piping shall be arranged, pitched, and valved for complete drainage and control of each system. Isolation valves to be installed per floor, per room per fixture.

B. Vents and Drains:

1. Vents shall be pitched to drain, collected at risers where practical, offset toward the center of the building, and extended through the roof. All traps and sumps shall be vented.

2. Relief Valve Drain: Union shall be installed on drain line on discharge side of relief valve within 3 inches (3") of relief valve.

3. Liquid Waste: Waste pipe centerline shall be located within 1 (1") inch of its corresponding fixture centerline where the waste pipe passes through the wall.

4. Plastic Piping: All plastic piping systems shall be installed in strict accordance with pipe manufacturer's recommendations, including preparation of pipe fittings for jointing, selection of solvent and primer, curing and installation.

3.2 BRAZING AND SOLDERING
A. Brazing: Use fifteen (15) percent silver, 80 percent copper and five (5) percent phosphorus for the following:
   1. Domestic water pipe: 2 inches and larger.
   2. Copper pipe: three inches (3”) and larger.
   3. Underground, or under floor piping.
   4. No solder fittings underground.

B. Soldering: Use 95-5, tin-antimony solder for other copper piping

C. Preparation/Installation:
   1. Clean surfaces to be joined, of oil, grease, rust and oxides. Clean socket or fitting and end of pipe thoroughly with emery cloth to remove dust and oxides. After cleaning and before assembly or heating, apply Handy or Aircosil Flux to joint surface and spread evenly.
   2. Cut copper tubing with copper tub cutters, size with sizing tool, and thoroughly clean before application of flux and solder.
   3. All joints that show evidence of overheating, cracking, poor penetration, or other defects of fit-up or workmanship shall be replaced as directed by the Project Manager at Contractor’s expense.

3.3 FIXTURE AND TRIM INSTALLATION

A. General:
   1. Install all fixtures in accordance with State of California accessibility requirements and architects dimensions where noted as accessible fixture.

B. Stops: All fixtures shall be provided with stops. All stops not integral with flush valves or faucets shall be accessible and located as inconspicuously as possible below the fixture. Install stop off to the side of the unit behind recessed panel.

3.4 FIELD QUALITY CONTROL

A. General
   1. Any deviation from the cleaning, installation testing, and certification requirements herein shall be approved in writing by the District.

B. All materials and workmanship shall be subject to inspection and examination by the qualified/authorized District's Representative at any place where fabrication or erection is carried on.

C. The qualified/authorized District's Representative, reserves the right to reject all
or any part of the system that does not conform to the requirements herein. Rejected materials or equipment shall be returned at the Contractor's expense for re-cleaning and certification.

D. The qualified/authorized District's Representative reserves the right to remove random samples of the installed work sufficient to establish the quality of materials and workmanship. If such samples indicate materials and workmanship do not meet the contract specification, the Contractor shall be required to replace or re-clean the installed work at no expense to the University. The University shall reimburse the Contractor on a time and materials basis for such work if the system proves to be installed to specification.

E. All testing shall be done in the presence of the qualified/authorized District's Representative.

F. Upon completion of this work, all systems shall be adjusted for use. Should any piece of apparatus or any material or work fail in any of these tests, it shall be immediately removed and replaced by new materials. The defective portion of the work shall be replaced by the Contractor in the presence of the qualified/authorized District's Representative at no expense to the District.

G. Any leaks found shall be repaired in the following manner:
   1. Brazed joint - Cut out and re-braze
   2. Plastic joint - Remove/Re-weld
   3. Screw joint - Taken apart and re-done (do not use compound)

H. Pipe Testing:
   1. All piping shall be tested as noted below unless more stringent testing is specified in other applicable sections.
   2. Test pressures shall be maintained until all leaks have been identified.
   3. Defective piping shall be repaired or replaced until tests are accomplished successfully.
   4. Test gauges shall be installed at convenient process connections. After completion of testing, the gauges and source connection shall be removed and the specified process attachments replaced.
   5. Natural Gas: Test new and existing piping downstream of isolation valves. Repair all leaks in existing and new piping without additional cost to the College. All joints shall be sprayed with soap solution and checked visually for leaks.

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>TEST PRESSURE</th>
<th>TEST MEDIUM</th>
<th>TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Hot &amp; Cold Water</td>
<td>100 PSIG</td>
<td>water</td>
<td>1 hr</td>
</tr>
</tbody>
</table>
Sanitary Sewer 10 ft. water water 4 hrs
Vents 10 ft. water. water 4 hrs
Lab Vacuum 100 PSIG Water 1 hr
Natural Gas 60-80 psi air 1 hr

3.5 CLEANING

A. General Cleaning Requirements: All pipe, fittings, valves, and system-related materials shall be cleaned before use. Contractor shall indicate in writing when each system is sufficiently clean for consideration by the qualified/authorized District's Representative for acceptance. Tie-in to central systems shall not occur prior to receipt of written acceptance from the Project Manager and/or the Project Manager's representative.

B. Water Pipe Cleaning: All domestic cold and hot water piping shall be cleaned and disinfected as follows:

1. The Contractor shall employ an agency licensed to certify the disinfecting operation to provide the orthotolidine testing equipment and make tests, take water samples, procure bacteriological analysis, and issue written approval of satisfactory disinfection results to the College representative.

2. The Contractor shall furnish labor, equipment, materials, and transportation to disinfect domestic hot and/or water systems in conformity with procedure and standards described herein.

3. Disinfecting agent shall be chlorine gas (approved type for water system disinfection, and approved chlorinator), or hypochlorite, calcium or sodium, powdered or aqueous "Purex", "Clorox", or similar commercial product with 5.25 to sixteen percent (5.25-16%) available chlorine in water solution.

4. 3/4 inch service cock or valve shall be provided within three feet of the service connection for introducing a sterilizing agent into the lines.

5. After final pressure tests, each fixture or outlet shall be left wide open until flow shows only clear water.

6. With system full of water and under "main" pressure, all faucets shall be opened to permit simultaneous trickle flow.

7. The disinfectant shall be injected through the service cock by means of pump or other pressure device at a slow, even, continuous rate until an orthotolidine test at each outlet shows chlorine residual concentration of at least fifty (50) parts per million (PPM).

8. All outlets and valves shall be closed, including service valve at main, and injection cock, to retain chlorinated water. This condition shall be maintained for twenty-four (24) hours.
9. An orthotolidine test, after twenty-four (24) hour period, shall indicate a chlorine residual concentration of not less than 50 PPM. If not, the disinfection procedure shall be repeated until this standard is attained.

10. After satisfactory completion of above test, the system shall be flushed out until orthotolidine tests show chlorine residual of less than 0.5 PPM.

11. After satisfactory completion of disinfection procedure, the College may issue a temporary approval for immediate use of the piping system pending results of a bacteriological analysis of water samples.

12. After final flushing, water samples shall be bacteriologically tested and shall provide negative for coli-aero-genes organisms.

13. Analysis shall indicate total plate count less than one-hundred (100) bacteria per cubic centimeter, or equal to the control sample.

14. If the analysis results are not satisfactory, the disinfection procedure shall be repeated until the specific standards are met.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE: Basic Mechanical Requirements specifically applicable all to Division 22 and 23 specifications, in addition to General Conditions, Supplemental General Conditions and Special Conditions.

A. Labor, materials, services, equipment and appliances required for completion of tasks as indicated on drawing or in specification or as inherently necessary for installation and testing of all HVAC, control, testing and plumbing systems.

1.2 DRAWINGS AND SPECIFICATIONS

A. Drawings accompanying these Specifications show intent of Work to be completed. Drawing notes and these specifications identify quality and grade of installation. Where equipment and hardware is not particularly specified, Contractor shall provide submittals for all products and install them per manufacturers’ recommendations, and in a first class manner.

B. Examine Drawings and Specifications for elements in connection with this Work; determine existing and new general construction conditions and be familiar with all limitations caused by such conditions.

C. Plans are intended to show general arrangement and extent of Work contemplated. Exact location and arrangement of parts shall be determined after equipment has been approved by the District, as Work progresses, to conform in best possible manner with surroundings, and as directed by District.

D. Do not scale from drawings. Dimensions on drawing shall be followed. Where dimensions are not provided Contractor shall coordinate with all trades to achieve the drawing intent.

1.3 WORK SEQUENCE: Install work in phases to accommodate District’s occupancy requirements. Prior to the construction period, coordinate the mechanical schedule and operations with the District.

1.4 UTILITIES: Location and sizes of mechanical service facilities are shown in accordance with data secured from existing record drawings and limited site observations. Data shown are offered as an estimating guide without guarantee of accuracy. Contractor shall check and verify all data given, and verify exact location of all utility services pertaining to Work prior to excavation or performing Work.

1.5 DISTRICT FURNISHED PRODUCTS: Unless noted otherwise, all items shall be furnished by the Contractor for a complete and operational installation.
1.6 APPLICABLE CODES AND REGULATIONS: Meet requirements of all applicable local, state and federal codes and standards having jurisdiction including but not limited to:

A. State of California Code of Regulations:

1. Title 8, Industrial Relations
2. Title 19, State Fire Marshal Regulations
3. California Building Code (CBC), Title 24, Part 2
4. California Electrical Code, Title 24, Part 3
5. California Mechanical Code, Title 24, Part 4
6. California Plumbing Code, Title 24, Part 5
7. California Fire Code, Title 24, Part 9
8. California Standards Code, Title 24, Part 12
9. Title 24, Energy Conservation Standards

B. NFPA - National Fire Protection Association Standards outlined in CBC 3801(d).

C. Codes and ordinances having jurisdiction over Work are minimum requirements; but, if Contract Documents indicate requirements which are in excess of those minimum requirements, then requirements of the Contract Documents shall be followed. Contractor shall identify any conflicts between Contract Documents and any codes or ordinances having jurisdiction and report these to the Engineer prior to proceeding with the work.

D. Obtain permits, and request inspections from authority having jurisdiction.

1.7 PROJECT/SITE CONDITIONS

A. The arrangement of and connection to equipment shown on the drawings is based upon information available to the Engineer at the time of design and is not intended to show exact dimensions peculiar to a specific manufacturer. The drawings are, in part, diagrammatic and some features of the illustrated equipment installations may require revision to meet actual equipment installation requirements.

B. Install Work in locations shown on approved Drawings, unless prevented by Project conditions.

C. Prepare revised drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Engineer before proceeding.

1.8 COOPERATION WITH WORK UNDER OTHER DIVISIONS

A. Cooperate with other trades to facilitate general progress of Work. Allow all other trades every reasonable opportunity for installation of their work.

B. Work under this Division shall follow general building construction closely.
C. Work with other trades in determining exact location of outlets, pipes, diffusers, and pieces of equipment to avoid interference with lines required to maintain proper installation of Work.

D. Make such progress in the Work to not delay work of other trades.

1.9 DISCREPANCIES

A. Refer to General Conditions.

B. The Contractor shall check all drawings furnished him immediately upon their receipt and shall promptly notify the Engineer of any discrepancies. Figures marked on Drawings shall in general be followed in preference to scale measurements. Process and instrumentation diagrams shall in general govern floor plans and sections. Large scale drawings shall in general govern small scale drawings. The Contractor shall compare all drawings and verify the figures before laying out the work and will be responsible for any errors which might have been avoided thereby.

1.10 CHANGES: The Contractor shall be responsible to make and obtain approval for all necessary adjustments in piping, ductwork and equipment layouts as required to accommodate the relocations of equipment and/or devices which are affected by any approved authorized changes or Product substitutions. All changes shall be clearly indicated on the "Record" drawings.

1.11 SUBMITTALS

A. Refer to section 01 33 00 for additional requirements.

B. Submit quantities as required in section 01 33 00.

C. Submit shop drawings, manufacturer's data certificates for equipment, materials and finish, and pertinent details for each system as grouped and referenced by the specification technical section numbers, and obtain approval before procurement, fabrication, or delivery of the items to the job site. Refer to drawings for additional submittal data.

D. Partial submittals are not acceptable and will be returned without review.

E. Include the manufacturer's name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable technical society publication references, and other information necessary to establish contract compliance of each item the Contractor proposes to furnish. Photographs of existing installations and data submitted in lieu of catalog data are not acceptable and will be returned without approval. Mark all options and model numbers with red arrow and tag number corresponding to tag numbers on drawings.
F. Contractor shall be responsible for reviewing and certifying submittals as conforming to the Drawings and Specifications prior to submittal and shall verify conformance of equipment as delivered with final shop submittals, specifications and plans. Contractor shall report to Engineer any deviations prior to initiation of Work. Contractor is responsible for promptly reporting to Engineer any news of late equipment delivery which is likely or certain to delay installation.

G. Sequentially number the transmittal forms. Resubmittals shall have original number with an alphabetic suffix.

H. Identify Cabrillo Community College District Bldg. 600, Project Number, Project Name, Contractor, Subcontractor or supplier, Engineer; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.

I. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

J. Schedule submittals to expedite the Project and comply with time restraints of the General Conditions and Supplemental General Conditions, and deliver to the District. Coordinate submission of related items.

K. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

L. Provide space for Contractor and Engineer review stamps.

M. Revise and resubmit submittals as required, identify all changes made since previous submittal.

N. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

O. Shop Drawings: Drawings shall be a minimum of 8.5 inches by 11 inches in size with a minimum scale of 1/4-inch per foot, except as specified otherwise. Site distribution piping shop drawings shall be a minimum scale of 1”=20’ or larger. Include installation details of equipment indicating proposed location, layout and arrangement, accessories, piping, duct work, and other items that must be shown to assure a coordinated installation. Indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. If equipment is disapproved, revise drawings to show acceptable equipment and resubmit.

P. Manufacturer's Data: For each manufactured item, provide current manufacturer's descriptive literature of cataloged products, certified equipment drawings, diagrams, performance and characteristic curves if applicable, and catalog cuts.
Q. Standard Compliance: When materials or equipment provided by the Contractor must conform to the standards of organizations such as American National Standards Institute (ANSI) or American Water Works Association (AWWA), submit proof of such conformance to the Engineer for approval. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified. In lieu of the label or listing, submit a certificate from an independent testing organization, which is competent to perform acceptance testing and is approved by the District. The certificate shall state that the item has been tested in accordance with the specified organization’s test methods and that the item conforms to the specified organization’s standard.

R. Certified Test Reports: Before delivery of materials and equipment, certified copies of all test reports specified in individual sections shall be submitted for approval.

1.12 PRODUCT ALTERNATIVES OR SUBSTITUTIONS: Refer to General Conditions.

1.13 GUARANTEE

A. Except as may be specified under other sections in the Specifications, guarantee all equipment furnished under the Specifications for a period of one year from date of project acceptance against defective workmanship and material and improper installation. Upon notification of failure, correct deficiency immediately and without cost to the District.

B. Standard warranty of manufacturer shall apply for replacement of parts after expiration of the above period. Manufacturer shall furnish replacement parts to the District for their service agency as directed.

1.14 OPERATION AND MAINTENANCE MANUALS

A. Refer to section 01 78 39 for additional requirements.

B. Format

a. Prepare data in the form of an instructional manual.
b. Binders: Commercial quality, 8-1/2 x 11 inch three-ring binders with hardback, cleanable, plastic covers; one inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
c. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; list title of Project and separate building; identify subject matter of contents.
d. Arrange content by systems and process flow under section numbers and sequence of Table of Contents of this Project Manual.
e. Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
f. Text: Manufacturer’s printed data, or typewritten data on 20 pound paper.
g. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
C. Contents, Each Volume (Provide 4 copies)

a. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of the Engineer, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

b. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

c. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

d. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

e. Type Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

D. Manual For Equipment and Systems

a. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

b. Panelboard Circuit Directories: Provide electrical service characteristics, controls and communications.

c. Include color coded wiring diagrams as installed.

d. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

e. Maintenance Requirements: Include routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

f. Provide servicing and lubrication schedule, and list of lubricants required.

g. Include manufacturer's printed operation and maintenance instructions.

h. Include sequence of operation by controls manufacturer.

i. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

j. Provide control diagrams by controls manufacturer as installed.

k. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

l. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

m. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

n. Additional Requirements: As specified in individual product specification sections.
o. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.15 INSTRUCTION TO DISTRICT PERSONNEL:

A. Provide training as specified in individual sections.

B. Before final inspection, instruct the District’s designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times. Furnish the services of competent instructors to give full instruction to District personnel in the adjustment, operation, and maintenance of systems and equipment, including pertinent safety requirements. Each instructor shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work.

C. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with the District’s personnel in detail to explain all aspects of operation and maintenance.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

F. Submit six copies of Manufacturer’s Instruction Certificates as specified in individual specification Sections.

1.16 MANUFACTURER’S RECOMMENDATIONS: Where installation procedures or any part thereof are required to be in accordance with manufacturer’s recommendations, furnish printed copies of the recommendations prior to installation. Installation of the item shall not proceed until recommendations are received. Failure to furnish recommendations shall be cause for rejection of the equipment or material.

1.17 DELIVERY AND STORAGE: Handle, store, and protect equipment and materials in accordance with the manufacturer's recommendations and with the requirements of NFPA 70B P, Appendix I, titled "Equipment Storage and Maintenance During Construction." Replace damaged or defective items with new items.

1.18 PROJECT RECORD DOCUMENTS

A. Refer to section 01 78 39 for additional requirements. Maintain record documents on site according to section 01 78 39. 1.3.

B. Store Record Documents separate from documents used for construction. Record documents shall be available for review by the Construction Inspector and Engineer at all times.
C. Record information concurrent with construction progress.

D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
   a. Manufacturer’s name and product model and number.
   b. Product substitutions or alternates utilized.
   c. Changes made by Addenda and Modifications.
   d. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
      1. Field changes of dimension and detail.
      2. Details not on original Contract Drawings.

B. All changes and information recorded on the set of prints maintained during the Work shall be neatly drawn and printed on a new set of plans in an orderly and legible manner, using approved permanent materials and methods. Any additional sheets necessary to complete the record drawings shall be provided by the Contractor and shall be of the same size, borderline, titling identification, and media as the record drawings.

C. Submit completed documents (one set of original blueprints and one set of reproducibles) to the District prior to Completion.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 WORK RESPONSIBILITIES

A. The drawings indicate diagrammatically the desired locations or arrangement of ducts, piping, equipment, etc., and are to be followed as closely as possible. Proper judgment must be exercised in executing the work so as to secure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference with structural conditions. The Contractor is responsible for the correct placing of Work and the proper location and connection of Work in relation to the work of other trades. Advise appropriate trade as to locations of access panels.

B. In the event changes in the indicated locations or arrangements are necessary, due
to developed conditions in the building construction or rearrangement of furnishings or equipment, such changes shall be made without extra cost, providing the change is ordered before the ductwork, piping, etc. and work directly connected to same is installed and no extra materials are required.

C. Where equipment is furnished by others, verify dimensions and the correct locations of this equipment before proceeding with the roughing-in of connections.

D. All scaled and figured dimensions are approximate of typical equipment of the class indicated. Before proceeding with any work, carefully check and verify all dimensions, sizes, etc. with the drawings to see that the equipment will fit into the spaces provided without violation of applicable codes.

E. Should any changes to the Work indicated on the Drawings or described in the Specifications be necessary in order to comply with the above requirements, notify the District immediately and cease work on all parts of the contract which are affected until approval for any required modifications to the construction has been obtained from the District.

F. Be responsible for any cooperative work which must be altered due to lack of proper supervision or failure to make proper provisions in time. Such changes shall be under direction of the Engineer and shall be made to his satisfaction.

G. Perform all Work with competent and skilled personnel.

H. All work, including aesthetic as well as mechanical aspects of the Work, shall be of the highest quality consistent with the best practices of the trade.

I. Replace or repair, without additional compensation, any work which, in the opinion of the Engineer, does not comply with these requirements.

END OF SECTION
PART 1 - GENERAL

1.1 DESCRIPTION

This section includes:

A. Testing, adjustment, and balancing of air systems.

B. Measurement of final operating condition of HVAC systems.

1.2 QUALITY ASSURANCE

A. References: This section contains references to the following standards for manufacturer and installation requirements. They are part of this section in their entirety or as specifically modified. In case of conflict between the requirements of this section and following listed documents, the requirements of this section shall prevail.

- AABC National Standards For Total System Balance.
- ADC Test Code For Grilles, Registers, And Diffusers.

B. Perform total system balance in accordance with AABC National Standards for Field Measurement and Instrumentation, Total System Balance or NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

C. Independent Agency: Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum five years documented experience certified by AABC or NEBB.

D. Perform Work under supervision of AABC Certified Test and Balance Engineer or NEBB Certified Testing, Balancing and Adjusting Supervisor experienced in performance of this Work and licensed in the State of California.

E. Sequencing:

1. Sequence work under the provisions of Division 1 General Conditions.
2. Sequence work to commence after completion of systems and schedule completion of work before Substantial Completion of Project.

1.3 SUBMITTALS
A. Submit under provisions of section 230500.

B. Submit name and qualifications of adjusting and balancing agency for approval within 30 days after award of Contract.

C. Field Reports: Submit under provisions of Division 1.

D. Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.

E. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Engineer and for inclusion in operating and maintenance manuals.

F. Provide reports in binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating sensor locations.

G. Include detailed procedures, agenda, sample report forms and copy of AABC National Project Performance Guaranty prior to commencing system balance.

H. Test Reports: Indicate data on AABC National Standards for Total System Balance forms or NEBB forms. Forms shall contain information indicated in Schedules.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

3.1 AGENCIES

A. Associated Air Balance Council (AABC).

B. National Environmental Balancing Bureau (NEBB).

3.2 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place.
15. Service and balance valves are open.

B. Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.

C. Beginning of work means acceptance of existing conditions.

3.3 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.

B. Provide additional balancing devices as required.

3.4 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

C. Outside Air: Adjust min and max control range for demand controlled ventilation to within plus 5% and minus 0%.

3.5 ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
E. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Architect.

3.6 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds. Provide drive and sheave changes required to achieve design airflow at minimum static pressure. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units including filter pressure drops, and total pressure across the fan.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

3.7 SCHEDULES

A. Report Forms: Agency shall compile the following data as outlined below:

1. Title Page:
   a. Name of Testing, Adjusting, and Balancing Agency
   b. Address of Testing, Adjusting, and Balancing Agency
   c. Telephone number of Testing, Adjusting, and Balancing Agency
   d. Project name
   e. Project location
f. Project Architect  
g. Project Engineer  
h. Project Contractor  
i. Report date  

2. Summary Comments:  
   a. Design versus final performance  
   b. Notable characteristics of system  
   c. Description of systems operation sequence  
   d. Summary of outdoor and exhaust flows to indicate amount of building pressurization  
   e. Nomenclature used throughout report  
   f. Test conditions

3. Instrument List:  
   a. Instrument  
   b. Manufacturer  
   c. Model number  
   d. Serial number  
   e. Range  
   f. Calibration date

4. Electric Motors:  
   a. Manufacturer  
   b. Model/Frame  
   c. HP/BHP  
   d. Phase, voltage, amperage; nameplate, actual, no load RPM  
   e. Service factor  
   f. Starter size, rating, heater elements  
   g. Sheave Make/Size/Bore

5. V-Belt Drive:  
   a. Identification/location  
   b. Required driven RPM  
   c. Driven sheave, diameter and RPM  
   d. Belt, size and quantity  
   e. Motor sheave diameter and RPM  
   f. Center to center distance, maximum, minimum, and actual

6. Air Moving Equipment / Furnaces & Return Fans, Make up Air Units  
   a. Location  
   b. Manufacturer  
   c. Model number
d. Serial number
e. Arrangement/Class/Discharge
f. Air flow, specified and actual
g. Return air flow, specified and actual
h. Outside air flow, specified and actual
i. Total static pressure (total external), specified and actual
j. Inlet pressure
k. Discharge pressure
l. Sheave Make/Size/Bore
m. Number of Belts/Make/Size
n. Fan RPM
o. Inlet and outlet temperatures during heating operation

7. Return Air/Outside Air Data:
   a. Identification/location
   b. Design air flow
c. Actual air flow
d. Design return air flow
e. Actual return air flow
f. Design outside air flow
g. Actual outside air flow
h. Return air temperature
i. Outside air temperature
j. Coordinate with controls provider to set minimum outside air positions

8. Fume Exhaust:
   a. Location
   b. Manufacturer
c. Model number
d. Serial number
e. Air flow, specified and actual
f. Total static pressure (total external), specified and actual
g. Inlet pressure
h. Discharge pressure
i. Sheave Make/Size/Bore
j. Number of Belts/Make/Size
k. Fan RPM

9. Duct Traverse:
   a. System zone/branch
   b. Duct size
c. Area
d. Design velocity
e. Design air flow
f. Test velocity
g. Test air flow
h. Duct static pressure  
  i. Air temperature  
  j. Air correction factor

10. Air Distribution Test Sheet:

  a. Air terminal number  
  b. Room number/location  
  c. Terminal type  
  d. Terminal size  
  e. Area factor  
  f. Design velocity  
  g. Design air flow  
  h. Test (final) velocity  
  i. Test (final) air flow  
  j. Percent of design air flow

11. Fume Hood

  a. 12"x12" Grid traverse of face velocity at 18" sash position  
  b. Average of 100 fpm velocity, + 10%, -0%, no readings more than +15% or less than -15% of average value.

B. Equipment Requiring Testing, Adjusting and Balancing:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Air Balance</th>
<th>Hydronic Balance</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
<tr>
<td>Gas Furnaces</td>
<td>X</td>
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</tr>
<tr>
<td>Return Fans</td>
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</tr>
<tr>
<td>Economizer Dampers/Outside Air</td>
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<td></td>
</tr>
<tr>
<td>Air Filters</td>
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<tr>
<td>Air Inlets and Outlets</td>
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<td></td>
</tr>
<tr>
<td>Fume Hoods</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

END OF SECTION
SECTION 23 30 00

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes all systems required for heating, ventilating and air conditioning including but not limited to all air distribution systems and equipment

B. Refer to drawings for equipment specifications.

1.2 QUALITY ASSURANCE

A. References: This section contains references to the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

1. ASTM A36-91 Structural Steel.

2. ASTM A90-81 Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.

3. ASTM A167-92b Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

4. ASTM A525-91 General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

5. ASTM A527-90 Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Lock Forming Quality.


7. NFPA 90B-93 Installation of Warm Air Heating and Air Conditioning Systems.

8. NFPA 91-92 Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying.


10. SMACNA DCS-85 HVAC Duct Construction Standards - Metal and Flexible.

11. CMC California Mechanical Code
B. No variation of duct configuration or sizes permitted except by written permission. Upon written permission size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

C. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

D. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

E. Installer: Company specializing in performing the work of this section with minimum five years documented experience.

F. Construct ductwork to NFPA 90A&B standards. Duct gauges shall conform to CAC Title 24 UMC unless otherwise specified in this section.

G. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

1.3 SUBMITTALS

A. Submit the following under provisions of Division 1:

1. Air Handlers
2. Air diffusers and grilles
3. Ductwork and ductwork specialties including dampers
4. Piping, valves, pipe insulation, pipe supports
5. Venturi air control valves

1.4 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

PART 2 - PRODUCTS

2.1 GENERAL

A. Refer to drawings for equipment and materials not specified herein.
2.2 DUCTWORK MATERIALS AND FABRICATION - SUPPLY, RETURN, OUTSIDE AIR AND GENERAL EXHAUST

A. Materials

1. Galvanized Steel Ducts: ASTM A525 and ASTM A527 galvanized steel sheet G-90 or better, lock-forming quality, chem treat or oil coat. G90 zinc coating shall be in conformance with ASTM A90.

2. Acoustic Type Insulated Flexible Duct: Pre-manufactured duct with galvanized steel wire helix (acoustic flex). Duct shall be pre-insulated to R8.0, UL 181 Listed, CPE liner duct permanently bonded to a coated to spring steel wire helix and supporting a fiberglass insulating blanket. Low permeability outer vapor barrier of fiberglass reinforced film laminate. Install in accordance with listing and Title 24 requirements. Support without kinks or bends. Provide minimum 3 diameters straight duct upstream of diffusers. **Note: Flex duct is only allowed and shall be provided at final connection to supply diffusers and return grills in length of 6' to 8'**. Manufacturers: Thermaflex M-KE or approved equal.

3. Fasteners: Rivets, bolts, or sheet metal screws shall be cadmium plated. Fasteners for stainless steel ductwork shall be stainless steel.

4. Sealant: Non-hardening, water-resistant, fire resistive, compatible with mating materials; liquid used alone or with heavy mastic.

5. Hanger Rod: ASTM A36; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

B. Fabrication

1. All ductwork shall be constructed to meet SMACNA requirements of SMACNA “HVAC Duct Construction Standards - Metal and Flexible” 2005. Unless otherwise indicated, provide duct material, gages, reinforcing, and sealing for operating pressures indicated. Circular ducts shall be spirally seamed.

2. Transverse Joints: Ductmate or WDCI proprietary duct connection systems will be accepted. Ductwork constructed using these systems will refer to the manufacturers guidelines for sheet gauge, intermediate reinforcement size and spacing, and joint reinforcements.

3. TDC/TDF/T-24 shall be constructed as a SMACNA T-24 flange. Use of these joint systems shall be limited as follows:

<table>
<thead>
<tr>
<th>Duct Size</th>
<th>Operating Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 42&quot;</td>
<td>0 - 2&quot; W.G.</td>
</tr>
</tbody>
</table>

4. Longitudinal Seams: Pittsburgh Lock shall be used on all longitudinal seams. All longitudinal seams will be sealed with mastic sealant. Snaplock is not acceptable.

5. Ductboard: Fiberglass ductboard will not be accepted.
6. The Contractor will be required to replace proprietary duct construction and transverse joining systems that are installed without authorization.

7. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide extended trailing edge turning vanes.

8. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

9. Fabricate continuously welded round two gages heavier than duct gages indicated in SMACNA Standard.
   a. Joints: 0" - 20" diameter, interior slip coupling beaded at center, fastened to duct with screws and with sealing compound applied continuously around joint before assembling and after fastening. Wrap joints with 3 inch wide foil backed tape.
   b. Joint 22" - 72" diameter, use 3 piece, gasketed, flanged joints consisting of 2 internal flanges (with integral mastic sealant) split to accommodate minor differences in duct diameter, and one external closure bank designed to compress gasketing between internal flanges. Example: Ductmate Spiralmate or equal.

10. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

2.2 DUCTWORK MATERIALS AND FABRICATION - FUME EXHAUST

A. Materials
   1. Duct, fittings and hardware: 316L Stainless Steel, gauge in accordance with SMACNA requirements.
   2. Gasket: Butyl gasket tape equal to DM 440 manufactured by Ductmate Industries.
   3. Hanger Rod: ASTM A36; 316L stainless steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

B. Fabrication
   1. All ductwork shall be constructed to meet SMACNA requirements of SMACNA “HVAC Duct Construction Standards - Metal and Flexible” 2005. Unless otherwise indicated, provide duct material, gages, reinforcing, and sealing for negative 6” w.c. pressure.
2. Joints: Fully welded (lap or butt welds) including transverse and longitudinal seams. Alternative for transverse joints: Flanged duct connection in accordance with SMACNA Duct Construction Standards 2005
   a. Rectangular: T-22 Alt Companion Angles Figure 2-1. Flanges shall be fully welded along entire perimeter.
   b. Round: Figure 3-1 RT-2A companion flanges (round). Flanges shall be stitch welded along perimeter at 4" intervals.

3. All fasteners, flanges and hardware shall be 316 L stainless steel.

4. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
   a. Pipe Clamps: Figure B-200 Tubing/Pipe Clamp, Figure B-2000 Series clip-in pipe clamps
   b. Strut: B-11, B-22, and B-52, 12 gauge. Size as required for piping load and span.
   c. Structural steel tubes and shapes as specified on details, fully hot-dipped galvanized after cutting and welding. Required field welds and cuts shall be coated with cold galvanizing compound.

2.2 DUCT INSULATION
   a. Insulate supply and return air ducts.
   b. Owens Corning “Soft R” Type 75 Duct Wrap or equal
   c. 1 1/2" thickness, R4.0 installed R-value 25% compression, FRK facing
   d. Seal insulation seams with approved tape for vapor tight seal.

2.3 CONTROL SYSTEM
   a. Refer to drawings for complete description of controls requirements and sequence of operation. Contractor shall verify field conditions prior to ordering of equipment and starting construction. Contractor is responsible for providing all necessary parts, labor, equipment and ancillary components as necessary to provide a complete and fully operational system that meets the sequence of operation.
   b. All wiring shall be in conduit.
   c. Mount new panels, controllers and components in fully accessible locations for easy maintenance and adjustment.
   d. Provide shop drawings for review. Shop drawings shall be complete reference documents and shall include point to point wiring diagrams, component
specifications, sequence of operation, and indication on drawings of locations of components. Provide catalog cutsheets of all equipment and materials to be used on the project.

2.4 ACOUSTIC DUCT LINER

A. 1" thickness (Owens Corning Type R4.2 or equal) unless otherwise noted

B. Shall meet requirements for bacterial and fungi resistance outlined in ASTM test methods G-21, G-22 and C-1338.

C. Install in strict accordance with manufacturer’s instructions and Title 24 requirements.

D. Note that duct size shown is net inside dimension. Sheet metal dimensions shall be 2" larger than size shown to account for liner thickness.

2.5 FLUES

A. Type B vent (pipe and fittings), double wall, 28 ga. galvanized steel outer, aluminum alloy inner. Connect and install in accordance with manufacturer’s instructions and UL listing.

B. Provide UL listed flue termination rain cap. Provide roof jack and flashing in accordance with architectural requirements.

2.6 FIRE/SMOKE DAMPERS:

A. As manufactured by Ruskin or equal. 120v power open, spring closed.

B. Submit complete installation instructions for review by Engineer.

C. Install in accordance with manufacturer’s instructions and UL listing.

D. Coordinate with Division 16 for connection to fire alarm system.

2.7 CONTROL DAMPERS

A. Ruskin CD-60 low leakage, air foil blade control damper or approved equal

B. Less than 3 cfm/sqft leakage at 1” w.c. static pressure

C. 16 ga. frame with concealed linkage

2.8 GAS FURNACES

A. Trane as scheduled on drawings or approved equal (Carrier, Bryant)

B. Must meet all performance and quality requirements of basis of design furnace.
2.9 MAKE UP AIR UNITS

A. Reznor as scheduled.

B. Fully modulating gas valve with supply air temperature controls.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install manufactured ductwork and fittings in accordance with manufacturer's instructions.

B. Install and seal ducts in accordance with SMACNA DCS and SMACNA HVAC Air Duct Leakage Test Manual.

C. Contractor shall verify all dimensions at the site, making all field measurements and shop drawings necessary for fabrication and erection of sheet metal work. Make allowances for beams, pipes and other obstructions in building construction and for Work of other Sections. Check Drawings showing Work of other trades and consult with the University in the event of potential interference.

D. Duct sizes are inside clear dimensions. For lined ducts, maintain sizes inside lining.

E. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

F. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

G. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.

H. Use double nuts and lock washers on threaded rod supports.

I. Fabricate ductwork in a workmanlike manner with airtight joints, presenting smooth surfaces on inside, neatly finished on outside, construct with curves, bends, turning vanes to aid the easy flow of air.

J. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

K. All exposed ductwork and supports shall be primed and painted. All ductwork shall be considered exposed unless concealed in shafts or ceiling spaces. Color to be selected by the College.
L. Provide manual volume damper with locking quadrant at all branch take-offs to

END OF SECTION
SECTION 239000

HVAC SYSTEM CLEANING

PART 1 – SPECIAL PROVISIONS

1.01 Qualification of the HVAC System Cleaning Contractor

A. Membership: The HVAC system cleaning contractor shall be a certified member of the National Air Duct Cleaners Association (NADCA), or shall maintain membership in a nationally recognized non-profit industry organization dedicated to the cleaning of HVAC systems.

B. Certification: The HVAC system cleaning contractor shall have a minimum of one (1) Air System Cleaning Specialist (ASCS) certified by NADCA on a full time basis, or shall have staff certified by a nationally recognized certification program and organization dedicated to the cleaning of HVAC systems.

C. Supervisor Qualifications: A person certified as an ASCS by NADCA, or maintaining an equivalent certification by a nationally recognized program and organization, shall be responsible for the total work herein specified.

D. Experience: The HVAC system cleaning contractor shall submit records of experience in the field of HVAC system cleaning as requested by the Engineer. Bids shall only be considered from firms which are regularly engaged in HVAC system maintenance with an emphasis on HVAC system cleaning and decontamination.

E. Equipment, Materials and Labor: The HVAC system cleaning contractor shall possess and furnish all necessary equipment, materials and labor to adequately perform the specified services.

1. The contractor shall assure that its employees have received safety equipment training, medical surveillance programs, individual health protection measures, and manufacturer’s product and material safety data sheets (MSDS) as required for the work by the U.S. Occupational Safety and Health Administration, and as described by this specification.

2. The contractor shall maintain a copy of all current MSDS documentation and safety certifications at the site at all times, as well as comply with all other site documentation requirements of applicable OSHA programs and this specification.

3. Contractor shall submit to the Owner all Material Safety Data Sheets (MSDS) for all chemical products proposed to be used in the cleaning process.

F. Licensing: The HVAC system cleaning contractor shall provide proof of maintaining the proper license(s), if any, as required to do work in this state. Contractor shall comply with all Federal, state and local rules, regulations, and licensing requirements.

02/01/13
1.02 Standards

A. NADCA Standards: The HVAC system cleaning contractor shall perform the services specified here in accordance with the current published standards of the National Air Duct Cleaners Association (NADCA).

1. All terms in this specification shall have their meaning defined as stated in the NADCA Standards.

2. NADCA Standards must be followed with no modifications or deviations being allowed.

1.03 Documents

A. Mechanical Drawings: The District shall provide the HVAC system cleaning contractor with one copy of the following documents:

1. Project drawings and specifications.

2. Approved construction revisions pertaining to the HVAC system.

3. Any existing indoor air quality (IAQ) assessments or environmental reports prepared for the facility.

PART 2 – HVAC CLEANING SYSTEM SPECIFICATIONS AND PROVISIONS

2.01 Scope of Work

A. Scope: This section defines the minimum requirements necessary to render HVAC components clean, and to verify the cleanliness through inspection and/or testing in accordance with items specified herein and applicable NADCA Standards.

The Contractor shall be responsible for the removal of visible surface contaminants and deposits from within the HVAC system in strict accordance with these specifications.

The HVAC system includes any interior surface of the facility’s air distribution system for conditioned spaces and/or occupied zones as defined and clarified below. This includes the entire heating, air-conditioning and ventilation system from the points where the air enters the system to the points where the air is discharged from the system.

a. Ductwork: Clean all existing supply and return ductwork and air plenums that are to be reused as part of the project. Exhaust ductwork is not required to be cleaned.

b. Equipment: Clean existing return fans. Note that project calls for relining of fans interior
2.02 HVAC System Component Inspections and Site Preparations

A. HVAC System Component Inspections: Prior to the commencement of any cleaning work, the HVAC system cleaning contractor shall perform a visual inspection of the HVAC system to determine appropriate methods, tools, and equipment required to satisfactorily complete this project. The cleanliness inspection should include air handling units and representative areas of the HVAC system components and ductwork. In HVAC systems that include multiple air handling units, a representative sample of the units should be inspected.

The cleanliness inspection shall be conducted without negatively impacting the indoor environment through excessive disruption of settled dust, microbial amplification or other debris. In cases where contamination is suspected, and/or in sensitive environments where even small amounts of contaminant may be of concern, environmental engineering control measures should be implemented.

B. Pre-inspection Report

1. A pre-inspection report shall be submitted documenting existing conditions of systems to be cleaned and including (but not limited to):

   a. Damaged system components found during the inspection shall be documented and brought to the attention of the Owner.

   b. Contractor shall photographically document the existing surface condition of specific points in the system to be compared with photographs taken after cleaning to show success of the cleaning operation. Photographs shall be printed in color and shall clearly show condition of the surface. A variety of system points shall be included in the photo documentation including:

      (i) Ducts (with and without acoustic duct liner)
      (ii) Plenums
      (iii) Inside of air handlers
      (iv) Fan blades

   A minimum of eight (80) photo documentation points shall be included in the pre-inspection report. Locations of photo documentation points shall be indicated on ½ size set of contract drawings which shall be submitted along with pre-inspection report.

C. Site Evaluation and Preparations: Contractor shall conduct a site evaluation, and establish a specific, coordinated plan which details how each area of the building cleaned.

D. Inspector Qualifications: Qualified personnel should perform the HVAC cleanliness inspection to determine the need for cleaning. At a minimum, such personnel should have an understanding of HVAC system design, and experience in utilizing accepted indoor environmental sampling practices, current industry HVAC cleaning procedures,
and applicable industry standards.

2.03 General HVAC System Cleaning Requirements

A. Containment: Debris removed during cleaning shall be collected and precautions must be taken to ensure that debris is not otherwise dispersed outside the HVAC system during the cleaning process.

B. Particulate Collection: Where the Particulate Collection Equipment is exhausting inside the building, HEPA filtration with 99.97% collection efficiency for 0.3-micron size (or greater) particles shall be used. When the Particulate Collection Equipment is exhausting outside the building, Mechanical Cleaning operations shall be undertaken only with Particulate Collection Equipment in place, including adequate filtration to contain debris removed from the HVAC system. When the Particulate Collection Equipment is exhausting outside the building, precautions shall be taken to locate the equipment down wind and away from all air intakes and other points of entry into the building.

C. Controlling Odors: Measures shall be employed to control odors and/or mist vapors during the cleaning process.

D. Component Cleaning: Cleaning methods shall be employed such that all HVAC system components must be Visibly Clean as defined in applicable standards (see NADCA Standards). Upon completion, all components must be returned to those settings recorded just prior to cleaning operations.

E. Air-Volume Control Devices: Dampers and any air-directional mechanical devices inside the HVAC system must have their position marked prior to cleaning and, upon completion, must be restored to their marked position.

F. Service Openings: The contractor shall utilize service openings, as required for proper cleaning, at various points of the HVAC system for physical and mechanical entry, and inspection.

1. Contractor shall utilize the existing service openings already installed in the HVAC system where possible.

2. Other openings shall be created where needed and they must be created so they can be sealed in accordance with industry codes and standards.

3. Closures must not significantly hinder, restrict, or alter the airflow within the system.

4. Closures must be properly insulated to prevent heat loss/gain or condensation on surfaces within the system.

5. Openings must not compromise the structural integrity of the system.

6. Construction techniques used in the creation of openings should conform to
requirements of applicable building and fire codes, and applicable NFPA, SMACNA and NADCA Standards.

7. Cutting service openings into flexible duct is not permitted. Flexible duct shall be disconnected at the ends as needed for proper cleaning and inspection.

8. All service openings capable of being re-opened for future inspection or remediation shall be clearly marked and shall have their location reported to the Owner in project report documents.

G. Ceiling sections (tile): The contractor may remove and reinstall ceiling sections to gain access to HVAC systems during the cleaning process.

H. Duct Systems. Contractor shall:

1. Create service openings in the system as necessary in order to accommodate cleaning of otherwise inaccessible areas.

2. Mechanically clean all duct systems to remove all visible contaminants, such that the systems are capable of passing Cleaning Verification Tests (see NADCA Standards).

2.04 Health and Safety

A. Safety Standards: Cleaning contractors shall comply with applicable federal, state, and local requirements for protecting the safety of the contractor’s employees, building occupants, and the environment. In particular, all applicable standards of the Occupational Safety and Health Administration (OSHA) shall be followed when working in accordance with this specification.

B. Occupant Safety: No processes or materials shall be employed in such a manner that they will introduce additional hazards into occupied spaces.

C. Disposal of Debris: All debris removed from the HVAC System shall be disposed of in accordance with applicable federal, state and local requirements.

2.05 Mechanical Cleaning Methodology

A. Source Removal Cleaning Methods: The HVAC system shall be cleaned using Source Removal mechanical cleaning methods designed to extract contaminants from within the HVAC system and safely remove contaminants from the facility. It is the contractor’s responsibility to select Source Removal methods that will render the HVAC system Visibly Clean and capable of passing cleaning verification methods (See applicable NADCA Standards) and other specified tests, in accordance with all general requirements. No cleaning method, or combination of methods, shall be used which could potentially damage components of the HVAC system or negatively alter the integrity of the system.
1. All methods used shall incorporate the use of vacuum collection devices that are operated continuously during cleaning. A vacuum device shall be connected to the downstream end of the section being cleaned through a predetermined opening. The vacuum collection device must be of sufficient power to render all areas being cleaned under negative pressure, such that containment of debris and the protection of the indoor environment are assured.

2. All vacuum devices exhausting air inside the building shall be equipped with HEPA filters (minimum efficiency), including hand-held vacuums and wet-vacuums.

3. All vacuum devices exhausting air outside the facility shall be equipped with Particulate Collection including adequate filtration to contain Debris removed from the HVAC system. Such devices shall exhaust in a manner that will not allow contaminants to re-enter the facility. Release of debris outdoors must not violate any outdoor environmental standards, codes or regulations.

4. All methods require mechanical agitation devices to dislodge debris adhered to interior HVAC system surfaces, such that debris may be safely conveyed to vacuum collection devices. Acceptable methods will include those, which will not potentially damage the integrity of the ductwork, nor damage porous surface materials such as liners inside the ductwork or system components.

B. Methods of Cleaning Fibrous Glass Insulated Components

1. Fibrous glass thermal or acoustical insulation elements present in any equipment or ductwork shall be thoroughly cleaned with HEPA vacuuming equipment, while the HVAC system is under constant negative pressure, and not permitted to get wet in accordance with applicable NADCA and NAIMA standards and recommendations.

2. Cleaning methods used shall not cause damage to fibrous glass components and will render the system capable of passing Cleaning Verification Tests (see NADCA Standards).

C. Damaged Fibrous Glass Material

1. Evidence of damage: If there is any evidence of damage, deterioration, delaminating, friable material, mold or fungus growth, or moisture such that fibrous glass materials cannot be restored by cleaning or resurfacing with an acceptable insulation repair coating, they shall be identified for replacement.

2. Replacement: When requested or specified, Contractor must be capable of remediating exposed damaged insulation in air handlers and/or ductwork requiring replacement.

3. Replacement material: In the event fiber glass materials must be replaced, all materials shall conform to applicable industry codes and standards, including those of UL and SMACNA. Refer to duct liner specifications in these documents.
D. Antimicrobial Agents and Coatings

1. Antimicrobial agents shall only be applied if active fungal growth is reasonably suspected, or where unacceptable levels of fungal contamination have been verified through testing.

2. Application of any antimicrobial agents used to control the growth of fungal or bacteriological contaminants shall be performed after the removal of surface deposits and debris.

3. When used, antimicrobial treatments and coatings shall be applied in strict accordance with the manufacturer’s written recommendations and EPA registration listing.

4. Antimicrobial coatings shall be applied according to the manufacturer’s written instructions. Coatings shall be sprayed directly onto interior ductwork surfaces, rather than “fogged” downstream onto surfaces.

2.06 Cleanliness Verification

A. General: Verification of HVAC System cleanliness will be determined after mechanical cleaning and before the application of any treatment or introduction of any treatment-related substance to the HVAC system, including biocidal agents and coatings.

B. Visual Inspection: The HVAC system shall be inspected visually to ensure that no visible contaminants are present.

1. If no contaminants are evident through visual inspection, the HVAC system shall be considered clean; however, the owner reserves the right to further verify system cleanliness through Surface Comparison Testing or the NADCA vacuum test specified in the NADCA standards.

2. If visible contaminants are evident through visual inspection, those portions of the system where contaminants are visible shall be re-cleaned and subjected to re-inspection for cleanliness at no cost to the owner.

3. NADCA vacuum test analysis should be performed by a qualified third party experienced in testing of this nature.

4. Contractor shall arrange to have personnel on-site to open access doors to hidden system components during the inspection by the Owner or the Owner’s representative.

C. Verification of Coil Cleaning

1. Cleaning must restore the coil pressure drop to within 10 percent of the pressure drop measured when the coil was first installed. If the original pressure drop is not known, the coil will be considered clean only if the coil is free of foreign matter and...
chemical residue, based on a thorough visual inspection (see NADCA Standards).

2.07 Pre-existing System Damage

A. It is the Contractor’s responsibility to bring to the attention of the owner any pre-existing system damage prior to work on that part of the system.

B. Contractor shall receive approval of the owner prior to starting repair or replacement of unforeseen pre-existing conditions.

2.08 Post-project Report

A. At the conclusion of the project, the Contractor shall provide a report to the owner indicating the following:

1. Success of the cleaning project, as verified through visual inspection and/or gravimetric analysis.

2. Areas of the system found to be damaged and/or in need of repair.

3. Photographic evidence of cleanliness of components of the system. Photographs shall be printed in color and shall clearly show condition of the surface. As a minimum, the locations shall coincide exactly with those photographs taken and presented in the pre-inspection report. A variety of points shall be documented with photographs including:
   a. Ducts (with and without acoustic duct liner)
   b. Plenum rooms

2.09 Applicable Standards and Publications:

A. The following current standards and publications of the issues currently in effect form a part of this specification to the extent indicated by any reference there to:


02/01/13


END OF SECTION
BASIC ELECTRICAL MATERIALS AND METHODS
SECTION 26 00 01

PART 1 - GENERAL

1.1 WORK INCLUDED

A. BASIC ELECTRICAL MATERIALS AND METHODS consists of furnishing transportation, labor, materials, and equipment to perform electrical work.

1.2 RELATED WORK

A. Section 26 05 19 - 600 VOLT OR LESS RATED WIRING SYSTEM
B. Section 26 05 33 - RACEWAYS AND BOXES
C. Section 26 05 34 - OUTLET, JUNCTION, AND PULL BOXES
D. Section 26 50 00 - LIGHTING

1.3 REFERENCES

A. American National Standards Institute (ANSI)
B. American Society for Testing and Materials (ASTM International)
C. California Electrical Code
D. Factory Mutual (FM)
E. Insulated Cable Engineers Association (ICEA)
F. Institute of Electrical and Electronics Engineers (IEEE)
G. National Electrical Manufacturers Association (NEMA)
H. National Fire Protection Association (NFPA)
I. Underwriters Laboratories (UL)

1.4 SUBMITTALS

A. Complete list of materials and equipment proposed for use in the Project prior to purchase and installation of materials or equipment.

1. Submittals shall include manufacturer's names and material descriptions or equipment identification such as styles, types, and catalog numbers. Submittal data shall show published ratings or capacity data, detailed equipment drawing for fabricated items, panel diagrams, wiring diagrams, installation instructions and other pertinent data. Where literature is submitted covering a group or series of similar items, clearly indicate or identify the applicable items.

B. Review of materials shall be based on the manufacturer's latest published data.
C. Prior to start of construction, submit to the Engineer proposed equipment layout drawings for each equipment room or area containing items of equipment furnished under Division 16. Layout drawings shall consist of plan view of room, to scale, showing projected outlines of equipment, complete with dotted indication of all required clearances including those needed for removal of service. Indicate location of conduit and pullboxes.

D. Project Records:
   1. The make and model of all equipment installed shall be indicated on the Record Drawings.

1.5 QUALITY ASSURANCE

A. Provide at the job site, a full time quality assurance person with minimum 5 years of electrical construction experience. This person shall lay out on plans the installation of electrical equipment, conduit alignments, terminations, wiring, and work pertaining to electrical construction, which shall be used by the electricians for field installations.

1.6 MAINTENANCE

A. Spare Parts: Deliver the following spare parts to Engineer and obtain receipts. Submit at same time as operating instructions.
   1. Spare fuses: 2 sets for each size combination fused breaker.
   2. Spare fuses for low voltage fused switch: two sets for each size used.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and equipment to be installed shall be standard catalogued products of companies regularly engaged in the manufacture of such products, UL listed, and meet the requirements of the California Electrical Code. The products shall be the latest standard designs that conform to the Drawings unless otherwise called out.

B. Equipment and devices of the same rating shall be new and interchangeable. Fixtures and fittings of one class shall be of the same manufacturer and model.

C. Materials and equipment shall have NEMA rating appropriate to the area where it is installed.

2.2 ENCLOSURES

A. Indoor: NEMA 1

B. Outdoor: NEMA 3R raintight.

C. Switch enclosures shall be clearly marked for maximum voltage, current, and horsepower rating.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Perform work in conformance with City, National Board of Fire Underwriters regulations, regulations of the Industrial Safety Commission of the State of California and any other legally constituted regulating authority having jurisdiction.

B. Avoid penetrating existing roof decks wherever possible in locating and routing new electrical equipment.

3.2 EMPTY CONDUITS

A. Provide a pull tape in each empty conduit for future use. Secure tape at both ends and provide with a minimum of 5 feet of slack.

B. Pull tape shall be a woven multi-fiber polyester ribbon with a minimum width of 3/8-inch. Tape shall be permanently printed with the rated tensile strength (1250 pounds minimum) and sequential footage markings.

C. Pull tape shall be in one continuous length without any cuts or ties.

D. Identify each tape at the end of each line.

3.3 FIELD QUALITY CONTROL

A. Compliance Test:

1. Conduct tests at portions of the installation as may be necessary to ensure full compliance with Drawings and Specifications. Perform tests in presence of the Owner's Representative. Costs of tests shall be borne by Contractor. Provide instruments, equipment, labor, and materials to complete tests. Tests may be required on any item between installation of work and end of one year warranty period. Should tests detect defective materials, poor workmanship, or variance with requirements of Specifications, Contractor shall make changes necessary and remedy defects at no additional cost to the Owner.

B. System Acceptance:

1. Request for final review prior to system acceptance after:

   a. Completion of installation of systems required under the Contract Documents.

   b. Submission and acceptance of operating and maintenance data.

   c. Completion of identification program.

2. Acceptance is contingent upon the following:

   a. Completion of final review and correction of deficiencies.

   b. Satisfactory completion of acceptance tests which demonstrate compliance with performance and technical requirements of Contract Documents.
c. Submission of manuals and drawings required by Contract Documents.

3.4 CLEAN-UP

A. Upon completion and at other times during the progress of the work, remove surplus materials, rubbish and debris resulting from the work.

END OF SECTION
600 VOLT OR LESS RATED WIRING SYSTEM
SECTION 26 05 19

PART 1 - GENERAL
1.1 WORK INCLUDED
A. 600 VOLT OR LESS RATED WIRING SYSTEM consists of furnishing transportation, labor, materials, and equipment to install 600 volt or less rated copper wire and cable.

1.2 RELATED WORK
A. Section 26 00 01 - BASIC ELECTRICAL MATERIALS AND METHODS

1.3 REFERENCES
A. California Electrical Code
B. Underwriters Laboratories, Incorporated (UL)

PART 2 - PRODUCTS
2.1 MATERIALS
A. Wire and Cable:
   1. Provide 600 volt or less rated low voltage wire and cable with conductors of soft-drawn annealed copper. Unless otherwise noted on Drawings, 600 volt or less rated wire No. 8 AWG and larger shall be stranded and No. 10 AWG and smaller shall be solid.
   2. Wire and cable insulation shall be Type THWN/THHN (75 degrees C wet or dry), single conductor, for general use as branch circuits and control wiring. No. 12 AWG minimum for branch circuits.

B. Connectors and Terminals:
   1. For connectors sizes No. 10 AWG and smaller, make splices and terminal connections using one or two-piece insulated crimp-type wire joints, splices and terminals manufactured by one of the following:
      a. Burndy Engineering Company ("Hylugs" and Hylinks")
      b. Ideal Industries, Incorporated (connectors, terminals, and the like.)
      c. Thomas & Betts ("Sta-Kons")

C. Use ring-tongue lugs on strap-screw device terminals. Do not use crimping tools not specifically designed for the application.

D. For conductor sizes No. 8 AWG and larger, make splices, taps, and terminal connections using cast or machined high-conductivity copper alloy connectors of the circular clamp type with multiple socket-head cap screws manufactured by T & B, OZ Electrical Manufacturing Company, Incorporated, Types "L", "LM", "TW", "TWC", "T", "TC". Except
where insulated covers are provided, fill voids and irregularities on connections with "Scotchfill" insulation putty and cover with 2 half-lapped layers of Scotch No. 88 insulating tape and 1 half-lapped layer of friction tape.

E. Wire Pulling Lubricants:

1. Provide wire pulling lubricants in accordance with the following schedule:
   a. Jacket Manufacturer and Type
   b. Polyethylene Burndy "Al Bentonite"
   c. Other (except asbestos) Ideal "Yellow 77"

F. Ties:

1. Conductor ties shall be T and B "Ty-Raps".
2. In lieu of "Ty-Raps" in lighting and receptacle panelboards, Panduit Corporation Type "B" 33 mm wide and 76 mm deep may be used.

2.2 IDENTIFICATION

A. Color Coding:

1. Provide color coding consistent with existing building color coding.

Insulated Equipment ground - Green

2. For insulations and jackets not manufactured by the selected vendor with integral colors, use Scotch No. 35 color-coding tape on each conductor entering every bow, trough, cabinet, and wireway and at intervals not exceeding 5 feet in wireways, trench duct, and other locations where conductors are continuously accessible.

B. Conductor Identification:

1. Other than color-coding, identify conductor with panel and circuit number and additional numbering systems shown on Drawings. Identify circuits by means of numbered tape markers.
PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Do not pull wire or cable through box fitting or enclosure where change of raceway alignment or direction occurs.
2. Do not cut strands from conductors to fit lugs or terminals.
3. Do not bend conductors to less than recommended radius.
4. Use temporary guides, sleeves, rollers and other hardware to protect cable from excess tension or abrasion during installation.

B. Wiring in Enclosures:

1. Form and tie conductors in panelboards, cabinets, control panels, wireways and wiring troughs, providing circuit and conductor identification, using T & B "Ty-Raps" of appropriate size and type.
2. Limit spacing between ties to 6 inches and provide circuit and conductor identification at least once in each enclosure.
3. In lieu of using "Ty-Raps" in lighting and receptacle panelboards, Contractor may install Panduit Corporation, Type "B" Panduct in gutter spaces with clearance between "Panduct" and circuit breakers, using hardware, covers, and fittings.

END OF SECTION
WIRING
SECTION 26 50 24

PART 1 GENERAL
1.1 WORK INCLUDED

A. WIRING DEVICES consists of furnishing design, transportation, labor, materials and
equipment to manufacture, transport, and install electrical receptacles, interrupters, surge
suppression units, switches, and plates including, but not limited to:

1. Single and duplex receptacles, ground fault circuit interrupters, and integral surge
suppression units.
2. Single and double pole snap switches and dimmer switches.
3. Device wall plates.
4. Floor service outlets, poke through assemblies, service poles, and multioutlet
assemblies.
5. Accessories required for a complete installation.

1.2 Related work
A. 26 05 33 - Raceways and Boxes for Electrical Systems

1.3 References
A. Same as 1.2 above.

1.4 SUBMITTALS
A. Product Data: Technical data for each type of product indicated.
B. Shop Drawings: List of legends and description of materials and process used for
premarking wall plates.
C. Samples: For each type of device and wall plate specified, in each color specified.
D. Field quality control test reports.

1.5 QUALITY ASSURANCE
A. Regulatory Requirements:
   1. Electrical Components, Devices, and Accessories: Listed and labeled as defined
      in NFPA 70, Article 100, by a testing agency acceptable to authorities having
      jurisdiction, such as Underwriters Labs, and marked for intended use.
   2. Comply with NFPA 70 in all aspects.

PART 2 PRODUCTS
2.1 Materials
A. Manufacturers:
1. Wiring Devices:
   b. Cooper Wiring Devices.

2. Multioutlet Assemblies:
   d. Hubbell Incorporated; Wiring Device-Kellems.
   e. Wiremold / Legrand.

B. Receptacles:
   1. Straight Blade Type Receptacles: Comply with NEMA WD 1, NEMA/ANSI WD 6, DSCC W-C-596G, and UL 498.
   2. Straight Blade and Locking Receptacles: Heavy-Duty grade.
   3. Straight Blade Receptacles: Hospital grade.
   4. GFCI Receptacles: Straight blade, nonfeed through type, Hospital grade, with integral NEMA/ANSI WD 6, Configuration 5-20R duplex receptacle; complying with UL 498 and UL 943. Design units for installation in a 2-3/4 inch deep outlet box without an adapter.

C. Switches:
   2. Snap Switches: Heavy Duty grade, quiet type.
   3. Dimmer Switches: Modular, full wave, solid state units with integral, quiet on/off switches and audible frequency and EMI/RFI filters.
      f. Control: Continuously adjustable slider; with single-pole or 3-way switching to suit connections.
      g. Fluorescent Lamp Dimmer Switches: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming with low end not greater than 20 percent of full brightness.

D. Wall Plates: Single and combination types to match corresponding wiring devices.
   1. Plate Securing Screws: Metal with head color to match plate finish.
   2. Material for Finished Spaces: Smooth, high impact thermoplastic 0.04 inch.

2.2 FINISHES

A. Color:
   1. As selected by Engineer unless otherwise indicated on Drawings or required by NFPA 70.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies level, plumb, and square with building lines.

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B. Install wall dimmers to achieve indicated rating after derating for ganging.
C. Install unshared neutral conductors on line and load side of dimmers.
D. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
E. Remove wall plates and protect devices and assemblies during painting.
F. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION
   A. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.3 CONNECTIONS
   A. Ground equipment according to California Electrical Code.

3.4 FIELD QUALITY CONTROL
   A. Perform field tests and inspections and prepare test reports:
      1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements.
      2. Test GFCI operation with both local and remote fault simulations conforming to manufacturer's written instructions.
   B. Remove malfunctioning units, replace with new units, and retest as specified in A.2 above.

END OF SECTION
RACEWAYS AND BOXES
SECTION 26 05 33

PART 1 - GENERAL

1.1 WORK INCLUDED
A. RACEWAYS AND BOXES consists of furnishing transportation, labor, materials, and equipment to furnish and install conduit raceways and fittings.

1.2 RELATED WORK
A. Section 26 00 01 - BASIC ELECTRICAL MATERIALS AND METHODS

1.3 REFERENCES
A. American National Standards Institute (ANSI)
B. American Society for Testing and Materials (ASTM International):
   ASTM 90 Standard Test Method for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
C. California Electrical Code.
D. National Electrical Manufacturers Association (NEMA)

1.4 SUBMITTALS
A. Submit catalog cuts of conduit products, accessories, and fittings.

PART 2 - PRODUCTS

2.1 RIGID GALVANIZED STEEL CONDUIT
A. Couplings, fittings, and adapters shall be of the same materials and size as the conduit.
B. Zinc Coating:
   1. Galvanized steel conduit, bends, and couplings shall be coated by the hot dip process. Other processes, such as metal spray, high zinc coatings, and cold galvanizing, can not be substituted for hot-dipped galvanizing, either in whole or in part.
   2. Galvanizing shall be applied to produce a smooth, uniform coating with no flaws or thin spots.
   3. The weight of zinc coatings shall not be less than 1.0 ounce per square foot on the outside and 1.0 ounce per foot of zinc on the inside of the conduit, conduit bends, and couplings.
   4. The determination of the weight of zinc coating shall be done in accordance with ASTM A90.
5. The conduit after galvanizing shall be uniformly pliable and free from brittleness. When a sample is bent to a semi-circle with an inner radius of six times normal internal diameter, the steel shall not crack, the welded joints shall not open, nor the zinc coating crack, flake, or be removable by rubbing with the bare fingers.

2.2 ELECTRIC METALLIC TUBING (EMT)

A. Couplings, fittings, and adapters shall be of the same material and size as the conduit.

B. Flexible conduits shall be an approved type and shall be spanned by a bonding assembly meeting Code requirements.

C. Zinc coating requirements: Refer to Paragraph 2.1, (D) of this Section.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Install conduit raceways in a neat and orderly manner. Raceways shall run true and be aligned plumb vertically and horizontally. Fasteners shall be factory designed and supports installed at spacing prescribed in California Electrical Code.

2. Conduits shall be cut square and rigid galvanized steel joint shall be painted with a rust resisting paint. Fittings shall be factory-approved, and 1 1/4 inch els and larger shall be factory els. Set screw fittings on EMT shall be restricted to 1 inch conduit or smaller; compression fittings on 2 inch or larger.

3. Branch circuits and feeders are shown schematically on Drawings. Provide conduits with junction boxes, condulets, expansion fittings, els, and supports as required by California Electrical Code. Routing of conduit shall be field engineered unless otherwise noted on Drawings.

4. Conduit sizes indicated or specified on the wiring diagram and floor plans on Drawings are for copper conductors in steel conduit without a grounding conductor.

5. Where conduit home runs to panels are grouped and exposed, coordinate the exact routing of the hanger system with the Engineer.

6. Install conduit in compliance with the California Electrical Code and in the following manner:

Concealed in Finished Areas: EMT with set screw fittings or compression fittings.

Conduits shall be flashed and sealed at locations where the conduit pierces exterior walls or roofs.

Install conduit trapeze hangers with 3/8 inch rod minimum and supported by thru-bolts at roof structural members. Lag screws not allowed.
Provide grounding conductor in all conduits. Conduits are sized on Drawings for metallic conduit and copper cables. Increase conduit capacity if required.

B. Rigid Galvanized Steel:

1. Exercise care in bending conduit to prevent damage to the conduit.

2. The radius of the curve of the inner edge of a field bend shall not be less than six times the internal diameter of the conduit. The internal diameter of the conduit at the bend shall not be reduced.

3. A run of conduit between box and box, between fitting and fitting, or between box and fitting shall not contain more than the equivalent of four 90 degree bends (360 degrees total), in compliance with Code requirements.

4. End of conduit shall be reamed to remove rough edges and where a conduit enters a box or other fittings. Use approved hot-dipped galvanized bushing and locknut to protect the wire from the abrasion unless the design of box and fitting accomplishes the equivalent purposes.

5. Install conduit as a complete, continuous system, mechanically and electrically connected to boxes and fittings. Connect boxes and fitting to provide electrical continuity.

6. Conduit shall be jointed with approved couplings and unions. Right angle bends, offsets and change-in-direction bends shall be made with hickey or power bends, standard elbows, conduit fittings or pull boxes. Conduit runs shall be uniform and symmetrical.

7. Cleaning: Conduit runs shall be cleaned and swabbed to remove foreign matter and moisture prior to pulling in wire or cable. Boxes in which conduits terminate shall be cleaned of foreign matter.

C. Electrical Metallic Tubing (EMT):

1. Exercise care in bending conduit to prevent damage to the conduit.

2. The radius of the curve of the inner edge of a field bend shall not be less than six times the internal diameter of the conduit. The internal diameter of the conduit at the bend shall not be reduced.

3. A run of conduit between box and box, between fitting and fitting, or between box and fitting shall not contain more than the equivalent of four 90 degree bends (360 degrees total), in compliance with California Electrical code requirements.

4. Terminations of conduit shall be reamed where a conduit enters a box and other fittings and to remove rough edges.

5. Continuous runs shall be installed as a complete, continuous system, mechanically and electrically connected to boxes and fittings. Boxes and fittings shall be connected to provide electrical continuity.

6. Coupling and unions shall be joined with approved couplings and unions. Right angle bends, offsets and change-in-direction bends shall be made with hickey or power bends.
power bends, standard elbows, conduit fittings or pull boxes. Conduit runs shall be uniform and symmetrical

7. Conduit runs shall be cleaned and swabbed to remove foreign matter and moisture prior to pulling in wire to cable. Boxes in which conduits terminate shall be cleaned of foreign matter.

END OF SECTION
PART 1 - GENERAL

1.1 WORK INCLUDED
   A. LIGHTING consists of furnishing transportation, labor, materials, and equipment to furnish and install lighting fixtures, lamps, ballasts, and seismic restraints.

1.2 RELATED WORK
   A. Section 26 00 01 - BASIC ELECTRICAL MATERIALS AND METHODS

1.3 REFERENCES
   A. American Standards Institute (ASI)
   B. Certified Ballast Manufacturers (CBM)
   C. California Electrical Code (LAEC)
   D. Electrical Testing Laboratory (ETL)
   E. State of California - Title 24 (T24)
   F. Underwriters Laboratories, Incorporated (UL).

1.4 SUBMITTALS
   A. Manufacturer’s catalog sheets of standard fixtures, indicating materials, dimensions, supports, standard finishes available, weights and approval of fixtures from a recognized testing laboratory approved by the Authority Having Jurisdiction.
   B. Pictures or cuts of lighting fixtures, with distribution curves and complete photometric data.
   C. Manufacturer’s catalog sheets indicating input and load electrical characteristics, ambient temperature rating, noise level rating, mounting methods, and U.L. listing for use with required lamps.

PART 2 - PRODUCTS

2.1 MATERIALS
   A. Fixtures shall be standard products of the fixture manufacturers, approved, and bear the label of the Underwriters’ Laboratories. Fixture types shall be as indicated on Drawings.
   B. Diffusers: Plastic diffusers or lenses shall be 100 percent pure virgin acrylic, unless otherwise specified.
   C. Complete units and electrical components for fluorescent, incandescent, and special fixtures shall meet requirements of recognized testing laboratory approved by the Authority Having Jurisdiction. Do not place labels on fixtures at locations where installation of unit labels is
D. Ballasts for fluorescent fixtures shall be electronic rapid-start type capable of operating T8-32 watt rapid-start lamps at full light output with minimum input watts. All fluorescent lamps other than 32 watt rapid start shall be operated by the most energy-efficient ballast available. Ballasts shall be Class P equipped with automatic resetting thermal protectors built in adjacent to the transformer coils. Ballasts shall be Electrical Testing Laboratory (ETL) tested and Certified Ballast Manufacturers (CBM) certified. Ballasts shall meet applicable American Standards Institute (ASI) and (UL) specifications regarding reliable starting, radio interference, dielectric and sound ratings. Ballasts shall be high power factor; voltages shall be as specified in the fixture schedule. Provide a 3-year written warranty for materials and labor on ballasts. Provide ballasts as required for switching as indicated on Drawings.

E. Lamps:

1. Fluorescent lamps shall be rapid start type. Lamps shall be warm white, except as noted and shall have minimum rating of 3000 lumens. Lamps shall be T8. Length of lamps as shown on drawings. Four foot lamps shall be low energy type, 35 watts as manufactured by General Electric or Sylvania.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install fixtures level, plumb, and in line on outlets and connected to the wiring, ready for operation. Assemble fixtures with screw and nuts tight, and parts securely mounted. Provide additional parts, wire, screws, nuts, washers, locknuts, bushings or required structural supports to make fixture installation complete, safe, and substantial. Parts, including paint and finish, shall be clean and undamaged.

B. Fixtures installed in gypsumboard ceilings or plaster soffits shall be provided with metal frames. Fixtures shall be compatible with type of ceiling.

C. Do not install louvers, diffusers, or lenses in lighting fixtures until glazing has been completed and construction work involving plastering, grinding, sanding, painting, and final clean-up sweeping and dusting have been completed.

D. Clean reflector surfaces and lamps in lighting fixtures prior to installation of louvers, diffusers, or lenses.

E. Fixture Supports: Fluorescent fixtures shall have minimum of 2 supports per 4-foot fixture, 1 near each end, fastened directly to structural members; method of installation shall be approved. Fixtures shall be grounded by fastening to outlet box fixtures stud or conduit connection to fixture.

F. Stems for pendant fixtures shall have approved swivel hanger and canopy at the ceiling.

G. At time of final observation, ballasts and lamps shall have been installed and in operating condition. Remove faulty lamps and replace with new lamps as approved by the Engineer.
3.2 CLEANING
   A. Clean lamps after installation.

3.3 TESTING
   A. Run a complete burn test for the light fixtures and lamps installed for a duration of 5 days continuously. Repeat test for early burn outs. If premature lamp failure occurs, replace the lamp at no cost to the Department and retest the fixture. Notify the Owner 5 calendar days prior to start of burn test.

END OF SECTION